AUSTRALIAN MARINE RESEARCH IN PROGRESS:

GREAT BARRIER REEF REGION 1985-1986

Great Barrier Reef Marine Park Authority
Research Publication

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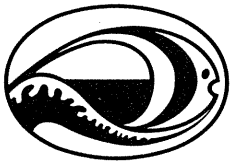

Great Barrier Reef Marine Park Authority

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Contents

INTRODUCTION

The Great Barrier Reef Marine Park Authority, with the assistance of the CSIRO Information Resources Unit, has produced this update of the computer–based information system on Australian Marine Research in Progress (AMRIP) for the Great Barrier Reef Region only.

Australian Marine Research in Progress (AMRIP) is a database designed to assist in coordinating the further development in Australia of marine research. It has been developed to encourage the flow of information between individual researchers and research organizations and also to provide the basis for more effective cooperation and coordination between researchers and the users of research in industry and Government. The further development of the database should assist researchers to design projects which complement ongoing research and to identify areas of research which are not being addressed.

It is proposed that the database will be updated annually. A special hard copy edition for the Great Barrier Reef Region will be published each year.

Management of the AMRIP database is currently coordinated by the Australian Institute of Marine Science with the cooperation of the Commonwealth Scientific and Industrial Research Organization (CSIRO), Great Barrier Reef Marine Park Authority (GBRMPA) and the Victorian Institute of Marine Sciences (VIMS).

The summaries of marine research projects contained in AMRIP are based directly on information provided by researchers and research organizations. These summaries have been edited only to meet uniform style and presentation standards. No responsibility can be taken for the accuracy of information supplied by contributors.

The Authority thanks the researchers and research organizations who submitted information for inclusion in this update.

Graeme Kelleher
Chairman

How to use this Directory

The main body of this Directory consists of a numbered series of "Project Summaries". Each summary contains all the information about the project substantially as contributed by the organization carrying out the research.

Within each subject class, the project summaries are arranged in alphabetical order of main responsible organization and project title.

The summaries are arranged in groups under subject classes. A complete list of AMRIP's Subject Classification Scheme follows this section.

The summaries are numbered sequentially and these entry numbers are used in the various indexes to refer to particular project summaries. Cross–references refer the reader to entries in other subject categories which may also be of interest. Since each project summary is printed only once (in the most pertinent subject class) these cross–references may be quite important in locating all relevant information.

Although the summaries are most self–explanatory, the user should be aware of the following points:

- *summaries which have been highlighed by an asterisk following the entry number, are identical to those of the previous edition, i.e. no response from the responsible organization was received concerning those projects
- *where information under "Period" is absent or incomplete, this reflects the information provided by the contributor; the absence of a completion date often indicates that the project will be continued indefinitely
- *in cases where the sole Project Leader of the project is also the Contact Officer for the project, his name is shown only once under the Project Leader heading
- *where the Contact Officer given is one of the previously listed Project Leaders, his telephone number and other information are not repeated
- *the "Co–ordination with other projects" does not normally include references to co–ordination with projects conducted by the same project leaders or department/organization

The "Project Summaries" section is followed by a number of indexes. In all of these indexes the numbers refer to project summary numbers and not page numbers.

- *The "Subject Index" is the key index in AMRIP. Each entry in the database is indexed by up to five descriptors (key words or phrases). All of these descriptors are used as lead terms in the (permuted) subject index.
- *The "Organization Index" contains entries for all organizations and private researchers responsible for projects included in the Directory. Titles only are printed in entry number order.
- *The "Project Leader/Contact Officer Index" enables the reader to check on the total involvement of particular project leaders and contact officers before approaching the contact officer regarding a project of particular interest.
- *The "Locality Index" contains the location of the marine area concerned. This information was obtained directly from the contributors.

The Directory also contains a manually compiled Glossary of Abbreviations, and a list of Geographic Area Codes. These aids are located just before the Project Summaries Section.

Subject Classification Scheme – Main Classes

Techniques and Equipment
Physical Sciences
Biomedical Sciences
Social Sciences
Fisheries and Aquaculture
Engineering
Resource Management
Operations
Cartographic Materials

Detailed Subject Classes

Techniques and Equipment
- Data management and manipulation
- Cartography and charting
- Navigation
- Miscellaneous

Physical Sciences
- General
- Oceanography
- Chemistry
- Meteorology and climatology
- Geology
- Oil, gas and mineral exploration

Biomedical Sciences
- General
- Microbiology
- Taxonomy
- Botany
- Algal taxonomy
- Taxonomy of plants other than algae
- Zoology
- Invertebrate taxonomy
- Vertebrate taxonomy
- Physiology
- Ecology
- Checklists
- Medicine

Social Sciences
- General
- Anthropology and archaeology
- Biography
- History
- Economics
- Law and legislation
- Recreation and tourism
- Education

Fisheries and Aquaculture
- General
- Resources
- Operations
- Products, processing and marketing

Engineering
- General
- Electrical engineering and communications

Glossary of Abbreviations

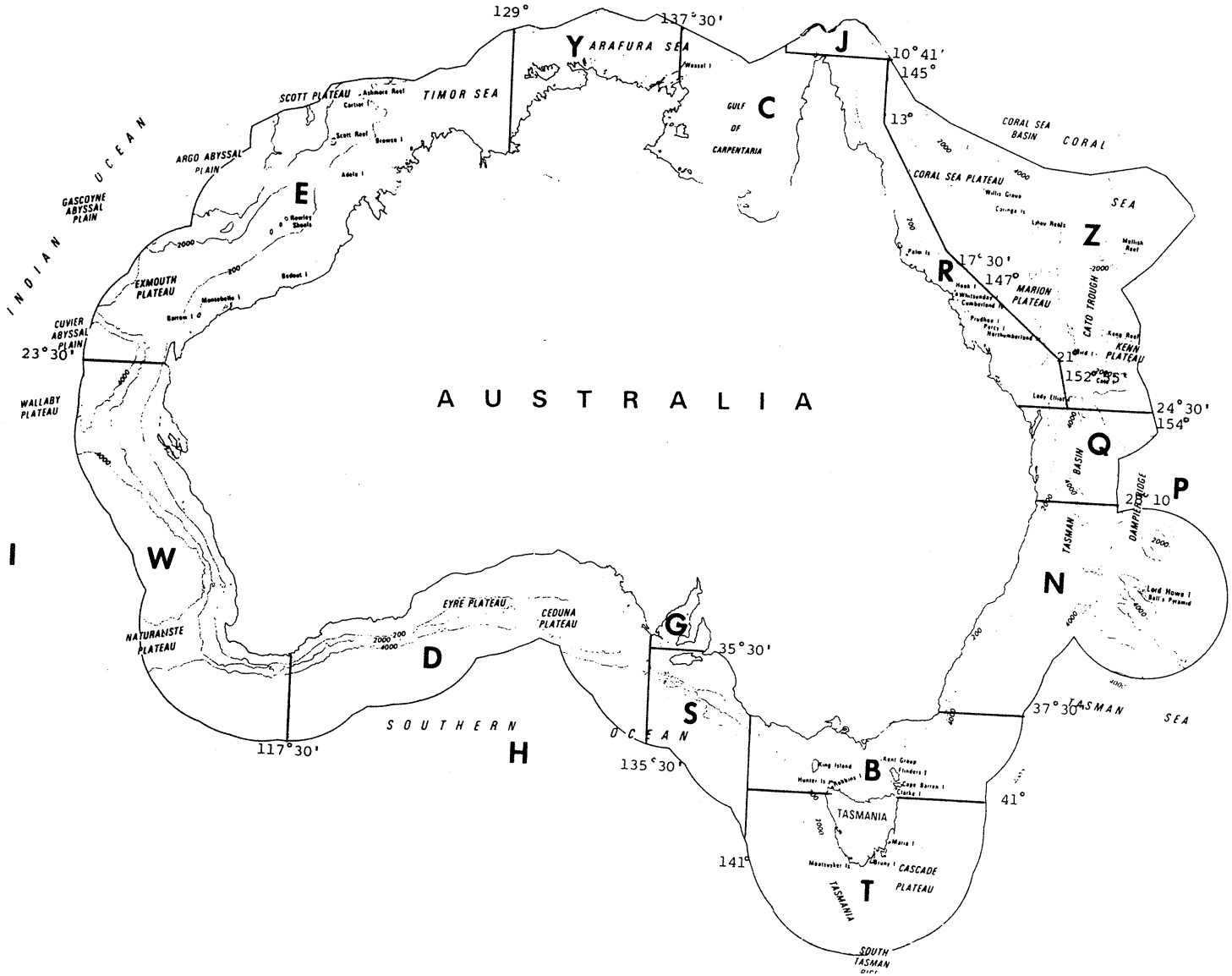
ABRS	—	Australian Biological Resources Study
AMSTAC–FAP	—	Australian Marine Sciences and Technologies Advisory Committee – Funding Advisory Panel
AIMS	—	Australian Institute of Marine Science
ARGS	—	Australian Research Grants Scheme
BMR	—	Bureau of Mineral Resources, Geology and Geophysics
BRIAN	—	Barrier Reef Image Analysis System
CSIRO	—	Commonwealth Scientific and Industrial Research Organization
DAIA	—	Department of Aboriginal and Islander Affairs
d.w.t.	—	Dead weight tons
FAO	—	Food and Agricultural Organization (of the United Nations)
FIBEX	—	First International BIOMASS Experiment
FIRTA	—	Fishing Industry Research Trust Account
FRG	—	Federal Republic of Germany
GBR	—	Great Barrier Reef
GBRC	—	Great Barrier Reef Committee
GBRMPA	—	Great Barrier Reef Marine Park Authority
HF	—	High–frequency
IOC	—	Intergovernmental Oceanographic Commission
IR	—	Infra–red
LNG	—	Liquid natural gas
NOAA	—	National Oceanic and Atmospheric Administration
OTH	—	Over–the–Horizon
PCB	—	Polychlorinated biphenyls
RAN	—	Royal Australian Navy
R.V.	—	Research Vessel
Scuba	—	Self–contained underwater breathing apparatus
SST	—	Sea Surface Temperature
UNESCO	—	United Nations Educational, Scientific and Cultural Organization
VIMS	—	Victorian Institute of Marine Sciences
VIMSIS	—	Victorian Institute of Marine Sciences Information System
XRF	—	X–ray fluorescence (spectrometry)

GEOGRAPHIC AREA CODES

The 200 mile Australian Fishing Zone has been used as the basis for defining geographic area for AMRIP. The map opposite shows how the codes have been assigned.

Codes

- B Bass Strait — southern limit 41°S, coast of Tasmania, 143°30'E, 148°30'E, coast of Victoria
- G South Australian Gulfs
- D Great Australian Bight
- S Other South Australian waters
- W South–west Australia
- E North–west Australia
- Y Northern Territory except Gulf of Carpentaria
- C Gulf of Carpentaria
- J Torres Strait — 10°41'S, 141°20'E, 145°E and outer border of Torres Strait protected zone
- R Great Barrier Reef — outer limit defined by GBRMPA act
- Z Coral Sea
- Q Other Queensland waters
- N New South Wales
- T Other Tasmanian waters
- H Southern Ocean
- V Antarctica — south of 60°S
- P Pacific Ocean
- I Indian Ocean
- A Australia — everywhere within 200n mile AFZ limit
- O Worldwide excepting areas above
- X Not applicable


AUSTRALIA
INDIAN OCEAN
ARAFURA SEA
TIMOR SEA
GULF OF CARPENTARIA
CORAL SEA BASIN
CORAL SEA PLATEAU
CORAL SEA
SCOTT PLATEAU
ARGO ABYSSAL PLAIN
GASCOYNE ABYSSAL PLAIN
CUVIER ABYSSAL PLAIN
EXMOUTH PLATEAU
WALLABY PLATEAU
NATURALISTE PLATEAU
EYRE PLATEAU
CEDUNA PLATEAU
MARION PLATEAU
CATO TROUGH
KENN PLATEAU
LORD HOWE RISE
TASMAN BASIN
DAMPIER RIDGE
TASMAN SEA
SOUTHERN OCEAN
TASMANIA
CASCADE PLATEAU
SOUTH TASMAN RISE
129°
137°30'
10°41'
145°
13°
17°30'
147°
21°
152°55'
24°30'
154°
23°30'
35°30'
37°30'
141°
135°30'
117°30'
41°
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1* Geographic information system for the Great Barrier Reef.

July 1984 – June 1987

ORGANIZATIONS:

CSIRO
Division of Information Technology
GPO Box 1800,
Canberra, ACT 2601

Great Barrier Reef Marine Park Authority
P.O. Box 1379,
Townsville, Qld. 4810

PROJECT LEADERS:

Dr D.J. Abel (077) 794855
Dr J.L. Smith (062) 433 260
Mr W. Wallace (077) 818811 (GBRMPA)

CONTACT OFFICER:

Dr D.J. Abel

EXPENDITURE:

$105,000 (this year), $320,000 (all years)

MANPOWER:

1.20 (this year), 4.00 (all years)

EXTERNAL SUPPORT:

GBRMPA – $29,000 (Access to data; evaluation of systems.)

MSTGS – $21,000

OBJECTIVES

To:
1. Develop technology for integrated spatial and formatted databases;
2. Implement the techniques as enhancements of relational database management systems;
3. Develop a geographic information system meeting GBRMPA needs;
4. Assess that system.

METHODOLOGY

The project involves analysis of computational geometry problems, development of algorithms, implementation of a spatial preprocessor and integration of database and graphics facilities.

STATUS

A prototype system for databases of point data has been completed. Construction of a browsing system with interactive colour graphics input and output and permitting freely–specified locations is underway. This has been designed to be used with an arbitrary set of attribute data held in an ORACLE database.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Data acquisition/Data processing/Information retrieval/

[CSIRO–073]

2 Marine Research and Management Information System (MARAMIS).

January 1986 –

ORGANIZATION:

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

PROJECT LEADER:

Dr W. Craik (077) 818811

OBJECTIVE

To produce a current list of marine research and management programs for the south–east Asian region.

METHODOLOGY

Development and distribution of questionnaires on current programs in marine research and management.

STATUS

Development of form design has commenced.

GEOGRAPHIC REGIONS: R,P

MAJOR DESCRIPTORS: Data acquisition/Data collections/Information retrieval/Research programmes/ Resource management/

[GBRMPA136]

3* Bathymetric mapping programme – Great Barrier Reef.

July 1979 –

ORGANIZATION:
Department of Resources and Energy
Division of National Mapping
P.O. Box 31
Belconnen, A.C.T. 2616

PROJECT LEADER:
Mr P.W. O'Donnell (062) 525180

CONTACT OFFICER:
Mr B.H. Willington (062) 525169

MANPOWER:
6.00 (this year), 24.00 (all years)

OBJECTIVE
To produce a National Bathymetric Map Series at 1:250 000 scale of the continental shelf of Australia and its Territories.

METHODOLOGY
Radio position fixing systems, echosounders and bottom mounted tide recorders are used to provide soundings, tide corrected to mean sea level, in order to prepare contour maps of the sea floor at 10 metre contour intervals.

STATUS
Refer map sales leaflet number 6.

CO-ORDINATION WITH OTHER PROJECTS
BMR Project .009 is conducted in conjunction with this programme.

GEOGRAPHIC REGION: R
SHIP TIME REQUIREMENTS: TSMV "Febrina" – 90 days
MAJOR DESCRIPTORS: Bathymetric surveys/Bottom topography/Charting/

[DNDE—002]

4 Mapping of Cairns and Cormorant Pass sections of the Great Barrier Reef.

January 1984 – December 1986

ORGANIZATION:
Queensland Department of Mapping and Surveying
P.O. Box 1425
G.P.O. Brisbane, Qld 4001

PROJECT LEADERS:
Mr M. Lambert (07) 224 5864
Mr A.J. Wheeler (07) 224 4720

CONTACT OFFICER:
Mr M. Lambert

EXPENDITURE:
$449,700 (all years)

EXTERNAL SUPPORT:
Queensland Coordinator General – $300,000

OBJECTIVE
To map 37 islands and cays at scales of 1:1000, 1:2500 or 1:5000. Maps to be used for recreation, administrative and environmental purposes.

METHODOLOGY
Major control to be established using Doppler translocation; minor control using Tellurometer and Theodolite. Tide gauge readings will allow conversion of vertical datum to lowest astronomical tide. Compilation of mapping will involve photogrammetry with contour interval appropriate to map scale. Acquisition of new colour photography will facilitate a colour or B/W photographic background as appropriate.

STATUS
Field work is complete for all 37 islands but some control identification remains for 2 islands.
Contouring is complete for 34 islands.
Cartography is complete or in hand for 32 islands.
Advance copy repromat of 22 islands has been forwarded to the Co-ordinator General.

GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Islands/Cays/Mapping/

[QDMS—005]

5 Overall mapping program for Great Barrier Reef.

January 1986 –

ORGANIZATION:
Queensland Department of Mapping and Surveying
PO Box 1425
Brisbane, Qld 4001

PROJECT LEADERS:
Mr A. Sparks (07) 2245796
Mr A.J. Wheeler (07) 2244720

CONTACT OFFICER:
Mr A. Sparks

EXTERNAL SUPPORT:
Coordinator General

OBJECTIVES

1. To map the whole of the Great Barrier Reef area at 1:100,000 to provide line maps suitable for administrative planning and zoning of Reef areas in cooperation with the Great Barrier Reef Marine Park Authority.
2. Features to be shown are dryland areas (islands and cays), approximate drying areas, reef drop off and underwater reefal platforms and shoals
3. The present national mapping format for 1:100,000 scale (30° lat x 30° long) is to be used.

METHODOLOGY

Reefal details will be derived from precision processed Landsat imagery.
Underwater reef/shoal shapes will be determined from large format shuttle imagery and from air photographs.
Linework from imagery will be interpreted by the Department and digitized by private consultants.

STATUS

Project at planning stage

CO-ORDINATION WITH OTHER PROJECTS

Data in the Cairns area will be included in a pilot project to demonstrate the advantages of a land information system.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Mapping/Reefs/

[QDMS—006]

6* Cairns North Hydrographic survey.

September 1984 – December 1986

ORGANIZATION:
Royal Australian Navy
Hydrographic Office,
P.O. Box 1332,
North Sydney, N.S.W. 2061

PROJECT LEADER:
Commanding Officer, HMAS Flinders

CONTACT OFFICER:
Lieutenant Commander G.J. Bond (02) 9254804

OBJECTIVE

To conduct a modern hydrographic survey at the 2 way shipping route and other selected areas of Great Barrier Reef waters between Low isles and Lizard I.

METHODOLOGY

Scale of survey 1:50 000 and larger in some areas. Horizontal control by Argo DM54 and Mini Ranger tied into the Aust. Map Grid. Vessels employed will be HMAS Flinders, HMAS Betano and one 10M survey boat.

STATUS

Surveying of the 'inner route' to modern standards has been an on–going programme for the RAN since the 1960's. The section between Low Isles and Lizard I is the last area (used by large vessels) which relies on old colonial surveys (1888 in this case).
Away from the shipping route the Barrier Reef Is, to all intents and purposes, unsurveyed.

LOCALITIES: Low Isles; Lizard Island

GEOGRAPHIC REGION: R

SHIP TIME REQUIREMENTS: 252

MAJOR DESCRIPTORS: Hydrographic surveys/Surveying/

[RANRL–008]

See also: 17*

7 Manta tow handbook.

March 1985 –

ORGANIZATION:
Bull, Mr G.
C/– Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

PROJECT LEADER:
Mr G. Bull (077) 818811

CONTACT OFFICER:
Ms S. Driml

EXPENDITURE:
$3,000 (this year), $3,000 (all years)

MANPOWER:
0.25 (this year), 0.25 (all years)

OBJECTIVE

To prepare a manuscropt for a handbook outlining the manta tow survey technique. The handbook will be of use in training and in field surveys where it will assist standardization of methods.

METHODOLOGY

Preparation of a manuscript, review by experts in the technique and field trial of the draft handbook.

STATUS

Manuscript complete. Publication proposed for 1986–87.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Manuals/Equipment/Towed sensors/

[GBRMPA142]

8 Analysis of spectrographic data of coral reef and coastal features, and water masses in the Great Barrier Reef Marine Park.

August 1984 –

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

CSIRO
Division of Water and Land Resources
GPO Box 1666
Canberra ACT 2601

PROJECT LEADERS:
Mr D.van.R Claasen (077) 818811
Dr D.L.B. Jupp (062) 464911
Dr D. Kuchler

CONTACT OFFICER:
Mr D.van.R Claasen

EXPENDITURE:
$36,000 (this year), $36,000 (all years)

EXTERNAL SUPPORT:
MSTGS – $55,700

OBJECTIVES

To determine the extent to which computer analysis of satellite and airborne, remotely sensed image data, such as CZCS, LANDSAT MSS and AVHRR, can be used to delineate productive areas of the Great Barrier Reef.

To determine the spectral reflectances of coral reef, coastal and water mass features within the Marine Park.

To establish a spectral data bank for coral reef and coastal system features for use with remotely sensed data as a base for feature interpretation and resource inventory and monitoring purposes.

METHODOLOGY

A pilot study to ascertain the potential of computer analysis of CZCS and LANDSAT data for Great Barrier Reef Region feature delineation was completed in July, 1984. This project involves the direct surface measurement of reflectance values of selected features and will link the results to airborne and satellite scanner data as a preliminary "signature" bank for those features. Field measurements involving handheld and fixed spectrometers are being taken during 1986. The results will be assessed and applied to preprocessed and appropriately formatted remotely sensed data tapes. Adjustments will be effected during the process and the spectral signature bank developed during the final phase of the project.

STATUS

Remotely sensed data tapes have been preprocessed and formatted. The period to June 1986 to be used for field measurement and consultation.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Coral reefs/Oceanographic data/Remote sensing/Spectral analysis/

[GBRMPA113]

9* **Techniques for underwater photogrammetry using simple cameras.**

May 1979 –

ORGANIZATIONS:

University of Newcastle
Department of Civil Engineering and Surveying
Newcastle, N.S.W. 2308

Australian Institute of Marine Science
Cape Ferguson,
PMB3, MSO,
Townsville, Qld. 4810

Hunter District Water Board
Survey Section
P.O. Box 5171B
Newcastle West, N.S.W. 2302

PROJECT LEADERS:

Dr J.G. Fryer (049) 685628
Mr M.H. Elfick (049) 685507
Dr T. Done (077) 789211
Mr A Pearson (049) 20461

CONTACT OFFICER:

Dr J.G. Fryer

EXTERNAL SUPPORT:

ARGS – $30,000

OBJECTIVE

To develop photogrammetric techniques for measurement of underwater objects and for mapping underwater features using non–metric cameras.

METHODOLOGY

Examine distortion characteristics of underwater cameras such as the NIKONOS 3.
Examine error propagation in stereo pairs of underwater photography.
Develop techniques for control of blocks of underwater stereo photos.
Develop standard mapping techniques using both underwater and very low level aerial photography.
Develop measurement techniques using a small analytical stereoplotter designed specifically for 35mm photography.
Examine methods of "through–water" photogrammetry.
Examine methods of "through–water" photogrammetry.

GEOGRAPHIC REGIONS: N,R

MAJOR DESCRIPTORS: Photogrammetry/Charting/Underwater photography/Error analysis/

[UNINEW002]

10 Australian shoreface project.

January 1986 – December 1988

ORGANIZATION:
University of Sydney
Coastal Studies Unit
Department of Geography
Sydney, NSW 2006

PROJECT LEADER:
Dr A.D. Short (02) 9693625, 3880

EXTERNAL SUPPORT:
MSTGS – $20,400 (1986)

OBJECTIVE

To empirically develop a series of shore face models capable of producing spatial and temporal variations in Australian sandy shorefaces through the range of wave and tide regimes and sediment combinations.

METHODOLOGY

To achieve these aims field experiments will be conducted in micro, meso and macro tidal sites to investigate the following:
1. Morphology – spatial and temporal variability. 2. Hydrodynamics – waves, tides, currents. 3. Sediment dynamics. 4. Sediment properties. 5. Bedforms. 6. Primary structures and shallow stratigraphy. 7. In and epi fauna. 8. Facies. 9. Modern shore face evolution.

STATUS

First field experiment in eastern Port Phillip January – February 1986

CO-ORDINATION WITH OTHER PROJECTS

University of Melbourne – Department of Geography (1986). Victorian Geological Survey – Marine Models Laboratory (1986)

GEOGRAPHIC REGIONS: R,Q,N,B,G,E,Y,C

SHIP TIME REQUIREMENTS: 20 days

MAJOR DESCRIPTORS: Coasts/Models/Geomorphology/Hydrodynamics/Stratigraphy/

[UNISYD103]

11* Collaborative flow modelling study of the Great Barrier Reef.

December 1983 – December 1986

ORGANIZATIONS:

Australian Institute of Marine Science
P.M.B. 3,
Townsville, Qld 4810

James Cook University of North Queensland
Department of Civil and Systems Engineering,
Townsville, Qld 4811

Great Barrier Reef Marine Park Authority
P.O.Box 1379,
Townsville, Qld 4810

PROJECT LEADERS:

Dr J.C. Andrews (077) 789211
Dr L. Bode (077) 814111
Mr G. Kelleher (077) 818811

CONTACT OFFICER:

Dr J.C. Andrews

EXPENDITURE:

$165,000 (this year), $350,000 (all years)

OBJECTIVES

1. To construct and validate numerical models of barotropic and baroclinic flows on the Queensland continental Shelf and slope, initially in central Great Barrier Reef Region.
2. To use models for understanding of fluid dynamics of central Great Barrier Reef Region and advection and dispersion in interior and boundary layers.
3. To use models to predict ocean response to environmental forcing.

METHODOLOGY

Analysis of tidal data, modification and establishment of James Cook University barotropic model, evaluation of baroclinic model, collection of appropriate field data for models and inclusion in model runs for objectives outlined above.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Fluid dynamics/Mathematical models/Water circulation/Oceanographic data/

[AIMS—006]

12 Installation of tide gauges: collaborative research.

January 1985 –

ORGANIZATIONS:

Australian Institute of Marine Science
PMB 3
MSO Townsville Qld 4810

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

Bureau of Meteorology
PO Box 1289K
Melbourne Vic 3001

James Cook University of North Queensland
Department of Civil and Systems Engineering

PROJECT LEADERS:

Dr J.C. Andrews (077) 789211
Mr I.M. Dutton (077) 818811
Mr T. Savory (03) 6694496
Dr L. Bode (077) 814111

CONTACT OFFICER:

Mr I. Dutton

EXPENDITURE:

$20,000 (this year), $42,000 (all years)

OBJECTIVE

To purchase and install tide gauges to monitor tides in the Great Barrier Reef Region and to gather long term tidal data in the Western Pacific in association with the Westpac program.

METHODOLOGY

Collaborative installation and monitoring of tide gauges.

STATUS

Tide gauges purchased and installed.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Tides/Measuring devices/Oceanographic data/

[AIMS—011]

13 Paleoenvironmental records in massive corals.

ORGANIZATION:
Australian Institute of Marine Science
PMB No 3
Townsville MC Qld 4810

PROJECT LEADER:
Dr. P. Isdale (077) 789211

CONTACT OFFICER:
Dr J.T. Baker (077) 789211

OBJECTIVES

Sub–Project 1. Growth and calcification in 10–30 year old corals from AIMS transect reefs.
Task 1. Cross– shelf growth and calcification
Task 2. Nature of density bands in corals
Sub–Project 2. Growth and calcification in 500 year old corals from the Great Barrier Reef
Task 3. Interannual density variation and ENSO events.
Sub–Project 3. Fluorescent banding in corals
Task 4. Measurement of terrestrial inputs to the inshore shelf region using fluorescent bands in porites.
Task 5. Biogeochemical analysis of fluorescence in massive corals. (New).
Sub–project 4. Other records in coral cores.
Task 6. Red Bands (New).
Task 7. Stable isotope studies. (New)
Task 8. Carbon 14 variation on the Great Barrier Reef in the last 500 years (New)
Task 9. Multi–annual fluorescence from outer reef cores. (New)
Task 10. Radiometric validation (New)

GEOGRAPHIC REGION: R

SHIP TIME REQUIREMENTS: 40 days

MAJOR DESCRIPTORS: Coral reefs/Core analysis/Environmental factors/Palaeoceanography/ Biogeochemistry/

[AIMS—009]

14* Wave data collection along the Queensland coastline.

April 1974 –

ORGANIZATION:
Beach Protection Authority
G.P.O. Box 2195,
Brisbane, Qld 4001

PROJECT LEADER:
Mr H.V. MacDonald (07) 2278253

CONTACT OFFICER:
The Secretary (07) 2278254

OBJECTIVE

To collect data on wave heights and periods along the Queensland coastline for use in investigations into coastal processes or other specific projects.

METHODOLOGY

Data from a waverider buoy are recorded four times per day by a shore based receiver. Each record is analysed to produce routine and spectral wave parameters. Further analysis of the routine data can then be undertaken to give percentage exceedance persistence and return interval statistics.

GEOGRAPHIC REGIONS: R,Q

MAJOR DESCRIPTORS: Wave measurement/Data acquisition/Wave spectra/

[QLDBPA014]

15 Automated measurement of nutrients in seawater and multielement analysis at sediment–water interfaces.

January 1977 –

ORGANIZATION:
CSIRO
Division of Oceanography
GPO Box 1538
Hobart Tas 7001

PROJECT LEADER:
Dr D. Airey (02) 5250137

EXPENDITURE:
$25,000 (this year), $300,000 (all years)

MANPOWER:
1.50 (this year), 19.50 (all years)

OBJECTIVES

To understand the behaviour and supply of nutrient elements in eddies of East Australian Current, Coral Sea, Great Barrier Reef and anoxic basins in estuaries.
To undertake pollution studies in estuaries.

METHODOLOGY

Continuous profiling water sampler for nutrients under development.

STATUS

Exploration of eddies completed; data being analysed
Five channel autoanalyzer for nutrient analysis (silicate, nitrate, nitrite, ammonia, phosphate) now available on RV 'Franklin'
Exploration of Coral Sea completed; data being analysed
Surveys of trace metal speciation in Port Hacking estuary published
Survey of multielement speciation in anoxic hole completed
Upwelling of nutrients onto Great Barrier Reef almost complete to publication
Dr Airey to leave CSIRO in March 1986 for Eco Logic Environmental Research and Services.

CO-ORDINATION WITH OTHER PROJECTS

Dr J.D. Smith of Marine Chemistry group at University of Melbourne sampled in anoxic basin for arsenic and iodine species. Dr J. Middleton of Department of Mathematics, University of NSW–exploration of nutrients entering Hydrographer's Passage. Dr M. Tomczak, University of Sydney– development of profiling nutrient water sampler.

GEOGRAPHIC REGIONS: G,Z,Q,N,R

MAJOR DESCRIPTORS: Nutrients/Eddies/Automated recording/Environmental pollution/Estuaries/

[CSIRO–106]

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16 Coastal circulation due to alongshore pressure gradients.

ORGANIZATIONS:

CSIRO
Division of Oceanography,
CSIRO Marine Laboratories,
G.P.O. Box 1538,
Hobart, Tas. 7001

University of New South Wales
Oceanography Group,
Mathematics Department,
P.O. Box 1,
Kensington, N.S.W. 2033

PROJECT LEADERS:

Dr J.A. Church (002) 206207
Dr J.H.F. Middleton (02) 6972222

CONTACT OFFICER:

Dr J.A. Church

EXTERNAL SUPPORT:

MSTGS – $27,628 ((1985))

OBJECTIVE

To determine the role the alongshelf pressure gradients and winds play in circulation in the Great Barrier Reef lagoon.

METHODOLOGY

Pressure gradients will be measured at the coast, mid shelf and the shelf edge by the means of pressure gauges. Bureau of Meteorology wind data will be used to calculate the windstress. Currents will be measured across the lagoon.

STATUS

The experimental phase is now complete and analysis is proceeding.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Oceanographic data/Coastal currents/Hydrology/

[CSIRO–074]

17* Airborne laser bathymetry.

January 1975 –

ORGANIZATIONS:
Defence Science and Technology Organisation
Electronics Research Laboratory,
G.P.O. Box 2151,
Adelaide, S.A. 5001

Royal Australian Navy Hydrographic Service
Defence Department,
Russell Offices A–3–12,
Canberra, A.C.T. 2600

PROJECT LEADERS:
Mr M.F. Penny (08) 2596290
Captain J. Myres (062) 655009

CONTACT OFFICER:
Mr M.F. Penny

OBJECTIVE

To develop an airborne laser depth sounding system suitable for hydrographic survey in shallow coastal waters. To survey at a rate of 50 km^2/hour from an aircraft flying at 70 m/sec with a 10 m spacing between soundings. To cover the depth range of 2 to 30 m in average coastal waters but with a capability of measuring to 50 m. To develop data processing methods for systematic analysis of large volumes of data and reduction to a scale suitable for chart production.

METHODOLOGY

The development programme required two experimental systems to be built, these were known as WRELADS I and II. The latter installed in a RAAF DC3 aircraft, has completed a 550 hour test flight programme. Emphasis was placed initially on optimising hardware and this was followed by exhaustive performance and accuracy investigations over a calibrated range in Gulf St Vincent. WRELADS II was also evaluated in North Queensland coastal waters and briefly off Fremantle in Western Australia.

STATUS

The requirement for the system, as set by the RAN, have been met. A large data bank has been established and processing methods developed and validated. The R&D Programme is almost completed. Hardware designs have been documented and processing algorithms specified. This documentation with other contributions will define an operational system for NAVY. This system has been designed for Fokker Friendship installation and is known as LADS.

LOCALITIES: Gulf St Vincent; Fremantle

GEOGRAPHIC REGIONS: G,W,R

MAJOR DESCRIPTORS: Lasers/Bathymetric surveys/Aerial surveys/Hydrographic surveys/Data processing/

[DSTO—003]

18 Vertical and cross shelf structure of the tidal streams of the central Great Barrier Reef.

February 1985 – February 1987

ORGANIZATIONS:
Flinders University of South Australia
School of Earth Sciences
Bedford Park, SA 5042

Australian Institute of Marine Science
PMB No3
Townsville, Qld 4810

PROJECT LEADERS:
Prof G.W. Lennon (08) 2752298
Dr J.C. Andrews (077) 789211 (AIMS)
Mr C.R. Steinberg (08) 2752657

CONTACT OFFICER:
Prof G.W. Lennon

OBJECTIVE

To obtain detailed observations of the tidal ellipses across the continental shelf and slope at various positions in the water column. The transect is from Cape Cleveland through magnetic passage to Myrmidon Reef on the shelf break. Analytical models are to be employed for interpretations of the hydrodynamics.

METHODOLOGY

Five moorings, each with up to 4 current meters, have been deployed for 6 months. 5 pressure sensing tide gauges have also been placed either side of the mooring transect in order to measure the pressure gradients.

STATUS

The experimental plan was concluded in December 1985 and initial harmonic analysis was completed in January 1986

LOCALITIES: Magnetic Passage; Myrmidon Reef; Cape Cleveland

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Tidal currents/Hydrodynamics/Oceanographic data/Continental shelf/

[FLINDE021]

19 Drift card study of Great Barrier Reef surface currents.

January 1981 – June 1986

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
P.O. Box 1379
Townsville, Qld 4810

James Cook University of North Queensland
(Subcontract)
Department of Marine Biology,
Post Office, James Cook University,
Townsville, Qld 4811

PROJECT LEADERS:

Dr W. Craik (077) 818811
Dr J.D. Collins (077) 814111

CONTACT OFFICER:

Ms C. Dalliston (077) 818811

EXPENDITURE:

$67,040 (all years)

OBJECTIVES

To produce an integrated picture of drift over the Great Barrier Reef Lagoon.
To establish correlations between drift and wind patterns.

METHODOLOGY

A total of 80,000 drift cards released over an 18 month period through the Great Barrier Reef Region by coastwatch aircraft. Data obtained for drift cards and wind data for the estimated period of drift were analysed by computer to obtain drift patterns.

STATUS

Report submitted to GBRMPA.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Wind–driven currents/Drift cards/Oceanographic data/

[GBRMPA035]

20 Influence of coral reefs on wave attenuation and circulation.

June 1986 – December 1986

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

Royal Military College
Duntroon ACT 2600

PROJECT LEADERS:

Dr W. Craik (077) 818811
Dr I. Young

CONTACT OFFICER:

Ms C. Dalliston (077) 818811

EXPENDITURE:

$3,200 (this year), $3,200 (all years)

OBJECTIVE

To determine the mechanism of wave attenuation by coral reefs, develop wave prediction techniques and determine the effectiveness of the reef as a water circulation barrier.

METHODOLOGY

Deployment of an array of wave and current measurement instruments across the reef and subsequent detailed analysis of data.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Coral reefs/Water waves/Hydrodynamics/Water circulation/

[GBRMPA130]

21* Evaluation of river mixing processes.

January 1983 – December 1986

ORGANIZATION:
James Cook University of North Queensland
Physics Department
Post Office
Townsville, Qld 4811

PROJECT LEADER:
Dr M.L. Heron (077) 814111

EXPENDITURE:
$22,000 (all years)

MANPOWER:
4.00 (all years)

EXTERNAL SUPPORT:
MSTGS – $22,000

OBJECTIVE
To understand the interactions between freshwater flood plumes and the lagoon water of the Great Barrier Reef in terms of currents driven by flood–plume momentum and buoyancy, and winds and tides.

METHODOLOGY
The two–station coastal ocean surface radar system is being deployed in Bowling Green Bay and Halifax Bay during Burdekin floods to observe surface current velocities. CTD transects and profiles are being used to map salinity gradients. The second phase of the project applies the same techniques in the Johnstone River outflow.

STATUS
Hardware for the two–station COSRAD system is operational and the software allows automatic surface–current mapping. Preliminary observations have been made at all sites. Software development on a different project during 1984 is now available to track Lagrangian trajectories.

CO–ORDINATION WITH OTHER PROJECTS
Australian Institute for Marine Science study of inshore circulation in Bowling Green Bay by observations and numerical modelling. Schedules for observation are being coordinated and some logistics shared.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: River plumes/Coastal lagoons/Water mixing/

[JAMESC062]

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22 Dynamical study of southern Barrier Reef circulation.

January 1983 – December 1985

ORGANIZATION:
University of New South Wales
School of Mathematics,
PO Box 1,
Kensington N.S.W. 2033

PROJECT LEADER:
Dr J.H. Middleton (02) 6973176

EXTERNAL SUPPORT:
MSTGS – $35,510

OBJECTIVE
To gain a quantitative assessment of the role that tides, wind forcing, long period waves and the coral sea play in the circulation of the southern Barrier Reef lagoon, and to parameterize these features in such a way that useful predictions might be made for the future.

METHODOLOGY
Techniques of time series and tidal analysis have been used to compare salient features of current and sea level data with existing theoretical and numerical models.

STATUS
All data analysis completed. Manuscript submitted.

Completed Project – This project will remain in the computerized Register for another 5 years but will not be included in future issues of the Compendium.

GEOGRAPHIC REGIONS: R,Z

MAJOR DESCRIPTORS: Wind–driven circulation/Tides/Mathematical models/

[UNINSW033]

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23 Theoretical studies of waves on a Continental Shelf.

ORGANIZATION:
University of New South Wales
P.O. Box 1
Kensington, N.S.W. 2033

PROJECT LEADER:
Prof V.T. Buchwald (02) 697 2961

MANPOWER:
1.25 (this year)

OBJECTIVE
To undertake theoretical studies of waves of frequency of several minutes to several days occurring on the Continental Shelf, and in the Barrier Reef Lagoon.

METHODOLOGY
Various mathematical and numerical techniques are used to solve the barotropic equations of motion of the ocean in a rotating reference frame, with appropriate boundary conditions.

STATUS
Several papers on shelf waves, shelf resonance and edge waves have been published. Work on diffraction of shelf waves is well advanced.

GEOGRAPHIC REGIONS: R,Q,N

MAJOR DESCRIPTORS: Water waves/Continental shelf/Mathematical models/Numerical analysis/

[UNINSW010]

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24 Tidal flow across Reefs.

October 1984 –

ORGANIZATIONS:
University of New South Wales
School of Mathematics,
P.O. Box 1,
Kensington, N.S.W. 2033

James Cook University of North Queensland
Department of Civil and Systems Engineering,
Townsville, Qld 4811

PROJECT LEADERS:
Dr J.H. Middleton (02) 6973176
Dr L. Bode (077) 814214

CONTACT OFFICER:
Dr J.H. Middleton

EXTERNAL SUPPORT:
MSTGS – $45,594

OBJECTIVE
To measure tidal constants on the outer reef in the Mackay region, and to measure the variation of tidal amplitude and phase as it progresses from the ocean to the inner Lagoon. To evaluate and calibrate large scale numerical and analytical models of flow across and through reef structures.

METHODOLOGY
Current meters and tide gauges deployed in Hydrographers Passage in October 1984 have provided data and tidal analyses for each location and will provide constituent data. This data will be compared with predictions of existing numerical and analytical models.

CO-ORDINATION WITH OTHER PROJECTS
Hydrodynamic studies of water movements within the Great Barrier Reef Region (Dr. L. Bode and Professor K.P. Stark)

LOCALITY: Hydrographers Passage

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Tidal currents/Flow/Reefs/Oceanographic data/Mathematical models/

[UNINSW037]

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25 Cyclonic waves at Heron Island and their influence upon coastal processes and marine park management.

January 1986 – December 1986

ORGANIZATIONS:
University of Queensland
Department of Civil Engineering
St Lucia, Qld 4067

Blain, Bremner and Williams Pty Ltd
47 Castlemaine Street
Milton, Qld 4064

PROJECT LEADERS:
Dr M.R. Gourlay (07) 3772543
Dr B. Harper

CONTACT OFFICER:
Dr M.R. Gourlay

EXTERNAL SUPPORT:
MSTGS

OBJECTIVES

To hindcast the wave conditions at the seaward edge of the reef platform during several historical cyclones which are known to have had significant effects upon either the beaches of Heron Island or its marine facilities.

To show the effectiveness of recently developed modelling procedures for cyclonic wave prediction in their application to predict the wave 'hydrograph' to a sufficient accuracy in a given situation.

METHODOLOGY

The cyclone wave prediction model developed at James Cook University will be utilised to hindcast wave conditions on the northern and southern sides of Heron Reef adjacent to Heron Island for several historical cyclones.

LOCALITY: Heron Island

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Wave hindcasting/Wave forecasting/Storm surges/Environmental impact/Coasts/

[UNIQLD091]

26 Mathematical simulation of the morphological dynamics of tidal inlets.

June 1984 –

ORGANIZATION:

University of Queensland
Department of Civil Engineering
St Lucia, Qld 4067

PROJECT LEADER:

Prof C.J. Apelt (07) 3773337

EXPENDITURE:

$3,000 (this year), $13,000 (all years)

MANPOWER:

0.15 (this year), 0.40 (all years)

EXTERNAL SUPPORT:

MSTGS – $28,616

OBJECTIVE

To develop a mathematical model which will take into account all of the known physical influences which affect the size and stability of tidal inlets and to test the validity of the model against the actual morphological dynamics of selected tidal inlets on the east coast of Australia. In this context, tidal inlets are intended to include estuaries and tidal lakes and lagoons.

METHODOLOGY

It is proposed to develop a numerical model which will include the following segments:–

1. Hydrodynamic model of tidal and flood flows in the inlet.
2. Hydrological model of the land catchment of the inlet to provide the stochastic flows as input to 1.
3. Fluvial sediment transport model to provide the stochastic supply of sediment to the inlet due to flood flows.
4. Littoral transport model to provide the stochastic supply of sediment to the inlet due to wave action.
5. Model of sediment transport in the inlet which uses the information from the other model segments to predict the response of the inlet to the combined effects of sediment inputs from fluvial and littoral processes and flushing of sediments by tidal and flood flows.

STATUS

The one–dimensional hydrodynamic model which constitutes segment 1 has been completed. Preliminary work has started on other segments. Data relating to Queensland inlets is being collected.

GEOGRAPHIC REGIONS: R,Q,N

MAJOR DESCRIPTORS: Tidal currents/Mathematical models/Hydrodynamics/Sediment transport/

[UNIQLD092]

27 Modelling the tides of the Coral Seaway.

October 1980 –

ORGANIZATION:
University of Queensland
Department of Civil Engineering
St Lucia, Qld 4067

PROJECT LEADER:
Prof C.J. Apelt (07) 3773337

EXPENDITURE:
$3,000 (this year), $19,000 (all years)

MANPOWER:
0.20 (this year), 1.40 (all years)

EXTERNAL SUPPORT:
AMSTAC–FAP – $13,319

OBJECTIVE
To develop a numerical model to simulate the ocean tides in the coral seaway between the east coast of Queensland and the outer fringe of the Great Barrier Reef, in the region between Gladstone and Bowen. In the central part of this region the tidal ranges are the largest for the whole of the Australian coastline, except for the north–west coast of Western Australia. The primary purpose in the numerical modelling is to improve the understanding of the mechanisms which give rise to such large tidal ranges.

METHODOLOGY
The tidal dynamics are described by the St Venant equations, representing long wave phenomena in two dimensions in plan. These equations are approximated by finite–difference expressions and are integrated numerically by an explicit "leap–frog" procedure.

STATUS
The numerical model has been completed. It has been established that the geography of the reef, of channels and their relationship to the coast result in significant amplification of the M2 tide. The diurnal tidal constituent is not amplified significantly. The exact details of shape of coastline, etc. are not particularly important, rather their overall scale and proportions. The model has been refined by finer representation of reefs.

CO–ORDINATION WITH OTHER PROJECTS
Liaison is maintained with analytical studies and field investigations of the same phenomena, being directed by Professor V.T. Buchwald of the University of New South Wales, Department of Applied Mathematics.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Tidal currents/Tidal range/Mathematical models/Coral reefs/

[UNIQLD006]

28* Heat Storage and Surface Fluxes of the Coral Sea.

December 1984 – December 1985

ORGANIZATIONS:
University of Tasmania
Geography Department,
GPO Box 252C,
Hobart, Tas 7001

CSIRO
Division of Oceanography,
GPO Box 1538,
Hobart, Tas 7001

PROJECT LEADERS:
Mr M. Nunez (002) 202487
Mr G. Meyers (002) 206208

CONTACT OFFICER:
Mr K. Michael (002) 202487 (UNITAS)

EXPENDITURE:
$3,000 (this year)

MANPOWER:
1.00 (this year)

OBJECTIVES
To observe net heat fluxes at the sea surface and determine to what extent surface fluxes control heat storage in the surface layer of the ocean.
To examine the feasibility of using satellite data to estimate surface heat fluxes.

METHODOLOGY
Heat storage in the ocean is measured by expendable bathythermographs launched from ships of opportunity.
Radiative fluxes are measured by pyranometers at islands. Latent and sensible heat fluxes are measured by bulk aerodynamic methods, which require observations of wind, humidity, air and sea temperature.
Microwave measurements recorded on satellites are sensitive to the distribution of moisture in the

atmosphere. The possibility of using these satellite data to replace ground based observations of humidity will be tested.
Isolation at the sea surface will be determined by atmospheric reflectivity measured aboard satellites.

STATUS

Completed Project – This project will remain in the computerized Register for another 5 years but will not be included in future issues of the Compendium.

CO-ORDINATION WITH OTHER PROJECTS

CSIRO – XBT Ship of Opportunity program.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Heat storage/Thermodynamics/Ocean circulation/Air–water interface/Satellites/

[UNITAS010]

29 Numerical modelling of coral reef hydrodynamics.

March 1986 –

ORGANIZATIONS:

Victorian Institute of Marine Sciences
14 Parliament Place
Melbourne, Vic 3002

Australian Institute of Marine Science
PMB No 3
Townsville M.C., Qld 4810

PROJECT LEADERS:

Dr K.P. Black (03) 6511714
Dr J.C. Andrews (077) 789211

CONTACT OFFICER:

Dr K.P. Black

OBJECTIVE

To identify circulation patterns around schematized and actual reefs, using a range of reef morphologies, to support assessment of dispersal and settlement capabilities of crown–of–thorns starfish larvae.

METHODOLOGY

Selected reef types, classified by their bathymetry, plan–shape and exposure to tidal currents, winds and waves, are being modelled to determine probabilities of advection of larvae to or from reefs or particular reef zones. Results from schematized reefs will provide an overview of the hydrodynamic phenomena, and will be supplemented and validated by simulations of real reefs.

STATUS

Modelling will be done during 1986, with a field programme commencing late 1986.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Reefs/Water circulation/Hydrodynamics/Larvae/Recruitment/

[VIMS—017]

30 Organic chemistry of seawater and marine sediments.

October 1982 –

ORGANIZATION:
CSIRO
Division of Oceanography
G.P.O. Box 1538
Hobart, Tas. 7001

PROJECT LEADER:
Dr J.K. Volkman (002) 206 281

EXTERNAL SUPPORT:
CSIRO/University of Tasmania Grant – $7,000

OBJECTIVES

To determine the compositions of particulate organic matter (POC) and dissolved organic matter (DOC) in seawater and elucidate how these are related to chemical, physical and biological processes occurring in the water column with emphasis on factors affecting primary production.
To determine how the lipid distributions in sediments are related to the environment of deposition and to bacterial processes occuring in the sediment.
To develop chemical methods characterizing different water bodies.

METHODOLOGY

Samples of seawater particulate matter are obtained by filtering seawater through glass fibre filters. DOC is obtained by passing the filtered water through a column of XAO resin. Lipids are obtained by solvent extraction and partitioned into different lipid classes by chromatography on silicic acid. Lipid concentrations are determined by Iatroscan TLC–FID and by capillary gas chromatography. Compounds are identified by gas chromatography–mass spectrometry.

STATUS

Samples of POC have been obtained from Coral Sea, Tasman Sea and Equatorial Pacific Waters during cruises of R.V. Sprightly and R.V. Franklin. POC and DOC samples have also been collected at a coastal site near Hobart over a 6 month period. The lipid compositions of phytoplankton have been analysed for comparison with the field data. Sediments from coral reefs off Lizard Island and at Davies Reef have been analysed, as have sediments from lakes and fjords in the Vestfold Hills region of Antarctica. Bacteria and phytoplankton from these areas have also been studied.

CO-ORDINATION WITH OTHER PROJECTS

Collaboration with Dr H.J. Bavor (Hawkesbury Agricultural College) on microbial chemistry of coral reef sediments (M.S.T. Funding). Study of seaweed secondary metabolites with Dr A. Blackman (University of Tasmania.)

GEOGRAPHIC REGIONS: B,N,R,Z,Q
SHIP TIME REQUIREMENTS: 14 days
MAJOR DESCRIPTORS: Biota/Sediment analysis/Organic constituents/Biochemical analysis/

[CSIRO–067]

31 Spectroscopy of coral reef features.

December 1984 –

ORGANIZATIONS:
CSIRO
Division of Water and Land Resources
GPO Box 1666,
Canberra, ACT 2601
James Cook University of North Queensland
Australian Institute of Marine Science

PROJECT LEADERS:
Dr D. Jupp (062) 465477 (CSIRO)
Dr D. Kuchler (CSIRO, based at Townsville)

CONTACT OFFICER:
Dr D. Jupp

EXPENDITURE:
$40,000 (this year), $40,000 (all years)

MANPOWER:
1.00 (this year), 1.00 (all years)

EXTERNAL SUPPORT:
MSTGS – $55,700 (1985;1986)
GBRMPA – $36,000 (1985;1986)

OBJECTIVES

1. To record and analyse the radiance spectra of coral reef features and associated water masses.
2. To integrate reef spectra with remotely sensed data for improved interpretation.

METHODOLOGY

1. Use a variety of spectroradiometers in the field to record field–based spectra.
2. Use radiative transfer models to relate these spectra to aircraft– and satellite–based remotely sensed data.

STATUS

Procedure for the collection of radiometric data in the field has been established, and is being applied to the northern Great Barrier Reef.
Data form: expected to be as computer files or tapes.
Availability: unrestricted.
Access: via publication, and possibly via project leader.

CO–ORDINATION WITH OTHER PROJECTS

Coordinated with reef studies at GBRMPA.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Coral reefs/Spectral analysis/Remote sensing/

[CSIRO–107]

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32 Water quality of the Narrows and associated estuaries adjacent to the Rundle oil shale project.

May 1981 –

ORGANIZATION:

Esso Australia Ltd
Coal & Synthetic Fuels Department
127 Kent Street
Sydney, NSW 2000

PROJECT LEADER:

Mr R.D. Tait (02) 2362187

EXPENDITURE:

$1,000 (this year), $130,000 (all years)

MANPOWER:

0.10 (this year), 1.90 (all years)

OBJECTIVE

To establish baseline water quality for the Narrows, Central Queensland, and investigate water quality changes due to inflow of freshwater through several small estuaries.

METHODOLOGY

Monthly samplings from up to 30 sites within the Narrows and freshwater streams were collected for analysis by contract laboratories. Analysis for anions, cations, carbon, nutrients, trace metals, and some hydrocarbons were carried out on all samples. Samples were collected over different tidal and freshwater input conditions.

STATUS

Computer analysis report prepared and further computer analysis continuing. Papers in preparation for publication in journals.

LOCALITY: Rundle

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Water analysis/Water quality/Oil shale/Environmental impact/

[ESSO—002]

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33 Novel compounds from marine organisms.

February 1984 –

ORGANIZATION:

Griffith University
School of Science,
Nathan, Qld 4111

PROJECT LEADER:

Dr R.J. Quinn (07) 2757567

EXPENDITURE:

$10,863 (this year), $11,463 (all years)

MANPOWER:

1.00 (this year), 2.00 (all years)

EXTERNAL SUPPORT:

ARGS – $10,863 (1985)

OBJECTIVE

To examine marine organisms for novel constituents and to carry out isolation, purification and structure elucidation of the novel organic constituents. This would provide new structural types, which are unlikely to be obtained by any other means, for evaluation for their biological significance.

Many therapeutically useful compounds are of natural origin and animals and plants are sources of a vast diversity of chemical products themselves biologically active with potential use in biological control and therapeutics. These studies would provide secure chemical knowledge necessary for further studies on understanding interactions between marine organisms.

METHODOLOGY

Novel constituents are identified by chromatographic and spectroscopic examination. Pure compounds are obtained by chromatographic techniques and structural elucidation undertaken by a combination of spectroscopic and chemical techniques.

STATUS

Novel brominated acetylenic acids from the sponge *Xestospongia testudinaria* are being investigated.

GEOGRAPHIC REGIONS: R,Q

MAJOR DESCRIPTORS: Organic compounds/Marine organisms/Biologically active compounds/ Chromatographic techniques/Spectroscopic techniques/

[GRIFFI012]

34* **The isolation of novel compounds from marine invertebrates.**

January 1978 –

ORGANIZATION:

James Cook University of North Queensland
Department of Chemistry and Biochemistry
Post Office
Townsville, Qld 4811

PROJECT LEADERS:

Dr J.C. Coll (077) 814533
Dr B.F. Bowden

CONTACT OFFICER:

Dr J.C. Coll

EXPENDITURE:

$24,800 (this year), $209,800 (all years)

MANPOWER:

2.50 (this year), 20.00 (all years)

EXTERNAL SUPPORT:

ARGS – $191,880 (1981–1984)

OBJECTIVE

The project seeks new and interesting compounds from marine invertebrates (especially soft corals). It also looks at the biosynthetic pathways used in the elaboration of selected natural products, and of the role in this of each partner in the symbiosis.

METHODOLOGY

Organisms are collected, frozen freeze–dried and extracted. Chromatographic separation affords pure substances which are identified by spectroscopic and chemical approaches.

STATUS

The project is in the second six year cycle.

CO–ORDINATION WITH OTHER PROJECTS

Collaborative links with the University of Western Australia and University of Canterbury for X–ray structure solution.

GEOGRAPHIC REGION: R

SHIP TIME REQUIREMENTS: 6 days

MAJOR DESCRIPTORS: Anthozoa/Octocorallia/Biochemistry/Chemical analysis/Symbiosis/

[JAMESC044]

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35 **Aromatic hydrocarbons and oil pollution in the marine environment.**

January 1973 –

ORGANIZATION:
University of Melbourne
School of Chemistry and Department of Industrial Sciences
Parkville, Vic. 3052

PROJECT LEADERS:
Dr J.D. Smith (03) 344 7093
Dr J. Bagg (03) 344 6873

CONTACT OFFICER:
Dr J.D. Smith

MANPOWER:
1.50 (this year), 7.00 (all years)

EXTERNAL SUPPORT:
MSTGS – $29,000 (1985)

OBJECTIVE
To determine the distribution of aromatic hydrocarbons, including polycylic aromatic hydrocarbons in the marine environment. To understand the sources of these compounds, their pathways into waters, sediments and organisms, and their degradation.

METHODOLOGY
Development and application of analytical procedures, using solvent extraction, HPLC and fluorescence spectroscopy and GC/MS

STATUS
Methods well established, results for water, organisms and sediments published. Great Barrier Reef and Port Phillip Bay reported .

CO-ORDINATION WITH OTHER PROJECTS
Coordinated with related projects of Dr D. Connell (Griffith University) and Dr G. Denton/Prof Burdon-Jones (James Cook University of North Queensland)

GEOGRAPHIC REGIONS: B,R,T,H

MAJOR DESCRIPTORS: Hydrocarbons/Biogeochemical cycle/Bioaccumulation/Sediments/Baseline studies/

[UNIMEL021]

36 Estuarine and seawater chemistry.

ORGANIZATION:
University of Melbourne
Marine Chemistry Laboratory,
Department of Inorganic Chemistry,
Parkville, Vic. 3052

PROJECT LEADER:
Dr J.D. Smith (03) 344 7093

MANPOWER:
1.00 (this year)

OBJECTIVE
Understanding of factors controlling the composition of seawater and estuarine waters, including the micronutrients (P, Si), redox sensitive elements (I, As, Fe, Cu), and radionuclides (U, Po). Modelling of the chemical effects of mixing river and seawater.

METHODOLOGY
Field and laboratory measurements of the chemical properties of seawater, river waters, and intermediate mixtures. Laboratory modelling of the chemical behaviour of estuaries.

STATUS
Methods established, some results published.

GEOGRAPHIC REGIONS: A,B,R

MAJOR DESCRIPTORS: Estuaries/Sea water/Chemical composition/Water mixing/

[UNIMEL063]

37* Multielement analysis of marine sediments and tissues of marine organisms.

ORGANIZATION:
University of Melbourne
Marine Chemistry Laboratory,
Department of Physical Chemistry,
Parkville, Vic. 3052

PROJECT LEADER:
Dr V. McRae (03) 3451844

MANPOWER:
1.00 (this year)

OBJECTIVE

Development of analytical methods for the analysis of marine sediments and the tissues of marine organisms using small amounts of sample material. Application to the use of sediments and marine organisms as integrators for assessment of marine pollution. Rapid methods for determination of all elements from sodium to uranium.

METHODOLOGY

Use of a variety of chemical and instrumental methods for calibration of rapid energy dispersive x–ray fluoroscence analysis procedures.

GEOGRAPHIC REGIONS: A,B,R

MAJOR DESCRIPTORS: Sediment analysis/Tissues/Indicator species/

[UNIMEL064]

38 Radionuclides in the study of marine processes.

ORGANIZATIONS:

University of Melbourne
Department of Inorganic Chemistry,
Marine Chemistry Laboratory,
Parkville, Vic. 3052

Australian Atomic Energy Commission
Private Mail Bag
P.O. Sutherland, N.S.W. 2232

PROJECT LEADERS:

Dr J.D. Smith (03) 344 7093
Mr D. Davy (02) 5433241 or 5433686

CONTACT OFFICER:

Dr J.D. Smith

MANPOWER:

1.00 (this year)

EXTERNAL SUPPORT:

AINSE
MSTGS
BMR

OBJECTIVE

Use of radionuclides in the natural uranium–decay series to elucidate mechanisms and rates of sedimentation, coral growth, and ferromanganese nodule growth. Understanding of the influence of benthic organisms on radionuclide distributions. Measure and model the distribution of naturally occuring U–238 decay series radionuclides in marine and lake sediments. Establish the interactions of the radionuclides with benthic organisms, the effects on sediment dating, and transfer of radionuclides into food chains.

METHODOLOGY

Alpha– and gamma– spectrometry, liquid scintillation counting. Lead–210 and throrium–230 dating.

STATUS

Refined techniques for Pb–210 dating. Methods established for U, Th, Ra, Po and Pb radio–isotopes. Some results published.

GEOGRAPHIC REGIONS: A,B,R

MAJOR DESCRIPTORS: Radionuclides/Dating/Sediment analysis/Manganese nodules/Coral/

[UNIMEL061]

39 Toxicology of marine animals.

ORGANIZATION:

University of Queensland
Department of Zoology,
St. Lucia, Qld. 4067

PROJECT LEADER:

Assoc. Prof. R. Endean (07) 3772482

CONTACT OFFICER:

Dr A.M. Cameron (07) 377 2506

EXPENDITURE:

$25,827 (this year), $47,613 (all years)

MANPOWER:

2.00 (this year), 4.00 (all years)

EXTERNAL SUPPORT:

ARGS
FIRTA

OBJECTIVE

Screening for and pharmacological testing of bioactive compounds in marine animals.

METHODOLOGY
Standard extraction, bioassay, pharmacological, culture and chemical preparative techniques are used.

STATUS
Discovery of several bioactive compounds with potential for new antibiotics, new cardioactive and other therapeutic drugs.

GEOGRAPHIC REGIONS: R,Q

MAJOR DESCRIPTORS: Biologically active compounds/Marine organisms/Pharmacology/Toxicity/

[UNIQLD063]

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40 Fluxes of inorganic nitrogen through benthic sediments on a coral reef.

January 1984 – December 1986

ORGANIZATION:
University of Sydney
School of Biological Sciences,
Building A.12,
Sydney, NSW 2006

PROJECT LEADERS:
Mr R.W. Johnstone (02) 6922277
Assoc Prof A.W.D. Larkum (02) 6923369

CONTACT OFFICER:
Mr R.W. Johnstone

EXPENDITURE:
$11,000 (this year), $22,000 (all years)

MANPOWER:
1.00 (this year), 2.00 (all years)

EXTERNAL SUPPORT:
GBRMPA – $1,600
MSTGS – $14,000
Linnean Society of New South Wales – $6,400

OBJECTIVES
To examine the exchange of inorganic nitrogen between sediments and the overlying water column.
To investigate the major metabolic processes involved in such exchanges and the flow of inorganic nitrogen through coral reef sediments generally.

METHODOLOGY
Sediment/water column fluxes are measured using enclosure experiments.
Interstitial water is assayed for NO_3,NO_2 and NH_4 at different depths in sediments to determine concentration gradients of each.
Ammonification, denitrification and nitrification rates are determined for the sediments using a combination of methods including N^{15} dilution techniques, acetylene inhibtor techniques and N – serv inhibitor method.
Also, all sediments are assayed for grain size distribution and O_2,pH and Eh profiles.

STATUS
Two papers are presently in press:
1. Fluxes of free ammonium between sediments and the water column in a coral reef lagoon.
2. The distribution of carbon and nitrogen in sediments on a coral reef lagoon.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Nitrogen/Biogeochemical cycle/Coral reefs/Benthic zone/

[UNISYD106]

41* Isolation and reconstitution of pigment–protein complexes of algae.

ORGANIZATION:
University of Sydney
School of Biological Sciences,
Sydney, N.S.W. 2006

PROJECT LEADER:
Assoc. Prof. A.W.D. Larkum (02) 6923369

EXPENDITURE:
$7,000 (this year), $7,000 (all years)

MANPOWER:
3.00 (this year), 3.00 (all years)

EXTERNAL SUPPORT:
ARGS – $7,000

OBJECTIVE

Investigation of the structure and function of pigment–protein complexes of a variety of unicellular algae, particularly from the following group: Cryptophyta, Eustigmatophyta, Prymnesiophyta, Chrysophyta, Phaeophyta, Rhodophyta, Cyanophyta and Prochlorophyta.

METHODOLOGY

Isolation of complexes by detergents, sucrose gradient centrifugation polyacrylamide electrophoresis and column chromatography. Identification of complexes by absorption spectrophotometry, low–temperature fluorimetry, electrophoresis and immunochemistry.

STATUS

Work has been completed on the chlorophyll–protein complexes of *Griffithsia* (Rhodophyta), *Pavlova lutheri* (Prymnesiophyta), *Prochloron* (Prochlorophyta) and *Chroomonas* (Cryptophyta). Further work is continuing on 1. *Polyedriella* (Eustigmatophyta) 2. reconstitution of the chlorophyll *a*/ c_2 complex of *Chroomonas* and 3. reconstitution of the PSII–phycobilisome particle of *Griffithsia* .

GEOGRAPHIC REGIONS: R,N

MAJOR DESCRIPTORS: Algae/Proteins/Pigments/Biochemical analysis/

[UNISYD057]

See also: 15, 50

42 Establishment of remote weather stations on the Great Barrier Reef.

January 1986 –

ORGANIZATIONS:

Australian Institute of Marine Science
PMB 3
MSO Townsville Qld 4810

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

PROJECT LEADERS:

Dr J.C. Andrews (077) 789211
Dr W. Craik (077) 818811

CONTACT OFFICER:

Dr W. Craik

EXTERNAL SUPPORT:

Townsville Motor Boat Club

OBJECTIVE

To provide long–term, accurate, real–time weather records for both research and public use.

METHODOLOGY

Installation of remote weather stations on specific reefs, initially in the Townsville Region. The remote stations will record a variety of weather and other scientific data to be transmitted to the network of visual display systems.

STATUS

First stations built and deployed June 1986.

LOCALITY: Townsville

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Meteorological data/Remote sensing/

[AIMS—010]

43 Offshore effects of Cyclone Winifred.

March 1986 – December 1986

ORGANIZATION:

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

PROJECT LEADER:

Dr W. Craik (077) 818811

CONTACT OFFICER:

Mr I.M. Dutton (077) 818811

EXPENDITURE:

$1,800 (this year), $1,800 (all years)

MANPOWER:

0.20 (this year), 0.20 (all years)

OBJECTIVES

To review information obtained from studies undertaken during and after the cyclone event.
To evaluate the significance of the event, and of the studies' findings.
To determine what studies (if any) should continue on the effects of the event.
To assess the adequacy of scientific response to the event.

METHODOLOGY

A workshop involving scientists, managers, Commonwealth, State and local Government officials, industry representatives and the general public to be held.

STATUS

Workshop held in Townsville on 20 June, 1986. A draft report has been prepared. Publication pending as part of the Authority's Workshop series.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Conferences/Storms/Meteorological data/Tropical cyclones/

[GBRMPA162]

44 Bioerosion of coral substrates, and mechanisms by which animals bore.

January 1980 –

ORGANIZATION:
Australian Museum
Invertebrate Division.
6–8 College Street,
Sydney, NSW 2000

PROJECT LEADER:
Dr P.A. Hutchings (02) 3398243

EXPENDITURE:
$25,000 (this year), $75,000 (all years)

MANPOWER:
1.50 (this year), 7.50 (all years)

EXTERNAL SUPPORT:
MSTGS – $87,000

OBJECTIVES
To determine the major agents of coral bioerosion.
To determine rates of bioerosion in varying coral reef environments.
To identify the changes in the boring communities over time. To determine mechanisms by which animals bore.

METHODOLOGY
To expose unbored coral blocks for varying periods of time and at various localities and to measure the rates of bioerosion and identify the causal agents.

STATUS
Variations within and between sites currently being analysed.

CO-ORDINATION WITH OTHER PROJECTS
A Ph.D. student funded by GBRMPA to study bioerosion in the Capricornia section of GBR.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Coral reefs/Boring organisms/Bioerosion/

[AUSMUS004]

45 Biologic Reef Destruction – Processes, Products and Rates (PhD study).

August 1983 – August 1986

ORGANIZATIONS:
Australian National University
Department of Geology,
P.O. Box 4,
Canberra, A.C.T. 2601

Australian Museum
P.O. Box A285,
Sydney South, N.S.W. 2000

Bureau of Mineral Resources, Geology and Geophysics
P.O. Box 378,
Canberra, A.C.T. 2601

PROJECT LEADERS:
Mr W.E. Kiene (062) 494303 (ANU)
Dr K.A.W. Crook
Dr P.A. Hutchings (02) 3399243 (AUS MUS)
Dr P.J. Davies (062) 499321 (BMR)

CONTACT OFFICER:
Mr W.E. Kiene

EXPENDITURE:
$14,303 (this year), $38,176 (all years)

MANPOWER:
1.00 (this year), 2.00 (all years)

EXTERNAL SUPPORT:
GBRMPA – $45,149 (grant to ANU for Mr W.E. Kiene (PhD Scholar))

OBJECTIVE
To define the processes, products and rates of biologic destruction on the Great Barrier Reef. The principle bioeroders and their rates of erosion in different environments on reefs at different stages of evolution are being investigated. This data will be used to construct a model of the role bioerosion plays in the growth and development of the Great Barrier Reef.

METHODOLOGY
Natural coral substrates have been prepared and attached to frames in reef slope, reef flat and lagoon environments in Llewellyn, One Tree and Wreck Reefs in the southern Great Barrier Reef. From these substrates collections are being made of infaunal borer communities over a period of two years. Measurements are being made of the amounts of erosion on these substrates caused by organisms.

STATUS

Experiments were established in February 1984 and substrate collections were made in September 1984 and February and September 1985. Analytical techniques have been developed to extract organisms and the measurment of the volume of material eroded from substrates. Initial results show significant differences in bioerosion and bioeroders in different reef environments. Mapping and sampling of reef bioeroder habitats has also begun.

CO-ORDINATION WITH OTHER PROJECTS

Bioerosion studies by Australian Museum at Lizard Island

LOCALITIES: Llewellyn Reef; One Tree Island; Wreck Reef

GEOGRAPHIC REGION: R

SHIP TIME REQUIREMENTS: 10 (shark cat)

MAJOR DESCRIPTORS: Coral reefs/Bioerosion/

[ANU—014]

46 Geochemical balances for the Great Barrier Reef.

January 1985 – December 1987

ORGANIZATION:

Australian National University
Research School of Earth Sciences
GPO Box 4
Canberra ACT 2601

PROJECT LEADERS:

Dr. A.L. Herczeg (062) 493248
Dr A.R. Chivas (062) 493247
Dr T. Torgerson

CONTACT OFFICER:

Dr. A.L. Herczeg

EXPENDITURE:

$19,700 (this year), $19,700 (all years)

MANPOWER:

1.30 (this year), 1.30 (all years)

EXTERNAL SUPPORT:

AMSTAC – $19,700

OBJECTIVE

To identify and quantify the net fluxes of phosphorus and nitrogen to and from the Great Barrier Reef.

METHODOLOGY

Obtain org P and org C profiles in sediments. Establish P flux from rivers and ocean. P and N measurements in mangrove soils.

STATUS

Org C and Org P measurements in sediments complete. Pb–210 measurements completed. Mangrove soils to be collected. No N determinations to date. Preliminary evaluation of data commenced. There is strong indication that both C and P are being liberated from the sediment.

CO-ORDINATION WITH OTHER PROJECTS

River and ocean P flux determination done by AIMS personnel.

GEOGRAPHIC REGION: R

SHIP TIME REQUIREMENTS: 10 days AIMS Sharkcat

MAJOR DESCRIPTORS: Geochemical cycle/Nitrogen/Phosphorus/Sediment analysis/

[ANU—020]

47 Mixing of radiocarbon across the Great Barrier Reef lagoon.

June 1985 – December 1986

ORGANIZATIONS:

Australian National University
Research School of Earth Sciences
G.P.O. Box 4
Canberra, ACT 2601

Australian Institute of Marine Science
P.M.B. 3,
Townsville M.C.,QLD. 4810.

PROJECT LEADERS:

Dr. A.R. Chivas (062) 493247
Dr. P. Isdale (077) 789235
Mr. C.J. Radnell (062) 494229

CONTACT OFFICER:

Dr. A.R. Chivas

OBJECTIVE

Measure modern and past (last 30 years) mixing and upwelling rates of C 14 and C 13 across the continental shelf and lagoon of the Great Barrier Reef. Determine terrestrial and atmospheric inputs of C 13 and C 14.

METHODOLOGY

Use cores or large massive corals collected in a traverse across the Great Barrier Reef lagoon near Townsville. Cores are from Pandora Reef, Wheeler Reef, Myrmidon Reef and possibly the Flinders Reefs. Determine annual banding in corals by fluorescence and x–radiography. Separate individual annual layers and measure C 14 and C 13 contents.

STATUS

C 14 measurements completed for yearly intervals from 1983 to 1945 for a coral core from Pandora Reef. Raw and reduced data available from A.R. Chivas, C.J.Radnell and kept on file in A.N.U. Radiocarbon Laboratory.

LOCALITIES: Pandora Reef; Wheeler Reef; Myrmidon Reef; Flinders Reefs

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Carbon isotopes/Upwelling/Coral reefs/Core analysis/

[ANU—019]

48* **Environmental, phylogenetic and biostratigraphic studies.**

July 1984 –

ORGANIZATION:

Bureau of Mineral Resources, Geology and Geophysics
Division of Marine Geoscience and Petroleum Geology,
G.P.O. Box 378,
Canberra, A.C.T. 2601

PROJECT LEADERS:

Dr D.J. Belford (062) 499341
Dr G.C.H. Chaproniere (062) 499538
Mr S. Shafik (062) 499537

CONTACT OFFICER:

Dr D.J. Belford

MANPOWER:

1.00 (this year), 1.00 (all years)

OBJECTIVE

To determine the biostratigraphic and environmental significance of microfaunas and microfloras from samples collected during the marine geoscience program of the Bureau of Mineral Resources, as a contribution to the study of the geological history of the Australian margins and nearby areas. Study phylogenetic trends as an aid to correlation.

METHODOLOGY

Standard collection, production and observational techniques applied to marine samples.

GEOGRAPHIC REGIONS: B,E,R,S,Z

MAJOR DESCRIPTORS: Geological history/Biostratigraphy/Phylogeny/Environmental significance/

[BMR—027]

49* **Factors affecting growth and maintenance of reefs in the central Great Barrier Reef.**

March 1980 –

ORGANIZATION:

Bureau of Mineral Resources, Geology and Geophysics
P.O. Box 378
Canberra City, A.C.T. 2601

PROJECT LEADER:

Dr P.J. Davies (062) 499217

EXTERNAL SUPPORT:

AMSTAC–FAP – $50,000

OBJECTIVE

To identify and describe the factors affecting the growth of reefs, their morphological variations, and the stability of the reef framework, both in recent times and earlier in the stratigraphic record.

METHODOLOGY

Shallow drilling through the existing reef framework and through reef–derived sediments. Quantitative measurement of the movement of water and sediment over and through the reef. Surface and sub–surface mapping of lithological variations on and around the reefs.

STATUS

Many papers have already been published. Data is still being analyzed in preparation for a major publication, probably in 1986.

CO-ORDINATION WITH OTHER PROJECTS

With Prof. D. Hopley's programme at James Cook University.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Coral reefs/Growth/Stability/Reef formation/Environmental factors/

[BMR—010]

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50 Analysis of Soils from Coral Islands in the Capricornia Section of the Great Barrier Reef Marine Park.

January 1984 – June 1986

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
P.O. Box 1379,
Townsville, Qld 4810

Capricornia Institute of Advanced Education
(Subcontract)
Department of Chemistry,
Rockhampton, Qld 4700

PROJECT LEADERS:

Dr W. Craik (077) 818811
Dr G. Pegg (079) 361177
Dr J. Hughes (079) 361177

CONTACT OFFICER:

Ms E. Eager (077) 818811

EXPENDITURE:

$630 (this year), $1,530 (all years)

MANPOWER:

1.00 (this year), 2.00 (all years)

EXTERNAL SUPPORT:

Queensland Co-ordinator General, Premier's Department – $900

OBJECTIVE

To determine important physical and chemical properties of soils and to relate these findings to papameters such as location, depth, human usage, flora and fauna populations and possibly effluent disposal.

METHODOLOGY

Soil samples will be analysed for pH, conductivity and concentrations of: chloride, sodium, potassium, magnesium, calcium, iron, copper, nitrate, nitrite, phosphate and total organic material.

LOCALITY: Great Barrier Reef Marine Park – Capricornia Section

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Coral reefs/Soil analysis/Islands/Environmental impact/

[GBRMPA106]

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51 Coastal processes forming and maintaining coral cays of the Great Barrier Reef and their implications for Marine Park Management.

August 1983 – August 1986

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
P.O. Box 1379,
Townsville, Qld 4810

University of Queensland
Dept. Civil Engineering,
St. Lucia, Qld 4067

PROJECT LEADERS:

Dr W. Craik (077) 818811
Dr M.R. Gourlay (077) 3771111

CONTACT OFFICER:

Dr W. Craik

EXPENDITURE:

$2,000 (this year), $5,000 (all years)

OBJECTIVE

To collect and collate relevant available information on physical and geomorphological processes forming and maintaining cays.

METHODOLOGY

Overview of available literature, assessment of its relevance to the Great Barrier Reef Region, review of current developments on Great Barrier Reef cays and assessment of future research needed.

STATUS

Field work complete, draft report being prepared.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Coral reefs/Cays/Geomorphology/

[GBRMPA081]

52 Modern Sediment Dispersal at the Burdekin River Mouth.

June 1984 – December 1986

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
P.O. Box 1379,
Townsville, Qld 4810

James Cook University of North Queensland
Department of Geology,
Post Office,
Townsville, Qld 4811

PROJECT LEADERS:

Dr W. Craik (077) 818811
Prof R.M. Carter (077) 814111
Dr D.P. Johnson (077) 814111

CONTACT OFFICER:

Mr I.M. Dutton (077) 818811

EXPENDITURE:

$3,330 (all years)

MANPOWER:

0.10 (this year), 1.30 (all years)

OBJECTIVES

To undertake a pilot study to investigate the patterns of sediment distribution and dispersal into the inner shelf of the Burdekin River Mouth, with emphasis on:
1. Locations of maximum sediment accumulations since 6.5 ky;
2. Volumetric estimate of the shelf sediment wedge;
3. Establishing the seawards extent of the wedge, particularly with respect to the 18–20m sediment "fence" and
4. Establishing a sedimentary baseline against which post–clam effects can be measured.

METHODOLOGY

Standard techniques of low–frequency seismic profiling, grab sampling, coring and laboratory study to be employed.

LOCALITY: Burdekin River

GEOGRAPHIC REGION: R

SHIP TIME REQUIREMENTS: 7 days

MAJOR DESCRIPTORS: Sediment distribution/River discharge/

[GBRMPA097]

53 Role of *Acanthaster planci* in reef degradational processes – a preliminary study.

May 1984 – September 1986

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
P.O. Box 1379,
Townsville, Qld 4810

James Cook University of North Queensland
Department of Geology,
Post Office,
Townsville, Qld. 4811

PROJECT LEADERS:

Dr W. Craik (077) 818811
Dr R. Henderson (077) 814111

CONTACT OFFICER:

Mr I.M. Dutton (077) 818811

EXPENDITURE:

$3,040 (all years)

MANPOWER:

0.50 (all years)

OBJECTIVE

To produce an atlas documenting the morphology of *A. planci* skeletal elements. To compile records of *A. planci* infestations in the GBR from skeletal elements in samples. To plan in detail a schedule and techniques for site investigation, monitoring and core sampling relevant to this sphere of investigation.

METHODOLOGY

Skeletal elements of *A. planci* are to be documented using a Scanning Electron Microscope. Concurrently, a literature review will be undertaken and records of *A. planci* infestations collated. A more comprehensive study program will be developed based on the results of this pilot phase.

STATUS
Project complete. Publication of Atlas in progress.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: *Acanthaster planci* /Geological surveys/Coral reefs/Morphology (organisms)/

[GBRMPA096]

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54 Sediment yield on the North Queensland Coast.

June 1985 – March 1986

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810
James Cook University of North Queensland
Townsville Qld 4811
Lancaster University
Department of Geography
Lancaster
U.K. LAI 47B

PROJECT LEADERS:
Mr I.M. Dutton (077) 818811
Assoc Prof D. Hopley (077) 814111
Dr A.W. Pringle

CONTACT OFFICER:
Mr I.M. Dutton

EXPENDITURE:
$4,332 (all years)

OBJECTIVE
To assess and predict changes in sediment yield due to engineering works and land use changes.

METHODOLOGY
Literature reviews, data and aerial photography analysis, field survey.

STATUS
The study found that there is significant annual variation in the amount of sediment exported to the north–east Queensland coast. The study also noted that definition of the anthropogenic component of the sediment budget is very different on a gross scale, although, localised influences are identifiable. The report will be published as a James Cook University Monograph.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Sediment transport/Coasts/Construction/Coastal engineering/

[GBRMPA149]

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55 Sedimentary setting of the fringing reef at Donovan Point.

May 1985 –

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810
James Cook University of North Queensland
Geology Department
Townsville Qld 4811

PROJECT LEADERS:
Mr I.M. Dutton (077) 818811
Dr D. Johnson (077) 814111

CONTACT OFFICER:
Mr I.M. Dutton

EXPENDITURE:
$5,740 (all years)

OBJECTIVES
To determine geological sediment facies.
To delineate shallow stratigraphy of peri–reef sediments.

METHODOLOGY
Field survey and collection of core samples for radiocarbon dating.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Reefs/Stratigraphy/Sediment analysis/

[GBRMPA150]

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56 Stratigraphy of lagoon sediments – Lady Musgrave Island.

June 1984 – June 1986

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
P.O. Box 1379,
Townsville, Qld 4810

University of Sydney
Department of Geology and Geophysics,
Sydney, N.S.W. 2006

PROJECT LEADERS:

Dr W. Craik (077) 818811
Assoc Prof C.V.G. Phipps (02) 6922924

CONTACT OFFICER:

Mr I.M. Dutton (077) 818811

EXPENDITURE:

$3,000 (all years)

MANPOWER:

0.20 (all years)

OBJECTIVES

To relate reef flat stratigraphy to lagoonal stratigraphy.
2. To define sedimentation rates in the lagoon.
3. To expand upon existing understanding of sedimentation processes and patterns.
4. Supplementary analysis of fresh water wedge under Lady Musgrave Island.

METHODOLOGY

Vibrocores to 6m will be used to study stratigraphy. Supplementary use of boomer lines and shallow drilling will determine sediment thickness and gain substrate information.

STATUS

Field work complete.

LOCALITY: Lady Musgrave Island

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Sedimentation/Lagoons/Stratigraphy/Reefs/

[GBRMPA094]

57* **Circulation and sediment movement on and around north Queensland bayhead fringing reefs, with special reference to the effect of resort development.**

May 1982 – December 1985

ORGANIZATIONS:

James Cook University of North Queensland
Geography Department
P.O. James Cook University
Townsville, Qld 4811

Great Barrier Reef Marine Park Authority
P.O. Box 1379
Townsville, Qld 4810

PROJECT LEADERS:

Assoc. Prof. D. Hopley (077) 814571
Mr K. Parnell (077) 814831

CONTACT OFFICER:

Mr K. Parnell

EXPENDITURE:

$8,000 (this year), $25,000 (all years)

MANPOWER:

1.20 (this year), 4.50 (all years)

OBJECTIVE

To study aims to determine the dynamics of bayhead fringing reefs, with special reference to the situation of resort development in these environments. A model for determining the likely effects of the introduction of a contaminant to a bay, with minimal field calibration will be produced. This will be of considerable use for the management of present resorts, and in determining likely effects and means of avoiding water quality and other problems at potential resort sites.

METHODOLOGY

Collection of oceanographic type data, both Eulerian and Lagrangian, for water movement study, using Braystoke current meters and fluorometric methods. Determination of nutrient and sediment (susp). concentrations in water together with water movement data will enable a model to be produced for Orpheus Island, Pioneer Bay (primary research site), with calibration at other sites.

STATUS

Data collection for initial modelling is almost complete. Model development is in progress. Initial investigation of sites to be used for calibration of the model is underway.

Completed Project – This project will remain in the computerized Register for another 5 years but will not be included in future issues of the Compendium.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Sediment transport/Water circulation/Tourism and environment/Water quality/

[JAMESC069]

58 Distribution, biostratigraphy and environmental trends of Cainozoic Foraminiferida from the Queensland continental shelf.

ORGANIZATION:
Queensland Mines Department, Geological Survey Division
GPO Box 194
Brisbane, Qld 4001

PROJECT LEADER:
Dr V. Palmieri (07) 2244166 or 2244929

CONTACT OFFICER:
Mr P.J.G. Fleming (07) 224 4980

MANPOWER:
0.10 (this year), 3.00 (all years)

OBJECTIVE
To identify associations of foraminifers and to determine distribution patterns, environmental significance and evolutionary trends of benthic and planktic assemblages in Quaternary, relict and recent associations, and in the subsurface Tertiary.

METHODOLOGY
Qualitative and quantitative analyses of foraminifera from sea bottom sediments, drill core, piston and vibro core samples.

STATUS
Results from areas C & J incorporated with report from ANU research. Results from area Q in report in draft form, completion delayed in favour of mapping in north Queensland. Results from area R published by Palmieri, V., 1984 in Palaeogeography, Palaeoclimatology, Palaeoecology 46, 165–183.

CO-ORDINATION WITH OTHER PROJECTS
With projects at School of Earth Sciences, Australian National University, AIMS, Departments of Geology, Queensland and James Cook Universities.

GEOGRAPHIC REGIONS: C,J,R,Q

MAJOR DESCRIPTORS: Foraminifera/Biostratification/Sediment analysis/Evolution/Benthos/

[QGS—002]

59 Distribution of mineral-walled microfossils in upper Quaternary shelfs sediments of the northern Great Barrier Reef.

September 1984 –

ORGANIZATION:
Queensland Mines Department, Geological Survey Division
GPO Box 194
Brisbane, Qld 4001

PROJECT LEADER:
Dr B.G. Fordham (07) 2244929

CONTACT OFFICER:
Mr P.J.G. Fleming (07) 2244980

OBJECTIVE
To interpret palaeoenvironments on the continental shelf in relation to late Quaternary development of the northern Great Barrier Reef.

METHODOLOGY
Systemic sampling of shallow cores in northern GBR area. Quantitative assessment for mineral-walled microfossils in two fractions each side of 38 microns. Interpreted by comparison with proportional abundances in present day sediments.

STATUS
Some initial sampling carried out. Set aside in favour of Palaeozoic conodont biostratigraphy of northeastern Queensland.

CO-ORDINATION WITH OTHER PROJECTS
Sedimentologic research being carried out by Dr G.R. Orme and colleagues, University of Queensland.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Sediment analysis/Foraminifera/Palaeoceanography/Distribution patterns/

[QGS—007]

60 Geological investigations for coastal zone management.

ORGANIZATION:
Queensland Mines Department, Geological Survey Division
GPO Box 194
Brisbane, Qld 4001

PROJECT LEADER:
Mr A.W. Stephens (02) 2244394

OBJECTIVES

To apply geological investigations to coastal management projects. Three approaches are used to identify causes and trends in coastal change: (a) historical data, (b) sediment budget/process data, and (c) geological data. The geological data are aimed at producing two types of results:
1. Sedimentological data from modern environments provide information on causal process – sedimentary response, and hence identification of sediment–budget components.
2. This information together with litho–stratigraphic and chrono–stratigraphic data are used to produce a detailed geological history, particularly for the past 7000 years, which can be used as a model for prediction of future trends in coastal change.

METHODOLOGY

Field data collection using airphotos, soil augering, grab sampling, seismic profiling, coring and drilling techniques. Laboratory analyses of texture, composition, and radiometric age. Interpretation of depositional environments, sediment sources, tranpsort paths, sediment sinks, sediment budgets, seismo–, litho–, and chrono– stratigraphy, and depositional history. Integration to produce a geological model of cause and effect, and to predict future trends in coastal change.

STATUS

Studies have been carried out in the Capricorn Coast, Noosa, and Cairns regions.
Current projects are in the Hervey Bay, Mackay and Bowen regions.

CO-ORDINATION WITH OTHER PROJECTS

This project is co–ordinated with several coastal management projects undertaken by the Beach Protection Authority of Queensland.

GEOGRAPHIC REGIONS: Q,R

MAJOR DESCRIPTORS: Coastal zone management/Geological surveys/Geological history/

[QGS—004]

61 Recruitment, dispersal, and distribution of living sedentary foraminifers on selected sites of Heron Island Reef.

December 1983 – December 1986

ORGANIZATIONS:
Queensland Mines Department, Geological Survey Division
GPO Box 194,
Brisbane, Qld 4001
University of Queensland
Department of Geology,
St Lucia, Qld 4067

PROJECT LEADERS:
Dr V. Palmieri (07) 2244166/2244929
Dr J.S. Jell (07) 3772677

CONTACT OFFICER:
Mr P.J.G. Fleming (07) 2244980

EXPENDITURE:
$5,200 (this year), $8,950 (all years)

MANPOWER:
0.60 (this year), 0.60 (all years)

EXTERNAL SUPPORT:
MSTGS – $8,500 (Geol. Survey of Queensland: full laboratory assistance.)

OBJECTIVE

To investigate the recruitment of sedentary foraminifers and biofouling plates in selected sites of Heron Island Reef and to examine the effect of environmental factors on their recruitment, dispersal and distribution.

METHODOLOGY

Qualitative and quantitative analysis of recruited foraminifers in a determined period of time on biofouling plates positioned along transects of Heron Island Reef.

STATUS

Sixteen stations with 12 biofouling plates each, are now placed along transects of Heron Island Reef. Sediments and coral rubble samples from each station site are collected. Plates are retrieved on a 3 and 6 month period and represent shaded, semishaded, and lighted environments. Encrusting

foraminifers pioneer with algae and briozoa the reef edge region. Data will be available on request to project leader, after 1986.

LOCALITY: Heron Island
GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Foraminifera/Sediment sampling/Distribution patterns/

[QGS—006]

62 Seismic stratigraphy of Queensland continental shelf.

January 1978 –

ORGANIZATION:
Queensland Mines Department, Geological Survey Division
GPO Box 194
Brisbane, Qld 4001

PROJECT LEADER:
Mr A.W. Stephens (07) 2244394

CONTACT OFFICER:
Mr D.E. Searle (07) 224 6243

OBJECTIVE
To investigate the Quaternary history of selected areas of the continental shelf.

METHODOLOGY
Continuous seismic profiling in co–ordination with investigations of available bottom sediment and corehole samples.

STATUS
In areas of the Central Great Barrier Reef the pre–Holocene surface has been delineated and the Postglacial sediment distribution investigated.

CO–ORDINATION WITH OTHER PROJECTS
This project is co–ordinated with some projects underway at the Departments of Geology and Geography, James Cook University of North Queensland.

GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Quaternary period/Geological history/Continental shelf/Seismic data/Stratigraphy/

[QGS—003]

63 Ostracoda : Banks Strait, South Pacific.

ORGANIZATION:
Riverina–Murray Institute of Higher Education
School of Applied Science
P.O. Box 588
Wagga Wagga, N.S.W. 2650

PROJECT LEADER:
Dr K.G. McKenzie (069) 232550

CONTACT OFFICER:
Mr D.J. Kelso (069) 232224

EXPENDITURE:
$2,040 (all years)

MANPOWER:
0.12 (this year), 0.24 (all years)

EXTERNAL SUPPORT:
AMSTAC–FAP – $2,040

OBJECTIVE
To study the taxonomy of ostracoda from Banks Strait, Lizard Island and the Southern Pacific, with a view to developing more precise environmental and stratigraphic interpretations of those late Mesozoic and Tertiary Australian sequences with the potential to produce petroleum.

METHODOLOGY
Species picked and mounted on slides.
Scanning electron microscopy.
Description of species, designation of types.
Publication.

STATUS
Banks Strait – all material picked and mounted on slides (27 samples).
Southern Pacific cruises – material picked and mounted on slides from about 60 samples. 1 publication
Lizard Island – material picked, retained in alcohol. 1 Publication (by S.J. Hall)

Flinders Island littorals sampled.
Campbell Island sampled and picked; types selected. 1 Publication.

LOCALITY: Lizard Island
GEOGRAPHIC REGIONS: B,R,P
MAJOR DESCRIPTORS: Ostracoda/Taxonomy/Biostratigraphy/

[RCAE—003]

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64 Analysis of Raine Island beach samples.

September 1985 – June 1986

ORGANIZATION:
University of Queensland
Department of Civil Engineering
St Lucia, Qld 4067

PROJECT LEADER:
Dr M.R. Gourlay (07) 3772543

MANPOWER:
0.10 (this year), 0.10 (all years)

EXTERNAL SUPPORT:
Raine Island Corporation.

OBJECTIVE
To determine sediment characteristics and variations, to ascertain their relationship to processes affecting the island and to make comparisons with conditions on other coral cays.

METHODOLOGY
Standard sieving and hydraulic properties analyses. Preliminary statistical analyses.

STATUS
The samples have been collected and the update of computer programs completed.

LOCALITY: Raine Island
GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Coral reefs/Cays/Beaches/Sediment analysis/

[UNIQLD090]

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65 Coastal processes forming and maintaining the coral cays of the Great Barrier Reef and their implications for marine park management.

January 1984 – December 1985

ORGANIZATION:
University of Queensland
Department of Civil Engineering
St Lucia, Qld 4067

PROJECT LEADER:
Dr M.R. Gourlay (07) 3772543

EXPENDITURE:
$4,000 (this year), $5,000 (all years)

MANPOWER:
0.20 (this year), 0.35 (all years)

EXTERNAL SUPPORT:
GBRMPA

OBJECTIVES
To collect and collate all relevant available material concerning the physical and geomorphological processes which form and maintain coral cays
To provide a basis for interim management guidelines for the cays of the Great Barrier Reef as well as for a subsequent more extensive research programme.

METHODOLOGY
Intensive library research, together with visits to selected cays to assess actual and potential problems likely to be met by management authorities.

STATUS

Completed Project – This project will remain in the computerized Register for another 5 years but will not be included in future issues of the Compendium.

GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Cays/Coral reefs/Construction/Resource management/Marine parks/

[UNIQLD088]

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66 Impact of coastal engineering works upon coral cays.

January 1979 – December 1985

ORGANIZATION:
University of Queensland
Department of Civil Engineering
St Lucia, Qld 4067

PROJECT LEADER:
Dr M.R. Gourlay (07) 3772543

MANPOWER:
0.20 (this year), 0.80 (all years)

OBJECTIVE

To study the effects of coastal development and construction activities upon the stability of coral cays, with particular reference to beach processes. Specifically, the effects of seawalls and the dredged channels at Heron Island are being considered, together with the influence of varying climatic conditions upon the processes which determine the alignment of the Island's beaches.

METHODOLOGY

1. Study of all available historical evidence and previously published information on the physical processes shaping coral cays in general and on developmental activities at Heron Island in particular.
2. Limited field observations of the beach alignment and sedimentation in the boat harbour to extend data available from other sources.
3. Detailed analysis of wind, sea and swell observations from various locations near Heron Island for a period of 20 years to determine seasonal and longer term variations in wave climate influencing Heron Island.
4. Estimation of waves and surge from a severe cyclone coming from the worst possible direction at high tide.

STATUS

The historical sequence of events and development at Heron Island has been recorded and the importance of winds, waves and tides in shaping the cay has been established.
It has been shown that the combined effects of a seawall, constructed on the most unstable portion of the island, and a dredged boat channel through the reef rim have been responsible for sand eroded by waves from the island's beaches being removed by tidal currents from the reef platform. This loss of sand from the reef can be remedied by restoring and reinforcing walls around the boat channel to a height equal to that of the nearby reef edge.

Completed Project – This project will remain in the computerized Register for another 5 years but will not be included in future issues of the Compendium.

LOCALITY: Heron Island
GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Cays/Construction/Dredging/Environmental impact/Erosion/

[UNIQLD007]

67* Structure and morphology of the shelf margin in the central Great Barrier Reef.

ORGANIZATIONS:
University of Sydney
Department of Geology and Geophysics,
Sydney, N.S.W. 2006

Bureau of Mineral Resources, Geology and Geophysics
Marine Division,
P.O. Box 378,
Canberra, A.C.T. 2601

James Cook University of North Queensland
Department of Geography,
Post Office,
Townsville, Qld. 4811

PROJECT LEADERS:
Assoc. Prof. C.V.G. Phipps (02) 6922924
Dr P.J. Davies (062) 499111
Dr D. Hopley

CONTACT OFFICER:
Assoc. Prof. C.V.G. Phipps

EXPENDITURE:
$70,000 (this year), $70,000 (all years)

EXTERNAL SUPPORT:
MSTGS – $70,000

OBJECTIVES

1. To examine and photograph halimeda banks previously examined by seismic profiles and coring by BMR.
2. To examine the reef front morphology of No. 5 Ribbon Reef, Myrmidon Reef and Bowl Reef. Photograph and sample for dating and petrographic examination.

METHODOLOGY

Observations and sampling using 2–man submersible Platypus 1. Photographic and video records obtained.

STATUS

Dives undertaken Oct/Nov. 1984 on halimeda banks west of Ribbon Reefs numbers 4,5, and 7, on the reef fronts of No. 5 Ribbon Reef, Myrmidon and Bowl Reef and a reef area 4 miles north of Bowl Reef. Data obtained is now being assessed and written up.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Reefs/Morphology/Petrology/Geomorphology/

[UNISYD070]

See also: 164

See: 32, 151, 152

68 Bacterial populations in the mucus of stressed and non-stressed Staghorn coral *Acropora* spp.

May 1983 – February 1986

ORGANIZATION:
La Trobe University
Microbiology Department,
Bundoora, Vic 3083

PROJECT LEADERS:
Prof J.S. Waid (03) 4792229
Ms A. Duncan

CONTACT OFFICER:
Prof J.S. Waid

EXPENDITURE:
$22,000 (this year), $25,000 (all years)

MANPOWER:
1.00 (this year), 2.00 (all years)

EXTERNAL SUPPORT:
GBRMPA – $2,540 (Covering travel grants for field work in 1983, 1984 and 1985)
MSTGS – $18,530
Australian Museum – $250 (Travel grant for 1985)

OBJECTIVE
To examine bacterial populations growing in mucus of healthy corals and to assess any changes that may occur in these populations if the coral is stressed.

METHODOLOGY
Coral samples were maintained in tanks of flowing seawater which was supplemented with one of the following, nutrient, freshwater, pesticide, oil, or oil and emulsifier. Control samples were maintained in flowing seawater without supplements. Samples were withdrawn periodically and bacteria present in mucus cultured, counted and characterised. Populations present were compared to populations present on samples collected from the field and processed immediately.

STATUS
Bacterial populations have been identified which may be indicative of coral stress. Return of samples to shore and maintenance in tanks causes some stress–related changes in bacterial populations. This illustrates the necessity of carrying out this type of work *in situ*, whenever possible. Work is underway to develop monoclonal antibodies to a bacterial indicator of coral stress. Monoclonal antibodies will enable more rapid detection of the bacteria.

CO–ORDINATION WITH OTHER PROJECTS
Part of this work was carried out during the MECOR meeting in August 1984.

GEOGRAPHIC REGION: R

SHIP TIME REQUIREMENTS: 4 days during MECOR.

MAJOR DESCRIPTORS: *Acropora* / *Anthozoa* /Coral stress/Bacteria/Pollution effects/

[LATROB009]

See also: 103, 138, 141*

See: 107

69 Preparation of a guide to seagrasses of the Great Barrier Reef.

July 1985 – June 1986

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

Lanyon, Ms J. (Consultant)

PROJECT LEADERS:

Ms E. Eager (077) 818811
Ms J. Lanyon

CONTACT OFFICER:

Ms C. Dalliston (077) 818811

EXPENDITURE:

$3,300 (this year), $3,300 (all years)

EXTERNAL SUPPORT:

Monash University Graduate Scholarship
M.A. Ingram Trust

OBJECTIVE

To provide a means for identification of the seagrass species likely to be encountered within the Great Barrier Reef Marine Park.

METHODOLOGY

The document was initially prepared as part of a seagrass workshop held at the Northern Fisheries Research Centre in Cairns in 1984. This project involves editing and preparation of a single volume on seagrass species of the Great Barrier Reef Region.

STATUS

The quide has been published as part of the Authority's Special Publication Series.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Seagrass/Check lists/Manuals/

[GBRMPA141]

70 Seagrass survey of central section of Great Barrier Reef Marine Park.

February 1986 – May 1986

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

Queensland Department of Primary Industries
Northern Research Centre
C/– PO Bungalow
Cairns Qld 4870

PROJECT LEADERS:

Dr W. Craik (077) 818811
Mr R. Coles (070) 515588

CONTACT OFFICER:

Mr J. Bastin (077) 818811

EXPENDITURE:

$1,700 (this year), $1,700 (all years)

OBJECTIVE

To survey the distribution of selected seagrass beds in the central section of the Great Barrier Reef Marine Park.

METHODOLOGY

Mapping of seagrass beds after aerial survey and field sampling.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Seagrass/Distribution/Aerial surveys/Mapping/

[GBRMPA134]

71* The role of crustose coralline algae in coral reef ecosystems with special reference to their contribution to primary production and calcification.

September 1983 – December 1986

ORGANIZATIONS:

James Cook University of North Queensland
Department of Botany,
Post Office,
James Cook University,
Douglas, Qld 4811

Australian Institute of Marine Science
PMB No 3,
MSO Townsville, Qld 4810

PROJECT LEADERS:

Mr J. Chisholm (077) 814853
Dr I.R. Price (077) 814133
Dr B.E. Chalker (077) 789275 (AIMS)

CONTACT OFFICER:

Mr J. Chisholm

EXPENDITURE:

$7,266 (this year), $7,266 (all years)

MANPOWER:

1.20 (this year), 1.20 (all years)

EXTERNAL SUPPORT:

Lizard Island Research Station Doctoral Fellowship – $4,000 (For payment of bench fees and travel)

Commonwealth Department of Education — $1,000 (For travel only)

OBJECTIVE

To establish models for photosynthesis and calcification in selected species of crustose coralline algae. These models will be used in combination with data from field analyses of distribution and percentage cover to provide estimations of gross productivity and calcification in specific assemblages of these organisms.

METHODOLOGY

1. Photosynthesis. Light–response curves for photosynthesis are being prepared on the basis of oxygen production under varied, natural (in the field) and artificial (in the laboratory) illumination.
2. Calcification. Calcification rates are being determined from calcium–45 incorporation under simulated conditions in the laboratory, and by pH changes measured using a pH electrode and alkalinity titrations in the field.
3. Growth. Long–term growth rates, for comparative purposes, are being measured at six–monthly intervals by linear extension rates and increases in crust thickness.
4. Distribution and abundance. Data on distribution and percentage cover is being derived from field surveys using line–transect and quadrat methods.

STATUS

The project has involved the preparation of light saturation curves for photosynthesis, measurement of calcification rates using calcium–45 radioisotope, and the establishment of long–term growth trials. Future studies will involve field measurements of primary production and calcification, measurements of long–term accretion rates, and surveys of distribution and abundance.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Algae/Ecosystems/Primary production/Calcification/Photosynthesis/

[JAMESC074]

72 Establishment of horsetail she–oak (*Casuarina equisetifolia* var *incana*) in the dry tropics.

December 1985 – December 1989

ORGANIZATION:

Queensland Beach Protection Authority
GPO Box 2195,
Brisbane, Qld 4001

PROJECT LEADER:

Mr R.J. Lloyd (07) 2278253

CONTACT OFFICER:

The Secretary (07) 2278254

OBJECTIVE

To identify planting techniques which will improve the early survival of horsetail she–oak in the dry tropics.

METHODOLOGY

To collect and assess data.

STATUS

Trial installation proposed for December 1985.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Angiospermae/Survival/Tropical zones/Coastal zone management/

[QLDBPA020]

73 Structure and physiology of mycorrhizas of plants of coral islands.

June 1979 – December 1988

ORGANIZATIONS:

University of New South Wales
School of Botany
P.O. Box 1
Kensington, N.S.W. 2033

University of Sydney
School of Biological Sciences
Sydney, N.S.W. 2006

PROJECT LEADERS:

Dr A.E. Ashford (02) 6622716 (University of New South Wales)
Dr W.G. Allaway (02) 6922280 (University of Sydney)

CONTACT OFFICER:

Dr A.E. Ashford

EXPENDITURE:

$25,000 (this year), $60,000 (all years)

MANPOWER:

1.50 (this year), 3.00 (all years)

EXTERNAL SUPPORT:

ARGS – $24,355

OBJECTIVES

To investigate the anatomy of the mycorrhiza of *Pisonia grandis* and its involvement in nutrition and water balance of this species, with particular reference to nutrient inputs from nesting and roosting birds.

To survey other higher–plant species of coral islands for the presence of mycorrhizas and for root structure.

METHODOLOGY

Small samples of roots are fixed for histochemical and ultrastructural studies, embedded and sectioned for light and electron microscopy. Roots and soils are analysed for chemical and nutrient composition. Seeds of mycorrhizal species will be collected for growth in sterile culture, and subsequent re–infection with mycorrhizal fungus. It is intended to identify the fungal partner(s) in the mycorrhizal(s), and to investigate nutrient flow in the field.

STATUS

Investigations of anatomy of *Pisonia grandis* , nutrient input from birds, a survey of mycorrhizal status of species, comparison with material from Seychelles and electron microscopy have been published. Mycorrhizal synthesis and nutritional physiology are in progress.

LOCALITY: Capricorn Group

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Cays/ *Pisonia grandis* /Angiospermae/Nutrient cycles/Mycorrhiza/

[UNINSW013]

74 Cloning the gene for the chlorophyll a/b protein of prochloron.

January 1985 –

ORGANIZATION:

University of Sydney
School of Biological Sciences
Building A.12
Sydney, NSW 2006

PROJECT LEADER:

Assoc Prof A.W.D. Larkum (02) 6923369

EXPENDITURE:

$3,000 (this year), $3,000 (all years)

MANPOWER:

0.20 (this year), 0.20 (all years)

EXTERNAL SUPPORT:

ARGS – $8,500 (Begins 1986)

OBJECTIVE

To clone the gene for the chlorophyll a/b light–harvesting protein of the prokaryotic alga *Prochloron* sp.

METHODOLOGY

DNA is extracted, cut by restriction endonucleases and inserted into PBR 322 plasmids of *E. coli*. The chlorophyll a/b gene is screened for using rabbit antibody to this protein. Cross–hybridization with probes to higher plant chlorophyll a/b light–harvesting protein is also being tried.

STATUS

Preliminary work on cross–hybridization with probes to the higher plant chlorophyll a/b light–harvesting gene were carried out in 1985 but proved negative . Antibody to the protein of *Prochloron* was raised in 1985 and will be used in 1986.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Algae/Genetics/Proteins/

[UNISYD104]

See also: 122*

75 Systematics and Ecology of Phytobenthos of Swain Reefs.

January 1981 – March 1986

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
P.O. Box 1379
Townsville, Qld 4810
Saenger, Dr P.
Northern Rivers CAE
Lismore, NSW

PROJECT LEADERS:
Dr W. Craik (077) 818811
Dr P. Saenger

CONTACT OFFICER:
Dr W. Craik

EXPENDITURE:
$10,570 (all years)

MANPOWER:
0.10 (this year)

OBJECTIVE
To document phytobenthos of Swain Reefs. To observe functional role of phytobenthos in a southern reef ecosystem.

METHODOLOGY
Systematic collecting at various depths, habitats, to complete taxonomic studies. Quantitative studies on the phytobenthos will be carried out using SCUBA.
Marked study sites will be revisited at various intervals to determine seasonal and long–term changes in species composition, standing crop growth rates and reproductive development.

STATUS
Field work has been completed. Report submitted to GBRMPA.

CO–ORDINATION WITH OTHER PROJECTS
A.B. Cribb. Algal flora in the Capricorn Bunker Groups.

LOCALITY: Swain Reefs
GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Phytobenthos/Check lists/Taxonomy/Life history/Population dynamics/

[GBRMPA027]

76* Systematics and ecology of tropical Australian marine macroalgae.

January 1968 –

ORGANIZATION:
James Cook University of North Queensland
Department of Botany,
James Cook University,
Douglas Qld 4811

PROJECT LEADER:
Dr I.R. Price (077) 814133 or (077) 814427

MANPOWER:
0.10 (this year), 2.85 (all years)

OBJECTIVE
To prepare systematic handbooks of the marine algal flora of tropical Australia, including descriptions, illustrations, keys for identification, and habitat, distribution, and phenological data.

METHODOLOGY
A comprehensive collection of marine benthic algae from representative areas and habitats in tropical Australia, particularly along the eastern coast of North Queensland and including the Great Barrier Reef, is being assembled. Data on distribution, habitat, seasonality, vegetative and reproductive structure and development, taxonomy, and phenology are being determined for each species. Relevant material from other parts of Australia and overseas is also being obtained for comparison.
Emphasis was initially placed on the genus *Caulerpa* . At present, the turf–forming species of coral reefs are being extensively studied, and a systematic handbook should be available in the next few years.

STATUS
Probably the most comprehensive collection of tropical Australian seaweeds in the country has been built up at the James Cook University. The studies already completed, and the collections assembled, provide a significant foundation for future research in the region.
Futher collections from particular regions and habitats are required, and considerable research into the structure and systematics of the species present remains to be carried out.

GEOGRAPHIC REGIONS: C,J,R
MAJOR DESCRIPTORS: Benthic environment/Tropical zones/Algae/Taxonomy/Ecology/

[JAMESC050]

77 Taxonomic studies of benthic marine algae.

January 1973 –

ORGANIZATION:
Murdoch University
Environmental and Life Sciences
Murdoch, W.A. 6150

PROJECT LEADER:
Dr M.A. Borowitzka (09) 3322333

MANPOWER:
0.15 (this year), 2.80 (all years)

OBJECTIVE
To improve our understanding of the systematics and taxonomy of a range of benthic marine algae, especially the Corallinaceae and the Caulerpales.

METHODOLOGY
A wide range of collecting methods are being used and the algae are being studied in various ways depending upon the genus.

STATUS
1. Studies on the crustose coralline algae of the GBR (essentially completed).
2. The algae of Port Jackson (initial collection and curation are complete).
3. The algae of central N.S.W. (curation of specimens is in progress).
4. The benthic algae of southern W.A. (studies of selected genera are under way and further collections are being made).

CO-ORDINATION WITH OTHER PROJECTS
Parts of this project have been carried out in collaboration with the Australian Institute of Marine Science (GBR crustose coralline algae); the Smithsonian Institution, Washington, D.C.; the Roche Research Institute of Marine Pharmacology; C.S.I.R.O. Division of Fisheries, Marmion, W.A.; and other Institutions.

GEOGRAPHIC REGIONS: W,E,R,O,N
MAJOR DESCRIPTORS: Algae/Benthic zone/Taxonomy/Corallinaceae/Caulerpales/

[MURUNI013]

78 Taxonomy/biology of estuarine algae.

January 1983 –

ORGANIZATION:
University of New South Wales
School of Botany,
P.O. Box 1,
Kensington, N.S.W. 2033

PROJECT LEADER:
Dr R.J. King (02) 6972066

EXPENDITURE:
$1,200 (this year), $3,600 (all years)

MANPOWER:
1.00 (this year), 2.50 (all years)

EXTERNAL SUPPORT:
Joyce – Vickery Scientific Research Fund. – $500

OBJECTIVE
To describe the distribution of estuarine macro–algae, especially those associated with saltmarsh and mangrove, and to measure their contribution to total productivity.

METHODOLOGY
The distributions of macro–algae associated with mangroves are mapped in local areas to relate them to environmental variables. The effect of salinity on growth and productivity is being measured in the laboratory. Collections of algae have been made on the entire New South Wales coast and the Queensland coast north of Townsville (Cape York and the Gulf of Carpentaria).

STATUS
A species list has been prepared for New South Wales and work is continuing on the northern Queensland collection. The genera *Bostrychia* and *Caloglossa* are receiving special attention. Studies so far indicate that productivity rates are low but of the same order as those for algae on rocky coast.

GEOGRAPHIC REGIONS: C,R,Q,N
MAJOR DESCRIPTORS: Algae/Ecology/Estuaries/Mangrove swamps/

[UNINSW040]

79 Systematics and ecological studies on the algae of the Southern Great Barrier Reef.

January 1965 –

ORGANIZATION:
University of Queensland
Department of Botany
St. Lucia, Qld 4067

PROJECT LEADER:
Dr A.B. Cribb (07) 3772728

EXPENDITURE:
$800 (this year), $9,000 (all years)

MANPOWER:
0.65 (this year), 2.00 (all years)

EXTERNAL SUPPORT:
GBRMPA – $1,100

OBJECTIVES
To prepare a handbook of the algal flora of the southern Great Barrier Reef.
To prepare ecological accounts of algal vegetation of various reefs.

METHODOLOGY
Field observations and collecting; laboratory examination – determination of specimens; preparation of descriptions and figures; all phases proceeding simultaneously.

GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Algae/Taxonomy/Ecology/Check lists/

[UNIQLD004]

80 Humpback whale songs and related behaviour off eastern Australia.

January 1986 –

ORGANIZATIONS:

Australian Museum
Vertebrate Zoology
6–8 College Street
Sydney NSW 2000

Royal Australian Navy Research Laboratory
PO Box 706,
Darlinghurst NSW 2016

PROJECT LEADER:
Dr W.H. Dawbin (02) 3398111 (Museum)

EXTERNAL SUPPORT:
MSTGS

OBJECTIVES

1. To record humpback whale sounds off eastern Australia concurrently with behavioural observations relating sound production and behaviour.
2. To analyse the sounds to determine the song pattern.
3. To compare the songs with those described from other regions such as Hawaii and California and the West Indies to identify the scale of regional differences.
4. To evaluate the value of songs for delimiting separate breeding stocks.

METHODOLOGY

Shore observers on headlands at Coffs Harbour and Byron Bay will locate migrating whales by radio and will guide the vessel with hydrophone equipment to their vicinity. Passive monitoring from a small vessel will also be carried out until songs are heard. These will be recorded on Sony Walkman Professional cassette recorders and satisfactory sequences will be analysed using Hewlett Packard Spectrum analysis Research equipment at the RAN Laboratory

STATUS

Some data has been obtained in pilot testing runs.

CO-ORDINATION WITH OTHER PROJECTS

There will be an exchange of data with Dr Roger Payne, Long Term Research Institute, Massachusetts USA who coordinates several northern hemisphere whale studies.

GEOGRAPHIC REGIONS: R,Q,N,B

SHIP TIME REQUIREMENTS: 20 days.

MAJOR DESCRIPTORS: Cetacea/Sound production (biological)/Communication/Behaviour/

[AUSMUS018]

81 Otolith–based studies of reef–associated fishes.

January 1984 –

ORGANIZATIONS:

CSIRO
Division of Fisheries Research,
G.P.O. Box 1538,
Hobart, Tas. 7001

Cornell University
Section of Ecology and Systematics,
Ithaca, New York 14853,
United States of America

University of Papua New Guinea
P.O. Box 320,
Papua New Guinea

PROJECT LEADERS:
Mr R. Thresher (002) 206222 (CSIRO)
Mr E. Brothers (Cornell University)
Mr P. Colin (Uni. of P.N.G.)
Mr L. Bell (Uni. of P.N.G.)

CONTACT OFFICER:
Mr R. Thresher

EXPENDITURE:
$5,280 (this year), $5,280 (all years)

MANPOWER:
0.25 (this year), 0.25 (all years)

OBJECTIVE

To assess utility of otolith microstructure as indicator of early life history events in reef–associated fishes, and to relate information so obtained to the reproductive biology of the fishes.

METHODOLOGY

Standard otolithic–ageing techniques, using optical microscopes, plus larval rearing studies and some field collecting and observations.

STATUS

Over two hundred reef–associated species examined, and apparent larval durations (as inferred from otolith microstructure) related to other life history parameters and biogeography. Detailed studies of factors influencing otolith microstructure in genus *Amphiprion* in progress.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Pisces/Life history/Reproduction (biological)/

[CSIRO–082]

82 Analysis of mollusc benthic community structure in Capricornia Group coral reef lagoon sediments.

February 1985 –

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

University of Queensland (Subcontract)
Department of Zoology
St Lucia Qld 4067

PROJECT LEADERS:

Dr W. Craik (077) 818811
Mr B. Long (07) 3771111

CONTACT OFFICER:

Ms C. Dalliston (077) 818811

EXPENDITURE:

$900 (this year), $1,800 (all years)

MANPOWER:

1.00 (this year), 2.00 (all years)

OBJECTIVE

To investigate the degree of variability of mollusc abundance in the Heron Reef lagoon and possible causal factors.

METHODOLOGY

Field survey, sampling and experiment.

STATUS

Exploratory sampling in Heron Reef lagoon has been conducted. Data on spatial variability has been analysed.

LOCALITIES: Heron Island; Wistari Reef; One Tree Island

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Mollusca/Benthos/Coral reefs/Abundance/

[GBRMPA160]

83 Biological basis for managing populations of dugongs and other marine mammals in the Great Barrier Reef Marine Park.

November 1983 –

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
P.O. Box 1379,
Townsville, Qld 4810

James Cook University of North Queensland
(Subcontract)
Post Office,
James Cook University,
Townsville, Qld 4811

PROJECT LEADERS:

Dr W. Craik (077) 818811
Dr H.D. Marsh (077) 814242

CONTACT OFFICER:

Dr H.D. Marsh

EXPENDITURE:

$69,000 (this year), $116,958 (all years)

MANPOWER:

1.00 (this year), 3.00 (all years)

OBJECTIVES

To develop an effective regime for monitoring dugong population in Northern Australia.
To obtain management relevant information on dugongs.
To co–ordinate information on man–induced dugong mortality.
To obtain collate and analyse information on other marine mammals.

METHODOLOGY

Aerial surveillance, specific dugong aerial surveys, specimen collection and analysis, collection of data on incidental sightings, collection of data on catches of dugong.

STATUS

Pilot study completed. Study continuing.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: *Dugong dugon* /Sirenia/Population dynamics/

[GBRMPA084]

84 Functional morphology and nutrition of the dugong in relation to it's seagrass diet.

January 1984 – October 1986

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
P.O. Box 1379,
Townsville, Qld 4810

Monash University (Subcontract)
Department of Zoology,
Clayton, Vic 3168

PROJECT LEADERS:

Dr W. Craik (077) 818811
Ms J. Lanyon

CONTACT OFFICER:

Ms E. Eager (077) 818811

EXPENDITURE:

$1,750 (all years)

MANPOWER:

1.00 (this year), 2.00 (all years)

OBJECTIVE

To investigate seagrasses at the community, morphological and ultra– structural levels in relation to the functional morphology of the dentition and digestive tract of the dugong.

METHODOLOGY

Laboratory investigation into the physical and chemical nature of seagrasses with respect to digestibility will be combined with studies of the mechanics of mastication by dugong and samples of ingested material from dugong.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: *Dugong dugon* /Sirenia/Nutrition/Seagrass/

[GBRMPA109]

85 Pathological investigation into causes of mortality in giant clams at Lizard Island.

July 1985 – June 1986

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

James Cook University of North Queensland
Department of Tropical Veterinary Science
Townsville Qld 4811

PROJECT LEADERS:

Dr W. Craik (077) 818811
Prof R.S.F. Campbell (077) 814111
Dr J. Glazebrook (077) 814111

CONTACT OFFICER:

Mr I.M. Dalton (077) 818811

EXPENDITURE:

$1,253 (this year), $1,253 (all years)

MANPOWER:

0.10 (this year), 0.10 (all years)

OBJECTIVE

To analyse samples of nine giant clams (*Tridacna* spp.) to determine whether there is any pathological variations between the samples.

METHODOLOGY

Following gross external examinations, tissues will be processed for microscopic examination. During routine analysis, any lesions present will be described and morphological diagnosis of the condition(s) made.

STATUS

A preliminary report suggesting infection with an unknown unicellular parasite has been submitted. Further investigation is continuing into the significance of this finding.

LOCALITY: Lizard Island

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Tridacna/Mortality causes/Pathology/

[GBRMPA135]

86 Pathology of crown of thorns starfish (pilot study).

April 1985 – June 1986

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

James Cook University of North Queensland
Department of Marine Biology
Townsville Qld 4811

PROJECT LEADERS:

Dr L. Zann (077) 818811
Dr J. Lucas (077) 814111
Dr D.C. Sutton (077) 814111

CONTACT OFFICER:

Dr L. Zann

EXPENDITURE:

$2,024 (this year), $2,024 (all years)

MANPOWER:

0.05 (this year)

OBJECTIVES

To isolate bacteria associated with a disease affecting *Acanthaster planci* in Fiji.
To characterise potentially pathogenic bacteria at the Centre for Tropical Marine Studies, James Cook University and test for ability to cause disease in *in vitro* cell cultures of *A. planci* from the Great Barrier Reef Region.

METHODOLOGY

Field collection of diseased and healthy specimens of *A. planci* from Suva barrier reef. Laboratory isolation of bacteria, purification and pathogenicity testing.

STATUS

Collection completed. Testing in progress. It is expected that this study will attract support from MSTGS and COTSAC.

CO-ORDINATION WITH OTHER PROJECTS

Specimens were also analysed for viral inclusions and histological changes by Prof J. Campbell and Dr J. Glazebrook, School of Tropical Veterinary Science, James Cook University.

LOCALITY: Fiji
GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: *Acanthaster planci* /Bacteria/Pathogenic organisms/

[GBRMPA143]

87 Reproductive ecology of eight staghorn coral species.

September 1983 – August 1985

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4811

James Cook University of North Queensland
Department of Marine Biology
Townsville Qld 4811

PROJECT LEADERS:

Dr W. Craik (077) 818811
Dr C. Wallace (077) 814111

CONTACT OFFICER:

Dr W. Craik

EXPENDITURE:

$2,741 (all years)

OBJECTIVE

To study eight closely related species of staghorn coral, living in close proximity on a reef, for their modes of sexual and asexual reproduction.

METHODOLOGY

Laboratory examination of reproductive specimens resulting from collection from tagged colonies of the eight study species over the previous two year period.

STATUS

Completed Project – This project will remain in the computerized Register for another 5 years but will not be included in future issues of the Compendium.

GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Corals/Reproduction (biological)/

[GBRMPA131]

88 **Sexual or asexual reproduction: an electrophoretic examination of the brood planulae of scleractinian corals.**

February 1985 –

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

Australian Institute of Marine Science
PMB 3, MSO
Townsville Qld 4810

PROJECT LEADERS:

Dr W. Craik (077) 818811
Ms J. Resing

CONTACT OFFICER:

Ms E. Eager (077) 818811

EXPENDITURE:

$900 (this year), $1,900 (all years)

MANPOWER:

1.00 (this year), 2.00 (all years)

OBJECTIVES

To determine the mode of reproduction of species of scleractinian coral which produce brooded planulae on the Great Barrier Reef.
To study substratum selection by the planulae.

METHODOLOGY

Field sampling, laboratory observation and electrophoretic examination of planulae. Field and laboratory settling experiments.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Scleractinia/Reproduction (biological)/Larvae/Recruitment/

[GBRMPA154]

89* **Feeding and breeding ecology of seabirds.**

August 1973 –

ORGANIZATION:

Griffith University
School of Australian Environmental Studies
Nathan, Qld 4111

PROJECT LEADERS:

Dr K. Hulsman (07) 2757520
Dr N.P.E. Langham

CONTACT OFFICER:

Dr K. Hulsman

EXPENDITURE:

$13,900 (this year), $27,669 (all years)

MANPOWER:

0.52 (this year), 3.26 (all years)

EXTERNAL SUPPORT:

GBRMPA – $14,300 (Aerial photographs of islands in the Capricornia Section.)

Co-ordinator General, Premier's Department (Queensland) — $10,400

OBJECTIVES

To gather information about the ecology of seabirds, that is needed to manage their populations in the Capricornia Section of the Marine Park. We are addressing these general questions:
(a) What population size is necessary for the long term survival of each species of seabird that breeds in the region?
(b) What islands are needed as breeding grounds for the long–term survival of these species?
(c) What is the direct and indirect impact of human activity on the survival of each species?
(d) What do seabirds eat and over what area of ocean around colonies does each species of seabird forage?
In order to answer these general questions, population parameters, such as, size of breeding and non–breeding populations, breeding success, rate of recruitment, causes of mortality and the amount of resources (nesting areas and food) needed must be measured.

METHODOLOGY

Islands are visited several times during the breeding season. Visits are timed to enable our measuring of number of pairs, hatching and fledging success. Populations are censused by absolute or relative counts (transects or quadrats). Banding birds with colour and/or metal bands can provide data on interchange of birds between colonies, age structure of population, recruitment and dispersal of birds. Aerial photographs can be used to measure the area suitable for each species to nest in provided the

characteristics of the nesting areas are known. Field experiments will resolve what portion of suitable area is available for nesting.
Number of each species foraging along belt transects between islands will provide data on distances that each species hunts from its colonies. Some colonies are observed for extended periods during which causes of mortality of eggs and chicks, growth rates of chicks and size and type of prey can be determined.

STATUS

All seabird colonies in the Capricornia Section of the GBR Marine Park were censused during two successive breeding seasons (1982–83 & 1983–84). The following were determined: The distribution and size of breeding colonies of each species of seabird, reproductive output, movement of species, features of nesting areas of each species and where each species foraged. These data are being used to develop possible management strategies. The most promising means to protect seabird colonies appears to be to increase the public's awareness about what seabirds require to breed successfully and so decrease levels of disturbance to breeding birds.

LOCALITIES: Capricorn Group; Bunker Group; Great Barrier Reef Marine Park – Capricornia Section

GEOGRAPHIC REGION: R

SHIP TIME REQUIREMENTS: 54

MAJOR DESCRIPTORS: Aves/Feeding behaviour/Reproductive behaviour/Biological surveys/Resource management/

[GRIFFI002]

90* Feeding structures, growth, and spat fall of scallops of the genus *Amusium* (Bivalvia: Pectinidae) in waters off Townsville.

ORGANIZATION:
James Cook University of North Queensland
Zoology Department,
Townsville, Qld 4811

PROJECT LEADERS:
Mr B. Kettle (077) 814844
Dr N.E. Milward (077) 814193

CONTACT OFFICER:
Dr N.E. Milward

EXPENDITURE:
$200 (this year), $200 (all years)

MANPOWER:
0.50 (this year), 0.50 (all years)

EXTERNAL SUPPORT:
Reef Link Pty. Ltd., Townsville (12 day trips to the reef, to enable spat collections to be made.)

OBJECTIVE

To determine particle size selection in feeding; to investigate the potential of shell characteristics for age and growth determinations; and to develop spat collecting techniques as a preliminary to recruitment studies.

METHODOLOGY

Size selection characteristics of the gill have been determined by photomicrography of sectioned gills and gut content examinations. Shell structure was investigated with a scanning electron microscope. Age is being determined from large samples of height distribution data, allowing comparison of structure and age of shells. Spat fall has been investigated using a number of artificial substrates, collector designs and materials, all at various depths.

STATUS

Gut particle sizes determined for both species, related to gill structure. No firm relationship between particular shell characteristics and age has been found. Spat stage detected in adult shell by S.E.M. Spat found on artificial collectors. Preferred designs, depths and materials becoming apparent. Results at write–up stage.

LOCALITY: Townsville

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Bivalvia/Feeding/Growth/

[JAMESC071]

91* **Larval growth, ecology and behaviour of commercially significant fish and crustacean species in the continental shelf zone of the Great Barrier Reef.**

June 1984 –

ORGANIZATION:
James Cook University of North Queensland
Zoology Department,
Townsville, Qld 4811

PROJECT LEADERS:
Dr R.F. Hartwick (077) 814272
Dr N.E. Milward (077) 814193

CONTACT OFFICER:
Dr N.E. Milward

EXPENDITURE:
$18,000 (this year), $18,000 (all years)

MANPOWER:
1.10 (this year), 1.10 (all years)

EXTERNAL SUPPORT:
MSTGS – $18,000

OBJECTIVE

To address a number of specific aspects of the larval ecology and behaviour of several groups of crustacea and fish with realized or potential commercial significance. The work is building upon the findings of studies on the basic systematics, distributional and feeding ecology of these groups, with the goal of providing information crucial to managerial predictions of juvenile recruitment or to the establishment of mariculture schemes. Initial emphasis is being placed upon growth and feeding studies of selected fish species and upon the larval development and symbiotic associations in scyllaridean lobsters.

METHODOLOGY

Field collections will be based upon an intensive grid sampling programme in waters off Townsville, conducted at intervals of 5–7 days during the November–January period of known maximum production of target species. On each sampling day, ten to twelve large–volume tows will be made with a modified Tucker trawl and at each station hydrographic profiles and fine–mesh plankton tows will be made to assess environmental conditions and abundance of major food items. Observations and collections of phyllosoma larvae will also be made by teams of 3 or 4 drivers, followed by laboratory studies of live material in plankton kreisels.

STATUS

This project, in its initial stages, is a development from a previous sampling programme of fish and decapod species from the continental shelf zone of the Great Barrier Reef. This programme provided an excellent sample base for continued studies on the zooplankton of this zone and much of the effort this year has been directed towards the further analysis of these samples.
The major collecting and observations of this new project will commence late in the year.

CO-ORDINATION WITH OTHER PROJECTS

Collaboration with projects being carried out on ichthyoplankton by Dr J. Leis (Australian Museum) and by Dr D. McB. Williams (AIMS).

GEOGRAPHIC REGION: R
SHIP TIME REQUIREMENTS: 13 days
MAJOR DESCRIPTORS: Pisces/Crustacea/Commercial species/Ecology/Behaviour/

[JAMESC070]

92 **Monitoring and mapping of coral spawning using remote sensing techniques (pilot study).**

September 1985 – June 1986

ORGANIZATIONS:

James Cook University of North Queensland
Sir George Fisher Centre for Tropical Marine Studies
Townsville Qld 4811

CSIRO
Davies Laboratory
PMB, PO
Aitkenvale Qld 4814

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

PROJECT LEADERS:

Dr J. Baker (077) 814111
Dr D. Kuchler (077) 719540
Dr L. Zann (077) 818811

CONTACT OFFICER:

Mr J. Oliver (077) 814111/(062) 465633

EXPENDITURE:

$25,200 (this year), $25,200 (all years)

MANPOWER:

0.30 (this year), 0.30 (all years)

OBJECTIVES

To investigate the occurrence, persistence and behaviour of coral spawning slicks in the Great Barrier Reef and West Pacific.
To correlate field verification and spectroscopy of coral spawning slicks, by simultaneous surface sampling, aerial photography and satellite imagery.

METHODOLOGY

Locate, photograph and take spectral measurement of slicks by aerial and surface surveys. Slicks are to be stained with vital dyes and monitored by aerial observation. LANDSAT and NOAA (AVHRR) images will be analysed.

STATUS

It is expected that this study will be supported by MSTGS.

GEOGRAPHIC REGIONS: R,P

MAJOR DESCRIPTORS: Corals/Spawning/Monitoring/Remote sensing/

[JAMESC082]

93* **Reproductive strategies and resource partitioning in comatulid crinoids at Lizard Island.**

April 1981 – October 1985

ORGANIZATIONS:

James Cook University of North Queensland
Biology Department,
Townsville, Qld 4811

Australian Museum
6–8 College Street,
Sydney, N.S.W. 2000

PROJECT LEADERS:

Mr L. Vail (02) 3398340
Dr J. Lucas (077) 814412 (Ph.D. supervisor)
Dr F. Rowe (02) 3398340 (Ph.D. supervisor)

CONTACT OFFICER:

Mr L. Vail

EXPENDITURE:

$3,500 (this year), $9,000 (all years)

MANPOWER:

1.00 (this year), 1.50 (all years)

EXTERNAL SUPPORT:

Macquarie University, Department of Environmental Studies – $1,000

OBJECTIVE

To determine reproductive patterns in seven species of commonly occurring comatulid crinoids at Lizard Island. To describe short term variation in spatial and temporal patterns of distribution, abundance, and size class structure for crinoids in various reef habitats.

METHODOLOGY

Reproductive patterns were determined through histological analysis of genital pinnules which were collected at regular intervals over two years. Aspects of crinoid population biology and dynamics were monitored, every 2–3 months for one year, for those crinoids contained in transects established at three depths at each of four stations.

STATUS

Field work was completed in March 1983. Reproductive patterns of five of the seven study species have been analyzed. This is the first long term study on reproductive patterns of Great Barrier Reef crinoids. Most of the population biology data remains to be analyzed although preliminary results

show strong circadian rhythms with some species being distinctly nocturnal. New species of crinoids were collected during the nocturnal studies and have been described.

Completed Project – This project will remain in the computerized Register for another 5 years but will not be included in future issues of the Compendium.

LOCALITY: Lizard Island
GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Crinoidea/Reproduction (biological)/Population dynamics/

[JAMESC075]

94* **Studies on the biology of Grunters (Teleostei: Pomadasyidae) from north Queensland waters.**

March 1980 – March 1986

ORGANIZATION:
James Cook University of North Queensland
Department of Zoology,
Townsville Qld 4811

PROJECT LEADERS:
Mr T.M. Bade (077) 814171
Dr N.E. Milward (077) 814193

CONTACT OFFICER:
Mr T.M. Bade

EXPENDITURE:
$2,300 (this year), $7,000 (all years)

MANPOWER:
0.50 (this year), 1.60 (all years)

OBJECTIVES
To study the growth, breeding cycles and feeding of four species of pomadasyid fishes in Cleveland Bay near Townsville, and in local estuaries.
To document the larval and early juvenile stages of the species in local waters.

METHODOLOGY
Monthly trawl samples of the four species have been collected in Cleveland Bay and supplementary data are being collected in local estuaries. A tagging program is being undertaken on most abundant species. It is intended to raise young fish in aquaria from artificially fertilized eggs.

STATUS
Three years of trawl sampling have been completed and data on length, weight, age and feeding have been collected. Approximately 980 fish have been tagged and 130 have been recovered to date, with freedom times up to eight months. The larval development work is still to be completed.

LOCALITY: Cleveland Bay
GEOGRAPHIC REGION: R
SHIP TIME REQUIREMENTS: Six days
MAJOR DESCRIPTORS: Pomadasyidae/Growth/Feeding/Life cycle/Larvae/

[JAMESC015]

95* **The culture of the giant clam (Tridacnidae) for food and restocking of tropical reefs.**

July 1984 – June 1987

ORGANIZATION:
James Cook University of North Queensland
Townsville, Qld 4811

PROJECT LEADERS:
Prof C. Burdon-Jones (077) 814530
Dr J. Lucas (077) 814412
Dr J. Munro (077) 814122

CONTACT OFFICER:
Dr J. Lucas

EXPENDITURE:
$155,634 (this year), $496,070 (all years)

MANPOWER:
8.00 (this year), 24.00 (all years)

EXTERNAL SUPPORT:
ACIAR – $496,070 (Additional funding is provided for overseas collaborating institutions.)

OBJECTIVES

1. To assess tridacnid stocks at various localities.
2. To study growth rates in natural populations and the effects of environmental factors.
3. To elucidate the reproductive biology of giant clams.
4. To determine the optimum conditions for development of larvae and juveniles.
5. To apply the results of this research to the development of large-scale mariculture techniques for production of giant clams for food and restocking reefs.

METHODOLOGY

James Cook University will collaborate in all aspects of this research with four institutions in developing countries: University of Papau New Guinea; Ministry of Agriculture and Fisheries, Fiji; Silliman University, Negros, Philippines; and University of the Philippines. Different aspects of the research will require a wide range of field and laboratory techniques.

STATUS

Preliminary planning for the project occurred through 1983 and early 1984. Funding of the project commenced in July 1984 and, since then, staff appointments have been made and the research commenced. A meeting of representatives from all the participating institutions will be held in November 1984 to review initial progress, standardise techniques and coordinate the research at the various centres.

CO-ORDINATION WITH OTHER PROJECTS

This project is associated with the International Giant Clam Research Program which was initiated by the International Centre for Living Aquatic Resources Management. It is coordinated with a major survey of giant clam stocks in the Great Barrier Reef region by Queensland Department of Primary Industries, Fisheries Division.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Tridacna/Commercial species/Growth/Reproduction (biological)/Aquaculture/

[JAMESC078]

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96 Year to year variation in recruitment of juvenile scleractinian corals.

January 1984 – December 1985

ORGANIZATIONS:
James Cook University of North Queensland
Department of Marine Biology
Townsville, Qld 4811

Bureau of Flora and Fauna
P.O. Box 1383
Canberra, ACT 2601

PROJECT LEADERS:
Dr C.C. Wallace (062) 467430
Ms A. Watt (077) 814252

CONTACT OFFICER:
Dr C.C. Wallace

EXPENDITURE:
$44,000 (this year), $84,000 (all years)

MANPOWER:
1.00 (this year), 1.00 (all years)

EXTERNAL SUPPORT:
MSTGS (1984,1985)

GBRMPA (1983 – 4)

OBJECTIVES

To examine:
1. Recruitment over 5 years to a series of replicated reef front sites by coral larvae
2. Growth in early life, patterns of larval dispersal and recruitment after predation by acanthaster.

METHODOLOGY

The project uses calcium carbonate (dead coral) settlement plates experimentally placed; corals are detected by microscopic examination after 4 months.

STATUS

Project is almost finalised. Recruitment has been most variable in shallow sites. Relative recruitment to various sites has been mostly consistent, with 3 significant anomalies. Recruitment has occurred within 10 weeks of predation by *Acanthaster planci*

Completed Project – This project will remain in the computerized Register for another 5 years but will not be included in future issues of the Compendium.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Scleractinia/Corals/Juveniles/Recruitment/Variations/

[JAMESC081]

97* **Times of evolutionary divergence of species and subspecies of the Indo West–Pacific fish family Siganidae.**

February 1984 –

ORGANIZATIONS:

University of New England
Department of Zoology and Division of Ecology,
Armidale, N.S.W. 2351

CSIRO
Division of Fisheries Research,
Marine Laboratory,
P.O. Box 120,
Cleveland, Qld. 4163

PROJECT LEADERS:

Dr D.J. Woodland (067) 732791
Dr J.B. Shaklee (07) 2862022

CONTACT OFFICER:

Dr D.J. Woodland

EXPENDITURE:

$3,000 (this year), $6,000 (all years)

MANPOWER:

0.10 (this year), 0.40 (all years)

OBJECTIVE

To place the evolutionary history of the Siganidae within a time frame so that their distributions can be interpreted in the light of their biology, present conditions (e.g. currents) and the history (e.g. plate tectonics) of the Indo–Pacific. The initial study will investigate whether quaternary events may have been responsible for the evolution of a number of parapatric pairs of geminate species in the Indo–Malayan area.

METHODOLOGY

Collecting specimens in key localities. Electrophoretic analyses of proteins of tissues.

STATUS

Deep frozen tissue samples from five of the eight species collected in Malaysian waters in storage, pending collection of remaining species in North Australian waters.

GEOGRAPHIC REGIONS: P,I,R,Y

MAJOR DESCRIPTORS: Siganidae/Evolution/Quaternary period/Biogeography/Species diversity/

[UNIARM007]

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98 **Genetic improvement of the Sydney Rock Oyster.**

July 1985 – June 1988

ORGANIZATION:
University of New South Wales
School of Zoology
PO Box 1
Kensington, NSW 2033

PROJECT LEADERS:
Dr P.I. Dixon (02) 6972112
Dr R.H. Crozier (02) 6972119
Mr R.A. Griffiths (02) 6972112

CONTACT OFFICER:
Dr P.I. Dixon

EXPENDITURE:
$22,500 (this year), $22,500 (all years)

MANPOWER:
1.20 (this year), 1.20 (all years)

EXTERNAL SUPPORT:
FIRTA – $21,078

OBJECTIVES

The project is aimed at improving the Sydney rock oyster. Two possible methods of improvement will be investigated.:–
1. Induction triploidy in the oysters. This method has produced increased growth rates in the American oyster (*Crassostrea virginica*).
2. Crossbreeding with *Saccostrea* sp. from Western Australia.

METHODOLOGY

1. Triploidy will be induced chemically by Cytochalasin B. Growth rates will be monitored. Heterozygosity will be estimated by means of (by electrophoresis) isozyme genetics.
2. Karyotypes will be determined for the Sydney rock oyster and the closely related WA species. Banding techniques may be used. Attempts will then be made to cross breed these oysters and growth and heterozygosity will be monitored as above.

STATUS

Hatchery ready to begin operations in Jan 1986.

CO-ORDINATION WITH OTHER PROJECTS

Where appropriate we will co–ordinate our work with that being carried out on oyster improvement by the NSW Fisheries Institute (Dept. of Agriculture).

GEOGRAPHIC REGIONS: N,R,W

MAJOR DESCRIPTORS: Bivalvia/ Oyster culture/Growth/Genetics/

[UNINSW046]

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99 Reproduction and recruitment of giant clams (Tridacnidae) and dietary preference of larvae of *Tridacna*.

November 1983 – December 1986

ORGANIZATIONS:
University of New South Wales
Zoology Department,
P.O. Box 1,
Kensington, N.S.W. 2033
Australian Institute of Marine Science
P.M.S. No. 3,
Townsville M.C., Qld 4810

PROJECT LEADERS:
Dr R.J. MacIntyre (02) 6622110
Dr E. Drew (077) 789211
R.D. Braley

CONTACT OFFICER:
Dr R.J. MacIntyre

EXPENDITURE:
$13,100 (this year), $41,979 (all years)

MANPOWER:
1.20 (this year)

EXTERNAL SUPPORT:
MSTGS – $58,839

OBJECTIVE

The central aim is the survival of giant clams, from the threat of extensive population damage to Pacific area populations. It is time for serious scientific study of their natural breeding and recruitment, together with artificial rearing work and study of larval nutrition to enable damaged populations to be re–established.

METHODOLOGY
Field study sites set up at 4 reefs: at one reef monthly gonad biopsy extraction samples are taken and examined microscopically, and one reef is sampled by the same method quarterly. Spatial distribution, recruitment and natural spawning studies are done within gapped study sites. Broodstock collection, holding, induced spawning, larval rearing and larval dietary preference studies are being done at Lizard Island Research Station, where high densities of clam populations are found.

STATUS
Field studies continue on recruitment, distribution and spawning (both natural and serotonin–induced). Larval rearing and continued growth have been achieved for 3 tridacnid species. Clam disease at Lizard Island has been monitored.

CO-ORDINATION WITH OTHER PROJECTS
Consultation continues with ACIAR clam project, James Cook University and AIMS.

GEOGRAPHIC REGION: R
SHIP TIME REQUIREMENTS: 37 days
MAJOR DESCRIPTORS: Tridacna/Recruitment/Reproduction (biological)/Larvae/Feeding/

[UNINSW035]

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100 **Biology of holoplanktonic molluscs of Australian waters.**

August 1985 – January 1989

ORGANIZATION:
University of Queensland
Department of Zoology
St Lucia, Qld 4067

PROJECT LEADERS:
Dr J. Greenwood (07) 3772491
Dr R. Willan

CONTACT OFFICER:
Ms L.J. Newman (07) 3772475

EXPENDITURE:
$700 (this year), $3,000 (all years)

MANPOWER:
0.50 (this year), 3.00 (all years)

EXTERNAL SUPPORT:
Hawaiian Malacological Society

OBJECTIVES
To document the holoplanktonic molluscan fauna of Australia.
To study the biology of pteropods and heteropods from waters of the Great Barrier Reef. Emphases are on taxonomy and phylogeny, reproductive and feeding biology. Their contributions to reef ecology will be considered.

METHODOLOGY
Nets of 200, 500 and 1000 μm mesh are used to capture various life–stages and species. Predator–prey interactions will be studied *in situ* and in aquaria at Heron and Lizard Islands research stations. Taxonomic studies will utilize SEM, and photomicroscopy of 'fresh' specimens.

STATUS
The distribution of pteroped molluscs from waters around most of Australia and New Guinea was examined in a previous study and formed the basis for a report to the Australian Biology Resources study program (Greenwood and Newman, 1985). Publications from that study are in preparation. Sampling around Heron Island has commenced and will be intensified through summer months. Sampling will be extended to the region of Lizard Island as funds permit.

LOCALITIES: Heron Island; Lizard Island
GEOGRAPHIC REGIONS: R,Z,N,E,C,Y,J
MAJOR DESCRIPTORS: Mollusca/Plankton/Taxonomy/Phylogeny/Ecology/

[UNIQLD085]

101* **Parasites and diseases of marine birds from coral cays on the Great Barrier Reef and their potential for causing zoonotic infections.**

December 1984 – December 1986

ORGANIZATIONS:
University of Queensland
Department of Parasitology,
St. Lucia, Qld. 4067
Queensland National Parks and Wildlife Service
P.O. Box 42,
Kenmore, Qld. 4069

PROJECT LEADERS:
Assoc. Prof. D.E. Moorhouse (07) 3773303
Mr M.P.S. Ogilvie (07) 2027000

CONTACT OFFICER:
Assoc. Prof. D.E. Moorhouse

EXPENDITURE:
$33,650 (this year), $33,650 (all years)

EXTERNAL SUPPORT:
MSTGS – $32,300

OBJECTIVE
To determine the arboviruses, protozoa and helminths which infect the marine birds on the coral cays and the ectoparasites which infest them. To evaluate the roles of these organisms in controlling the bird populations and the likelihood of these same infections affecting man.

METHODOLOGY
Standard investigational and arbovirus isolation techniques will be used by principal investigators and collaborating laboratories.

GEOGRAPHIC REGIONS: Q,R
MAJOR DESCRIPTORS: Parasites/Aves/Disease control/Cays/

[UNIQLD064]

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102 **Parasitology of coral reef fish.**

May 1986 – December 1986

ORGANIZATIONS:
University of Queensland
Department of Parasitology
St Lucia Qld 4067
Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

PROJECT LEADERS:
Dr R. Lester (07) 3773305
Dr L. Zann (077) 818811

CONTACT OFFICER:
Dr L. Zann

EXPENDITURE:
$1,980 (this year), $1,980 (all years)

OBJECTIVES
To study parasites of coral reef fish during a workshop following the 6th International Congress of Parasitology.
To subsequently describe a number of new species.

METHODOLOGY
One week workshop involving international experts to be held at Heron Island in August 1986. Collection and taxonomic description of parasites.

GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Parasites/Pisces/Coral reefs/Conferences/

[UNIQLD077]

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103 **Virus diseases in juvenile prawns.**

January 1984 – December 1986

ORGANIZATIONS:
University of Queensland
Department of Parasitology,
St. Lucia, Qld. 4067
CSIRO
Marine Laboratories,
Cleveland, Qld. 4163
University of Arizona
Environmental Research Laboratory,
Tucson, Arizona 85706.
United States of America

PROJECT LEADERS:
Dr C. Dobson (07) 3772572
Dr W. Dall (07) 2862022
Dr D. Lightner

CONTACT OFFICER:
Dr R.J.G. Lester (07) 3773305

EXPENDITURE:
$15,000 (this year)

MANPOWER:
0.70 (this year)

EXTERNAL SUPPORT:
Rural Credits Development Fund – $29,849
(Total for 1984/6)

OBJECTIVE
To find out what viruses are present in Australian juvenile penaeid prawns.

GEOGRAPHIC REGIONS: C,Q,R

MAJOR DESCRIPTORS: Penaeidae/Juveniles/Viruses/Disease control/

[UNIQLD069]

104 Functional morphology and phylogeny of barnacles (Cirripedia).

January 1978 –

ORGANIZATION:
University of Sydney
School of Biological Sciences
Zoology Building A.08
Sydney, NSW 2006

PROJECT LEADER:
Prof D.T. Anderson (02) 6922438

EXPENDITURE:
$4,500 (this year), $14,500 (all years)

MANPOWER:
1.00 (this year), 7.00 (all years)

EXTERNAL SUPPORT:
ARGS – $3,800

OBJECTIVE
To elucidate the functional morphology of the barnacles of eastern Australia and its bearing on cirripede phylogeny. A major emphasis is placed on cirral activities and feeding mechanisms.

METHODOLOGY
Available species of lepadomorphs, chthamaloids, coronuloids and balanoids are being investigated using light microscopy, histology and scanning electron microscopy. Experimental investigations of cirral activity involving cine– and video recording are carried out under controlled conditions.

STATUS
Studies have now been carried out in iblids, lepadids, chthamaloids and some tetraclitids, resulting in various hypotheses on the phylogeny of these groups. Convergent evolution of rhythmic cirral activities has been demonstrated. Convergent evolution of filter feeding in larger balanomorphs is now being investigated.

GEOGRAPHIC REGIONS: N,Q,R

MAJOR DESCRIPTORS: Cirripedia/Morphology (organisms)/Feeding/Phylogeny/

[UNISYD013]

105* Population limitation in the reef fishes *Pomacentrus amboinensis* and *Dascyllus aruanus*.

ORGANIZATION:
University of Sydney
School of Biological Sciences,
Sydney, N.S.W. 2006

PROJECT LEADER:
Dr G.P. Jones (02) 6922387

EXPENDITURE:
$3,000 (this year), $3,000 (all years)

MANPOWER:
1.00 (this year), 1.00 (all years)

EXTERNAL SUPPORT:
QFMRAAC

OBJECTIVE

To assess the importance of variability in recruitment, juvenile survivorship and maturation time on input to breeding populations of two reef fishes, *Pomacentrus amboinensis* and *Dascyllus aruanus* (Pomacentridae). A series of experiments are being conducted to examine the effects of food availability and intra– and interspecific social interactions on these pre–maturational demographic processes.

METHODOLOGY

Density manipulations on natural reefs, and those uniformly constructed from coral rubble.

STATUS

Approximately two thirds of the planned experiments are underway and will be continued for as long as possible (approximately 2 years). Experiments involving food manipulations will be initiated in January and February, 1985.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Pisces/Pomacentridae/ *Dascyllus* /Population dynamics/

[UNISYD069]

See also: 44, 115, 130, 174, 185, 187, 202, 208, 211*

106 Taxonomy of the common dictyoceratid sponges of the Great Barrier Reef.

January 1984 – December 1985

ORGANIZATION:
Australian Institute of Marine Science
PMB 3,
Townsville, Qld. 4810

PROJECT LEADERS:
Dr C. Wilkinson (077) 789211
Dr J.A. Stoddart (077) 789211

CONTACT OFFICER:
Dr C. Wilkinson

EXPENDITURE:
$20,000 (this year), $12,300 (all years)

MANPOWER:
0.75 (this year), 1.75 (all years)

EXTERNAL SUPPORT:
ABRS – $12,010

OBJECTIVE
To clarify the systematics and taxonomy of the common dictyoceratid sponges of the Great Barrier Reef, and document these findings.

METHODOLOGY
Character sets will include both morphological and electrophoretic characters, as well as reproductive criteria. Analysis of character sets will be by classical and numeric methods.

STATUS
Results awaiting publication.

Completed Project – This project will remain in the computerized Register for another 5 years but will not be included in future issues of the Compendium.

GEOGRAPHIC REGION: R

SHIP TIME REQUIREMENTS: 8

MAJOR DESCRIPTORS: Taxonomy/Sponges/ *Carterospongia* / *Phyllospongia* /

[AIMS—008]

107 Taxonomy of Australian marine fish parasitic isopod crustaceans (Family Cymothoidae).

February 1985 – February 1987

ORGANIZATION:
Australian Museum
Division of Invertebrate Zoology,
PO Box A285,
Sydney NSW 2001

PROJECT LEADER:
Dr N.L. Bruce (02) 3398111

EXPENDITURE:
$5,500 (this year), $5,500 (all years)

MANPOWER:
1.00 (this year), 1.00 (all years)

EXTERNAL SUPPORT:
Queen Elizabeth Fellowship in Marine Science

OBJECTIVE
Collect and describe cymothoid fish parasitic isopods from the Barrier Reef and tropical Australia.

METHODOLOGY
Methods used are those traditionally used to study taxonomy of peracarid crustacea.

STATUS
The project has centred on those cymothoids that occur externally on the fish and the total number of species within these genera has increased from 6 to 25, including 8 new species. A manuscript (ca 65 pp) is about to be submitted for publication, and two further manuscripts are being prepared. These three articles should be published in 1987.

GEOGRAPHIC REGIONS: Y,C,J,R

MAJOR DESCRIPTORS: Taxonomy/Crustacea/Parasites/Cymothoidea/

[AUSMUS017]

108* Taxonomic revision of the cephalochordata.

January 1983 – December 1985

ORGANIZATION:
Department of Home Affairs and Environment
Bureau of Flora and Fauna,
P.O. Box 1383 G.P.O.,
Canberra, A.C.T. 2601

PROJECT LEADER:
Dr B.J. Richardson (062) 467481

EXPENDITURE:
$300 (all years)

MANPOWER:
0.05 (this year), 0.20 (all years)

OBJECTIVE
To revise the taxonomy of the temperate and tropical cephalochordates of Australia using morphological and biochemical (electrophoresis) characteristics. To identify distributions and habitat preferences of the species.

METHODOLOGY
Morphometric analysis of body parameters and comparative electrophoresis of enzymes.

STATUS
The status and distribution of the two southern species have been determined. The distribution of the five plus tropical species is still under study. Several species complexes are involved and further work will be concentrated on determining the number of species in these groups using electrophoresis. A key has been prepared to all known Indo– Pacific species.

Completed Project – This project will remain in the computerized Register for another 5 years but will not be included in future issues of the Compendium.

GEOGRAPHIC REGIONS: A,R

MAJOR DESCRIPTORS: Cephalochordata/Taxonomy/Distribution patterns/

[DHAE—009]

109 Ostracoda and environment – northern Australia, Indopacific.

ORGANIZATION:
Riverina–Murray Institute of Higher Education
School of Applied Science
P.O. Box 588
Wagga Wagga, N.S.W. 2650

PROJECT LEADER:
Dr K.G. McKenzie (069) 232550

CONTACT OFFICER:
Mr D.J. Kelso (069) 232224

EXPENDITURE:
$11,166 (all years)

MANPOWER:
0.84 (all years)

EXTERNAL SUPPORT:
ARGS (Accommodation was provided at Bandung for 10 days during July 1980.)

OBJECTIVE
To identify Cenozoic (Tertiary–Recent) ostracodes of the region, determine their environmental associations, and place type collections in Australian repositories.

METHODOLOGY
Collection of samples, determination of associated ecological factors.
Picking of ostracoda and sorting onto microslides.
Scanning electron microscopy.
Description of species, designation of types.
Publication.

STATUS
Sahul Shelf – all material picked and mounted in microslides (78 samples); ecological factors known; species identified; analysed numerically, types selected. 3 publications.
Arafura Sea – all material picked and mounted; ecological factors known; species identified, analysed numerically. 1 publication.
CSIRO IIOE planktic material – all material prepared; species identified; analysed numerically; species identified. 1 publication.
Torres Strait. 1 publication (joint, with A.J. Keij).
Darwin – paper in preparation.

Indonesia – 1 publication (joint with Sudijono).
Lizard Island – samples collected; ostracodes picked; stored in alcohol.
SOPAC Cruises – about 60 samples picked. Report forwarded to SOPAC, published as Technical Report. 1 publication.

GEOGRAPHIC REGIONS: E,Y,C,J,R

MAJOR DESCRIPTORS: Ostracoda/Taxonomy/Distribution patterns/Abiotic factors/Biotic factors/

[RCAE—001]

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110 **Taxonomy and ecology of benthic invertebrates from Heron Island, Queensland.**

November 1980 –

ORGANIZATION:
University of Queensland
Department of Zoology
St Lucia, Qld 4067

PROJECT LEADER:
Dr T.S. Hailstone (07) 3772508

EXPENDITURE:
$11,724 (this year), $55,562 (all years)

MANPOWER:
0.40 (this year), 1.80 (all years)

EXTERNAL SUPPORT:
AMSTAC–FAP – $55,562

OBJECTIVES

To publish field–guide handbooks which will enable research workers and others to identify species in selected groups of marine benthic invertebrates known to occur in the vicinity of Heron Island (especially opisthobranch and prosobranch gastropods, holothurians, and isopods).
To summarize collected information concerning habitats, habits, resource utilization, and breeding activities of species covered by these handbooks.
To collate relevant information which is scattered throughout the literature.
These handbooks should provide: bases upon which more extensive ecological studies can be planned for this area; information essential to assessment of po ssible undescribed species; and information that has bearing on marine park management procedures.

METHODOLOGY

Workers with expertise in each selected invertebrate group are accumulating reference collections and relevant field observations. Species are identified and the current state of their taxonomy is being established. Information extracted from literature records and existing museum collections is incorporated. Each selected group is to be treated in a handbook which provides a checklist of known species, a guide to the identification of species, and illustrations, diagnoses, and summarized information for as many of the known species as possible.

STATUS

An opisthobranch handbook has been published (R.C. Willan and N. Coleman (1984) – "Nudibranchs of Australasia"). A holothurian handbook is nearing completion (H.J. Silver and L. Cannon). Prosobranch (T.S. Hailstone) and isopod (N. Bruce) information is being assembled into manuscripts. Other benthic invertebrate groups will be considered after the present handbooks are completed.

LOCALITY: Heron Island

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Invertebrata/Benthic environment/Taxonomy/Ecology/

[UNIQLD010]

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111 **The functional morphology of myodocopid Ostracodes (Crustacea).**

August 1983 – August 1986

ORGANIZATION:
University of Sydney
School of Biological Sciences,
Zoology Building, AO8,
Sydney, N.S.W. 2006

PROJECT LEADERS:
Prof. D.T. Anderson (02) 6922438
Ms. S.J. Hall (02) 6922438

CONTACT OFFICER:
Prof. D.T. Anderson

EXPENDITURE:
$7,800 (this year), $10,000 (all years)

MANPOWER:
1.00 (this year), 1.30 (all years)

EXTERNAL SUPPORT:
Australian Government Postgraduate Studentship – $9,600

OBJECTIVE
To investigate the taxonomy, seasonal occurrence and functional morphology (locomotion, feeding) of myodocopid ostracodes.

METHODOLOGY
Regular sampling and taxonomic analysis on a seasonal basis at sublittoral sites near Sydney: microscopy, laboratory culture. Activity analysis using cine and video techniques, combined with morphological and histological studies. Comparative studies at Lizard Island, North Queensland.

STATUS
Sampling programme in N.S.W. waters is proceeding. Several new species have been described. Functional morphological analysis of locomotion in relation to coarse and fine sand habitats is proceeding.

GEOGRAPHIC REGIONS: N,R

MAJOR DESCRIPTORS: Crustacea/Ostracoda/Morphology (organisms)/Taxonomy/

[UNISYD052]

112* **Oysters of the Indo-West Pacific region (Bivalvia : Ostreidae and Gryphaeidae).**
December 1975 –

ORGANIZATIONS:

Western Australian Museum
Department of Malacology
Francis Street
Perth, W.A. 6000

University of New South Wales
Department of Zoology
Kensington, N.S.W. 2033

PROJECT LEADERS:

Mrs S.M. Slack–Smith (09) 3284411
Dr P.I. Dixon

CONTACT OFFICER:

Mrs S.M. Slack–Smith

EXPENDITURE:

$1,200 (this year), $12,382 (all years)

EXTERNAL SUPPORT:

ABRS — $10,282 (Dr Dixon's grant from ABRS not included.)
West Australian Fisheries Department (Ship time — Research vessel Flinders at Shark Bay, W.A.; assistance with collecting, staff, transport.)
Department of Zoology, University of Hong Kong (Assistance with collecting — staff, transport, lab space, use of facilities.)
Lembaga Oseanologi Nacional Jakarta, Indonesia (Assistance with collecting — staff, lab space and use of facilities in Jakarta and at Research Station, Pulau Pari.)
Bureau of Fisheries, Manila, Philippines (Assistance with collecting — staff and transport.)
N.T. Dept of Fisheries (Collecting, staff, transport.)
University of Papua New Guinea. Dept of Biology (Assistance with collecting, staff, transport, accommodation.)
Dept Zoology, James Cook University of North Queensland (Administrative assistance.)
Australian Institute of Marine Science (Assistance with collecting, staff, transport.)
NSW Dept of Agriculture (Divn of Fisheries) (Assistance with collecting, staff, transport, accommodation.)

OBJECTIVES

To elucidate the taxonomy of the oysters of the Indo–West Pacific region and determine the specific and generic relationships, both within this faunal group and between it and extra–limital taxa.
To determine the geographic and ecological ranges of each species, and to investigate the factors governing their distribution, abundance and growth forms.

METHODOLOGY

1. Collection of specimens and pertinent ecological data.
2. Anatomical dissection of specimens as they are collected, with electrophoretic analysis, particularly of the rock oysters (*Saccostrea* spp.).
3. Comparison with types and other specimens examined in or borrowed from other institutions.

STATUS

Twelve of the 13 currently recognised Australian oyster species have Indo–Pacific affinities. The remaining southern Australian species appears to be endemic. Recent work has been concentrated on the 3 *Saccostrea* (rock oyster) species with anatomical and electrophoretic studies stressing inter–population variation. All 13 species are being compared with more or less closely related taxa from the Indo–Pacific region or elsewhere to determine specific and supra–specific relationships.
To date, anatomical studies on most of the Australian species is at or near completion. Work will continue on the Australian species, on SE Asian endemic species and on type species of problematical genera from recently collected material, and from material from other institutions as it becomes available.

GEOGRAPHIC REGIONS: E,Y,C,J,R

MAJOR DESCRIPTORS: Bivalvia/Ostreidae/Gryphaeidae/Taxonomy/Biogeography/

[WAMUS–008]

See also: 63, 100, 104, 171*

113* An illustrated key to the parrotfishes of the Great Barrier Reef.

ORGANIZATION:
Australian Museum
Department of Fishes
P.O. Box A285
Sydney South, N.S.W. 2000

PROJECT LEADER:
Dr J.H. Choat (02) 3398111

CONTACT OFFICER:
Dr J.R. Paxton (02) 3398111

EXTERNAL SUPPORT:
MSTGS – $6,645
GBRMPA – $9,900

OBJECTIVE

To produce an appropriately illustrated key to allow for rapid identification of the approximately 25 species of parrotfishes (Scaridae) which occur on the Great Barrier Reef.

METHODOLOGY

The project involved 3 trips to the northern Great Barrier Reef to collect and photograph additional species of parrotfishes. These occurred during March, June and November of 1982. In November I was joined by Dr J. Randall, Bishop Museum, for an examination of Museum collections and further field work. Field collecting and museum work was completed by December 1982.

STATUS

Most outstanding taxonomic problems have been clarified although the identity of two species remains problematical. At present we hold most of the required illustrative material. Field work has been completed.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Scaridae/Identification keys/Taxonomy/

[AUSMUS002]

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114 Taxonomy and ecology of larval and adult fishes.

January 1979 –

ORGANIZATIONS:
Australian Museum
Ichthyology Department
P.O. Box A285
Sydney South, N.S.W. 2000
Lizard Island Research Station
PMB 37
Cairns, Qld 4870

PROJECT LEADERS:
Dr J.M. Leis (02) 3398111 (Ext 262)
Dr B. Goldman (070) 534500

CONTACT OFFICER:
Dr J.M. Leis

EXPENDITURE:
$52,200 (this year), $103,413 (all years)

MANPOWER:
1.50 (this year), 3.00 (all years)

EXTERNAL SUPPORT:
GBRMPA – $4,000 (Shiptime, equipment)
MSTGS – $264,500
ABRS – $15,000
CSIRO

OBJECTIVE

To study the taxonomy and ecology of larval fishes in the Great Barrier Reef and elsewhere.

METHODOLOGY

Ecological collections are made and studied. Taxonomic collections are made and studied.

STATUS

Research now concentrating on area immediately seaward of outer Barrier Reefs (i.e. Coral Sea). Distribution of reef fish is being examined to 15KM seaward of outer reefs in Lizard Island Region. Taxonomic research is being emphasized with studies of *Plectropomus*, Ostraciids, Lutjanids, pseudochromids and apogonids in progress.

CO-ORDINATION WITH OTHER PROJECTS

Co-operation with investigators at CSIRO, NSW Uni., Sydney Uni., and James Cook Uni., and A.I.M.S. on taxonomy and ecology of larval and adult fishes.

GEOGRAPHIC REGIONS: R,E,O

SHIP TIME REQUIREMENTS: 10 days

MAJOR DESCRIPTORS: Taxonomy/Ecology/Pisces/Larvae/

[AUSMUS008]

115 Sensory systems of the shrimp *Acetes* in relation to behaviour.

August 1974 –

ORGANIZATIONS:
Australian National University
Department of Neurobiology
Research School of Biological Sciences
P.O. Box 475
Canberra City, A.C.T. 2601

Australian Institute of Marine Science
P.M.B. No. 3
Townsville, M.S.O., Qld 4810

PROJECT LEADERS:
Dr E. Ball (062) 494496
Dr L.B. Quetin
Dr R. Ross–Quetin

CONTACT OFFICER:
Dr E. Ball

MANPOWER:
0.10 (this year), 4.60 (all years)

OBJECTIVE
To understand the sensory capabilities of the shrimp *Acetes* and the role that these capabilities play in limiting/determining the shrimp's behaviour.

METHODOLOGY
The project involves neuroanatomy, electrophysiology, and laboratory and field observations of behaviour.

STATUS
A paper on structure and function of the compound eyes of *Acetes* has been completed and is currently in press, (Phil. Trans. Roy. Soc. London). Several additional papers are in preparation on structure and ultrastructure of the statocyst and antennal setae. Data for several other papers on activity patterns and other aspects of natural history including mating, moulting and schooling has been collected.

GEOGRAPHIC REGIONS: R,Q,N

MAJOR DESCRIPTORS: *Acetes* /Malacostraca/Neurophysiology/Behaviour/

[ANU—008]

116 Bacterial production in sediments.

June 1979 –

ORGANIZATION:
CSIRO
Division of Fisheries Research
CSIRO Marine Laboratories
P.O. Box 120
Cleveland, Qld 4163

PROJECT LEADER:
Dr D.J.W. Moriarty (07) 2862022

EXPENDITURE:
$20,600 (this year), $77,300 (all years)

MANPOWER:
2.00 (this year), 4.00 (all years)

OBJECTIVE
To measure biomass and productivity of bacteria and other microorganisms in sediments and the water column and to study their interrelationships with primary producers in order to assess their role in food chains.

METHODOLOGY
Biochemical assays for muramic acid, DNA synthesis, chlorophylla; microscopical counting; C, N analysis.
Methods have been developed for measuring biomass and growth rate of bacteria and are being used to measure productivity particularly in seagrass beds and coral reef areas.

STATUS
Methods developed are being applied to measurements of bacterial production in seagrass and coral reef sediments and to the water column.

GEOGRAPHIC REGIONS: C,R,Q,N

MAJOR DESCRIPTORS: Bacteria/Sediments/Primary production/Trophic relationships/Nutrient cycles/

[CSIRO–040]

117 Physiology of Penaeid prawns.

July 1976 –

ORGANIZATION:
CSIRO
Division of Fisheries Research
CSIRO Marine Laboratories
P.O. Box 120
Cleveland, Qld 4163

PROJECT LEADER:
Dr W. Dall (07) 2862022

EXPENDITURE:
$30,000 (this year), $593,000 (all years)

MANPOWER:
3.00 (this year), 17.00 (all years)

OBJECTIVE
The lipid and protein metabolism of *Penaeus esculentus* (tiger prawn); Uptake and utilization of lipids particularly during the moulting cycle; the role of amino acids and body muscle as an energy source in normal metabolism.

METHODOLOGY
Lipids as total crude lipid gravimetrically following solvent extraction; individual lipids by High Pressure Liquid Chromatography (HPLC) and Gas Liquid Chromatography (GLC) total protein and free animo acids by a ninhydrin method; excreted N by ion–selective electrodes as ammonia and by a ninhydrin method; specific amino acids by High Pressure Liquid Chromatography uptake and turnover of specific lipids and amino acids by tritium or ^{14}C labelled compounds; oxygen consumption by intermittent flow respiratory chamber and oxygen electrode.

STATUS
Lipid and protein metabolism: Stored digestive gland lipids are used mainly in preparation for moulting, but are used during early starvation. Proteins are also metabolised during early starvation and become the principal energy source. Standard and routine metabolic rates have been established; metabolic rate is reduced during starvation by decreased nocturnal activity; free amino acids with a role in energy metabolism have been identified.

GEOGRAPHIC REGIONS: C,R,Q

MAJOR DESCRIPTORS: Penaeidae/Malacostraca/Osmoregulation/Metabolism/

[CSIRO–056]

118 The effects of fuel oil, oil emulsifier and lower salinity upon the common Indo–Pacific reef coral *Acropora formosa* .

May 1983 – August 1986

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
P.O. Box 1379
Townsville, Qld 4810
James Cook University of North Queensland
Sir George Fisher Centre for Tropical Marine Science
Post Office
Townsville, Qld 4811

PROJECT LEADERS:
Dr W. Craik (077) 818811
Mr P. Harrison (077) 814111

CONTACT OFFICER:
Ms C. Dalliston (077) 818811

EXPENDITURE:
$2,784 (all years)

MANPOWER:
1.50 (all years)

OBJECTIVE
To determine the effects of oil emulsifier, oil plus emulsifier and lowered salinity on *Acropora formosa* .

METHODOLOGY
Healthy branches of *A. formosa* collected and coral conditions recorded by photography, and notes made on coral colouration, extension, mucus and zooxanthellae extrusion. Tissue samples are collected for histology, single radial polyps are collected and fixed for ultrastructural study on transmission electron–microscope. Branch tips will be collected and examined by scanning electron–microscope study of skeletal growth form.
Use coral *A. formosa* (Widespread and well–studied), Bunker C fuel (widely used in Great Barrier Reef Region), emulsifier BPA– B (currently recommended by Department of Transport), lowered salinity (typical of increased urbanization and industrialisation), in 4 treatments and control.

STATUS

Draft report submitted to GBRMPA.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: *Acropora formosa* /Anthozoa/Histology/Ultrastructure/Pollution effects/

[GBRMPA066]

119 Chemical regulation of biological processes; host release factors in marine symbioses.

February 1983 – February 1987

ORGANIZATION:
Griffith University
School of Science
Nathan
Brisbane, Qld 4111

PROJECT LEADER:
Dr R.J. Quinn (07) 2757567

EXPENDITURE:
$24,473 (this year), $59,021 (all years)

MANPOWER:
1.30 (this year), 2.00 (all years)

EXTERNAL SUPPORT:
MSTGS – $50,209 (1984, 1985)

OBJECTIVE

Symbiosis is an important phenomenon in the marine environment. Symbiotic dinoflagellates contribute significantly to world ocean productivity and particularly to coral reef benthic primary productivity. The dinoflagellates have an important role in the nutrition of the host animals and are essential for the skeleton building process in hard corals. Translocation of fixed carbon from the dinoflagellates to the host is controlled by the host chemically using "host release factors" This project aims to isolate, purify and identify the compound(s) which are utilised by marine invertebrates of marine invertebrate–dinoflagellate symbiotic associations to achieve release of nutrients from the zooxanthellae symbiont.

METHODOLOGY

This project depends on an ability to assay for the release of nutrients from the algal symbionts. This is achieved by isolation of algal cells from the marine invertebrate–dinoflagellate association, incubation of algal cells with $NaH^{14}CO_3$ to obtain incorporation of radioactivity into the products of photosynthesis and examination of release caused by extracts of the host. Various separation techniques will be employed, eg. gel permeation, adsorption,. reverse–phase adsorption and ion–exchange chromatography, electrophoresis, isoelectric focussing, in order to isolate the host release factors.

STATUS

Currently two marine invertebrate/dinoflagellate systems are being investigated. A new method for the isolation of the algal symbionts using centrifugal elutriation has been developed. The algal symbionts from the sea anemone *Stichodactyla hadonni* and a soft coral have been identified using electron microscopy as *Symbiodinium* species. The bioassay for the detection of host release factor is being established.

CO-ORDINATION WITH OTHER PROJECTS

This project is examining the chemical aspects of host release factor and collaboration exists with Dr R. Hine, School of Biological Science, the University of Sydney, and Dr M. Borowitska, School of Environmental and Life Sciences, Murdoch University, who are examining the biological side of control substances in symbioses and nutritional and eco–physiological aspects of symbiosis between algae and invertebrates.

GEOGRAPHIC REGIONS: R,Q

MAJOR DESCRIPTORS: Invertebrata/Algae/Symbiosis/Biochemical analysis/Hosts/

[GRIFFI011]

120* Eye structure in polychaetes.

ORGANIZATION:
James Cook University of North Queensland
Post Office
Townsville, Qld 4811

PROJECT LEADERS:
Dr C.G. Alexander (077) 814282
Mr R.S. Smith

CONTACT OFFICER:
Dr C.G. Alexander

EXPENDITURE:
$1,000 (this year)

MANPOWER:
1.10 (this year)

OBJECTIVE
Investigate the fine structure of the eyes of serpulid (polychaete) worms from a functional, behavioural and possibly evolutionary viewpoint. Developmental biology of polychaete eyes.

STATUS
Fine structure of some adult eyes determined. Larval eyes and their development investigated.

GEOGRAPHIC REGIONS: Q,R
MAJOR DESCRIPTORS: Serpulidae/Annelida/Eyes/Evolution/Behaviour/

[JAMESC058]

121* Monitoring heavy metal pollution in tropical marine waters.

ORGANIZATION:
James Cook University of North Queensland
Department of Marine Biology
Post Office
Townsville, Qld 4811

PROJECT LEADERS:
Prof C. Burdon-Jones (077) 814530
Dr G. Denton (077) 814191

CONTACT OFFICER:
Prof C. Burdon-Jones

EXPENDITURE:
$34,882 (this year), $34,882 (all years)

MANPOWER:
1.00 (this year), 1.00 (all years)

OBJECTIVES
1. To establish current baseline levels and distribution of heavy metals, i.e. mercury, cadmium, lead, copper, zinc and nickel in a range of dominant marine organisms at various trophic levels in the food chain within the Great Barrier Reef province.
2. To determine regional and seasonal fluxes of metals in potentially useful sentinel organisms from strategically located stations within the reef system.
3. Prescribe an efficient readily implemented monitoring system for tropical waters of Australia.

METHODOLOGY
1. Baseline Survey (18 months). Seawater, algae, bivalves, hard and soft corals holothurians and a variety of fish of recreational and commercial importance have been collected from stations in the northern, central and southern regions of the Great Barrier Reef.
2. Seasonal Survey (12 months). Potentially useful sentinel species identified from the baseline survey were sampled at regular intervals from Lizard, Urpheus and Heron Islands. These data will provide a measure of the noise level in the system and incorporate predictive capacity for future monitoring programmes.

LOCALITIES: Lizard Island; Orpheus Island; Heron Island
GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Heavy metals/Indicator species/Trophic levels/Pollution monitoring/Baseline studies/

[JAMESC023]

122* Physiology and ultrastructure of prokaryotic green algal symbionts from certain tropical ascidians.

January 1977 –

ORGANIZATION:
James Cook University of North Queensland
Botany Department
Post Office
Townsville, Qld 4811

PROJECT LEADERS:
Prof D.J. Griffiths (077) 814121
Dr T. Luong-Van (077) 814466

CONTACT OFFICER:
Prof D.J. Griffiths

EXTERNAL SUPPORT:
ARGS – $23,119 (1981 – 7225; 1982 – 8085; 1983 – 9309; 1984 – 8500)

OBJECTIVE
To investigate aspects of the growth and physiology of the *Prochloron* symbionts associated with various tropical ascidian species.

METHODOLOGY
Standard ultrastructural techniques.
Standard techniques for investigating photosynthetic characteristics.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: *Prochloron* /Prochlorophyta/Symbionts/Plant physiology/Ultrastructure/

[JAMESC028]

123* **Structure and function of sense organs in the banana prawn *Penaeus merguiensis* in relation to the animals behaviour.**

February 1979 –

ORGANIZATION:
James Cook University of North Queensland
Department of Marine Biology
Post Office
Townsville, Qld 4811

PROJECT LEADER:
Dr C.G. Alexander (077) 814282

EXTERNAL SUPPORT:
ARGS – $5,600

OBJECTIVES
To identify and catalogue all external sense organs of *Penaeus merguiensis* .
To describe these in detail using electron microscopical techniques.
To investigate the physiological properties of these organs and relate them to the behaviour of the animal in determining how it responds to the physical environment (e.g. temperature, salinity changes) and the biological environment (e.g. food, animals of the opposite sex, potential predators).

METHODOLOGY
1. Video tape recording of animal's behaviour.
2. Optical and electron microscope examination of sense organs.
3. Electrophysiological recording of neural signals from sense organs.

STATUS
Parts (1) and (2) have produced significant results published in the journal : Marine Biology.

LOCALITY: Cleveland Bay

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: *Penaeus merguiensis* /Malacostraca/Sense organs//Behaviour/

[JAMESC042]

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124 **Calcification mechanisms in corals.**

February 1980 –

ORGANIZATION:
La Trobe University
Department of Zoology
Bundoora, Vic. 3083

PROJECT LEADER:
Dr A.T. Marshall (03) 4792250 or (03) 4792279

EXPENDITURE:
$14,000 (this year), $25,000 (all years)

MANPOWER:
1.30 (this year), 2.00 (all years)

EXTERNAL SUPPORT:
MSTGS – $25,400

OBJECTIVES

To determine the mechanisms of calcification in corals using electron probe X–ray microanalysis, electron microscopy and isotope techniques.
The effects of oil and heavy metal pollutants on these mechanisms will also be investigated.

STATUS

An initial description of coral ultastructure has been made and preparation methods for X–ray microanalysis are being investigated. Isotope flux studies have been made on isolated tissue using Ca^{45}.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Calcification/Anthozoa/Oil pollution/Heavy metals/Pollution effects/

[LATROB004]

125 Ionic regulation in marine insects (Hermatobatidae).

August 1980 –

ORGANIZATION:
La Trobe University
Department of Zoology
Bundoora, Vic. 3083

PROJECT LEADER:
Dr A.T. Marshall (03) 4792259 or (03) 4792279

EXPENDITURE:
$200 (this year), $400 (all years)

MANPOWER:
0.01 (this year), 0.25 (all years)

OBJECTIVE

To investigate physiological mechanisms of ionic and osmotic regulation in marine insects (Heteroptera : Hermatobatidae).

METHODOLOGY

Preliminary work on the nature of the regulatory organs and tissues is being done by electron microscopy.

STATUS

These insects present peculiar problems for both electron microscopy and physiological investigation by virtue of their extremely hydrophobic cuticle and their small size. Methods of dealing with these problems are being developed.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Hermatobatidae/Insecta/Osmoregulation/

[LATROB005]

126 Studies on the rectal gland of the shovel–nosed ray *Rhinobatus armatus*.

August 1985 – August 1991

ORGANIZATION:
La Trobe University
Department of Zoology
Bundoora, Vic 3083

PROJECT LEADER:
Dr A. Wright (03) 4792235

EXPENDITURE:
$5,000 (this year), $20,000 (all years)

MANPOWER:
0.50 (this year), 2.50 (all years)

OBJECTIVE

To investigate the structure and function of the rectal gland of the shovel–nosed ray.

METHODOLOGY

The gland from normal animals will be examined by light and electron microscopy. Glands from rays subjected to osmotic stress will be similarly examined. Body–fluids and urine will be analysed to determine changes in sodium, potassium, chloride and total electrolytes.

STATUS

Rectal glands have been processed for microscopical examination. A few samples of body fluids have been collected.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: *Rhinobatus armatus* /Ultrastructure/Osmoregulation/Physiology/

[LATROB017]

127 Algal calcification.

March 1971 –

ORGANIZATION:
Murdoch University
Environmental and Life Sciences
Murdoch, W.A. 6150

PROJECT LEADER:
Dr M.A. Borowitzka (09) 3322333

OBJECTIVE
To elucidate the mechanism(s) of calcification in algae which normally deposit $CaCO_3$, with particular emphasis on those algae important as sediment formers or consolidators in tropical reefs.

METHODOLOGY
Location, organization and development of the $CaCO_3$–deposition mechanisms is studied by various physiological, biochemical and physical methods.

STATUS
There are a number of different mechanisms by which algae calcify, and these mechanisms show varying degrees of control by the organisms. Detailed models for the calcification mechanisms in *Halimeda* and *Chara* have been developed and models for some of the other calcareous algae have been proposed. Some aspects of the interaction between photosynthesis and calcification in the coralline reef algae *Amphiroa* have been described.

GEOGRAPHIC REGIONS: R,X

MAJOR DESCRIPTORS: Algae/Coral reefs/Calcification/Photosynthesis/

[MURUNI012]

128 Cellular responses of marine phytoplankton to heavy metal stress.

ORGANIZATION:
University of Melbourne
Marine Chemistry Laboratory,
Department of Inorganic Chemistry,
Parkville, Vic. 3052

PROJECT LEADER:
Dr J.D. Smith (03) 344 7093

MANPOWER:
1.00 (this year)

EXTERNAL SUPPORT:
Great Barrier Reef Marine Park Authority

OBJECTIVES
To determine the effects of different forms of heavy metals on phytoplankton cellular metabolism.
To elucidate the effects of heavy metal toxicity on selected biochemical pathways.
To elucidate the effects of phytoplankton on speciation of redox elements in the seawater.

METHODOLOGY
Study of element uptake using radiotracers and energy–dispersive X–ray fluorescence. Determination of element binding by gel–chromatography and effects on fatty acids by gas chromatography. Measurement of redox species in the seawater.

STATUS
Some results published.

GEOGRAPHIC REGIONS: A,B,R

MAJOR DESCRIPTORS: Phytoplankton/Cells/Metabolism/Heavy metals/

[UNIMEL060]

129 Ecological genetics of *Anadara trapezia* .

January 1966 –

ORGANIZATION:
University of New South Wales
School of Zoology
P.O. Box 1
Kensington, N.S.W. 2033

PROJECT LEADER:
Dr P.I. Dixon (02) 6622733

EXPENDITURE:
$1,000 (this year)

MANPOWER:
0.10 (this year)

OBJECTIVES

The project is aimed at studying the biochemical and physiological differences between electrophoretic variants in *Anadara trapezia*, an intertidal bivalve mollusc. These studies will be undertaken with a view to gaining evidence as to whether or not the observed variations are adaptive in nature. In brief this will involve:
(1) Determination of the level of genetic variability in *A. trapezia* and identification of those enzymes which have electrophoretic variants.
(2) Comparisons between the electrophoretic variants in several populations of *A. trapezia*.
(3) Selection of suitable isozymes for detailed biochemical and physiological studies and the carrying out of these studies.

METHODOLOGY

Isozyme analyses followed by biochemical and physiological techniques as required.

STATUS

Phase 1 and 2 as described above proceeding, Phase 3 not yet commenced.

GEOGRAPHIC REGIONS: W,B,N,Q,R

MAJOR DESCRIPTORS: *Anadara trapezia* /Bivalvia/Physiology/Biochemistry/Genetics/

[UNINSW019]

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130 Physiology and anatomy of sensory receptors and central nervous systems of crustaceans.

January 1982 –

ORGANIZATION:
University of New South Wales
School of Zoology
Kensington, N.S.W. 2033

PROJECT LEADER:
Prof D.C. Sandeman

OBJECTIVE

To investigate the fundamental principles which govern the action of neurons in the central nervous system of animals.

METHODOLOGY

Electrophysiological, light and electron microscope techniques.

GEOGRAPHIC REGIONS: R,Q,N

MAJOR DESCRIPTORS: Crustacea/Sense organs/Anatomy/Electrophysiology/

[UNINSW006]

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131 Ascidiacea of the Great Barrier Reef: Morphological, biological, and chemical bases of inter– and intra– specific relationships.

April 1984 – December 1986

ORGANIZATIONS:
University of Queensland
Chemistry Department,
St Lucia, Qld. 4067
Queensland Museum
Gregory Terrace,
Fortitude Valley, Qld. 4006

PROJECT LEADERS:
Prof. C.J. Hawkins (07) 3772384
Dr P. Mather (07) 522716

CONTACT OFFICER:
Prof. C.J. Hawkins

EXPENDITURE:
$47,125 (this year), $76,125 (all years)

MANPOWER:
1.50 (this year), 3.00 (all years)

EXTERNAL SUPPORT:
MSTGS – $42,125

OBJECTIVE

To investigate the taxonomy of the Ascidiacea with special reference to the sub–order Aplousobranchia (the primarily colonial ascidians), to explore the relevance of certain aspects of their chemistry to proposed phylogenies, and to pursue systematic investigation of aspects of the chemistry of the Ascidiacea.

METHODOLOGY

The taxonomic work will be carried out at the Qld Museum with preserved specimens and work with fresh material at Heron Island.
The three main chemical aspects involve: (1) the presence of metals, in particular the presence and oxidation state of vanadium; determined by atomic absorption and e.s.r. spectroscopy.
(2) Isolation and purification of the major chromogens from the blood cells of a number of species from the 3 sub–orders and determination of their structures using hplc, ^{1}H and ^{13}C nmr, UV–Visible and circular dichroism techniques. The amino acids will be analysed by hplc.
(3) Isolation of biologically active molecules, didemnins.

STATUS

The major organic pigment (chromogen) has been isolated from a number of species from the three–sub–orders and these show differences from species to species. The study of the presence of vanadium and oxidation state has been extended to a larger number of species to further clarify the phylogeny of higher taxa.

LOCALITY: Heron Island
GEOGRAPHIC REGIONS: R,Q
MAJOR DESCRIPTORS: Ascidiacea/Blood cells/Metal–organic complexes/Bioaccumulation/

[UNIQLD051]

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132 Electrophysiology and behaviour of sponges and anthozoans.

January 1983 –

ORGANIZATION:
University of Queensland
Heron Island Research Station,
via Gladstone, Qld 4680

PROJECT LEADER:
Dr I.D. Lawn (079) 781399

EXPENDITURE:
$30,651 (this year), $91,193 (all years)

MANPOWER:
1.33 (this year), 1.66 (all years)

EXTERNAL SUPPORT:
ARGS – $71,622

OBJECTIVES

1. To interpret how behaviour is controlled in invertebrates lacking a central nervous system.
2. To obtain an understanding of how nervous systems may have originated.

METHODOLOGY

Electrophysiological, behavioural, and microscopical techniques.

STATUS

A conduction system, triggered by mechanical or electrical stimulation, has been discovered in a marine sponge and its essential properties have been described. Future work will concentrate on: (1) comparative studies to see if other sponges possess similar conduction systems; and (2) the elucidation of the biophysical processes involved.
Electrophysical recordings from sea anemones and anthozoan corals are providing new information on how behaviour is controlled in these animals by both nervous and non–nervous conduction systems.
Form: Raw data/ hardcopy.
Availability: In future
Access: Project Leader.

GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Porifera/Anthozoa/Electrophysiology/Behaviour/Nervous system/

[UNIQLD050]

133* Pharmacology and pathology of ciguatera poisoning in mammals and studies on the possible effects of ciguatoxin on fish.

June 1983 – June 1986

ORGANIZATIONS:
University of Queensland
Department of Physiology and Pharmacology
St. Lucia, Qld 4067
Princess Alexandra Hospital
Wolloongabba, Brisbane 4102

PROJECT LEADERS:
Dr M.F. Capra (07) 3773120
Dr J. Cameron (07) 2216081

CONTACT OFFICER:
Dr M.F. Capra

EXPENDITURE:
$40,284 (this year)

MANPOWER:
2.50 (this year)

EXTERNAL SUPPORT:
FIRTA – $16,300
MSTGS – $23,984

OBJECTIVE
(1) Isolation and purification of ciguatoxin (CTX) from toxic fish. (2) Testing the hypothesis that CTX as a fundamental action, causes the opening of Na^+ channels in excitable tissues. (3) An examination of the electrophysiological and neuropathological effects of CTX on mammalian nerves. (4) An assessment of functional and structural damage to peripheral nerves in the victims of CTX intoxication. (5) Examination of the effects of CTX on excitable membranes in "carrier" and "non–carrier" species of fish.

METHODOLOGY
CTX will be extracted and purified by the method of Tachibona developed at University of Hawaii. Standard neurological tests of nerve conduction (velocity, latency, sub and super normality) will be performed on laboratory mammals, fish and man. Structural changes in nerves will be assessed by light and electronmicroscopy. ^{22}Na efflux studies will be used to examine the action of CTX on Na channels.

STATUS
Ciguatoxin has been extracted from toxic reef fish. Purified toxin has been used in pharmacological experiments in intact rats. Sub–lethal doses of ciguatoxin alter a number of sensory nerve conduction parameters (conduction velocity, latency, refractoriness and supernormality). The action of ciguatoxin on the supernormal period indicates that this toxin acts on Na^+ channels to increase their opening time.

GEOGRAPHIC REGIONS: C,R,Q

MAJOR DESCRIPTORS: Pharmacology/Pathology/Poisons (biological)/Ciguatoxins/Nervous system/

[UNIQLD031]

134 Control substances in symbioses between algae and invertebrates.

January 1983 –

ORGANIZATION:
University of Sydney
School of Biological Sciences,
Sydney, N.S.W. 2006

PROJECT LEADER:
Dr R.T. Hinde (02) 6924035

EXPENDITURE:
$19,600 (this year), $58,600 (all years)

MANPOWER:
1.30 (this year), 3.90 (all years)

EXTERNAL SUPPORT:
ARGS – $57,200

OBJECTIVE
To investigate the physical and biochemical processes which allow and promote the movement of metabolites between partners in mutualistic symbioses, with particular emphasis on "Host Release Factors" (HRFs).

METHODOLOGY
1. Transmission electron microscopy and freeze–fracture.
2. $NaH^{14}CO_3$ as tracer of rates and products of photosynthesis, rates of translocation of photosynthate from plant to animal cells, and the nature of compounds translocated.

3. Bioassays for HRF activity and studies of the physiology of HRF–simulated translocation. 4. Chromatography, ultrafiltration and other biochemical methods for isolation of biologically active compounds are being used in attempts to purify HRF.

STATUS

The following have been established:
1. That there are effective symbioses, of nutritional significance to the animal hosts, between the nudibranch *Pteraeolidia ianthina* and its zooxanthellae, and between an unidentified zoanthid (Australian Museum deposit no. G15210) and its zooxanthellae.
2. The levels of HRF activity in the hard coral *Plesiastrea versipora*, in the zoanthid and in *P. ianthina*, and the repeatability, and consistency throughout the year, of the HRF effect.
3. The effectiveness of crude preparations of HRF from each of these animal species against zooxanthellae of the others.
4. A bioassay for HRF activity *in vitro* in these three symbioses.
5. The approximate size of the active compounds; some degree of purification has been achieved.
6. Calcium, phosphate, ammonia and pH have been shown to not cause HRF–like effects.

CO-ORDINATION WITH OTHER PROJECTS

There is collaboration with Dr R.J. Quinn (Griffith University), who is investigating HRF in an anemone.

LOCALITIES: Sydney; One Tree Island
GEOGRAPHIC REGIONS: N,R
MAJOR DESCRIPTORS: Invertebrata/Algae/Symbiosis/Metabolites/Biochemical analysis/

[UNISYD039]

135 Ecophysiological and nutritional aspects of symbioses between algae and invertebrates, and between chloroplasts and molluscs.

June 1982 – June 1986

ORGANIZATIONS:

University of Sydney
School of Biological Sciences
Sydney, N.S.W. 2006

Murdoch University
School of Environmental and Life Sciences,
Murdoch W.A. 6150

PROJECT LEADERS:

Ms F. Pironet (02) 6924035
Dr R.T. Hinde (02) 6924035
Dr M.A. Borowitzka (09) 3322211

CONTACT OFFICER:

Dr R.T. Hinde

EXPENDITURE:

$20,000 (this year), $60,244 (all years)

MANPOWER:

1.00 (this year), 5.00 (all years)

EXTERNAL SUPPORT:

MSTGS – $58,244

OBJECTIVE

To establish the role of the blue–green algal symbiont of a tropical marine sponge in the nutrition of the sponge.

METHODOLOGY

1. Use of oxygen electrode to establish levels and variability of photosynthesis and respiration in *Dysidea herbacea* and its blue–green algal symbiont, *Oscillatoria spongeliae*.
2. Use of carbon–14 to establish pathways of carbon fixation and nature and amounts of photosynthetic products transferred from alga to sponge.
3. Electron microscopy.
4. Culture of the blue–green algae and study of their metabolism when away from the sponge.

STATUS

Work on variability within and between sponges, and seasonal variability of photosynthetic and respiratory rates has been completed, along with a study of the uptake of $^{14}CO_2$ in the light and dark. Incorporation of ^{14}C into various tissue fractions and soluble compounds, both during and after a period of photosynthesis, is being studied. Attempts to isolate the algal symbionts in a viable state and to bring them into culture are underway. The ultrastructure of *O. spongeliae* and its location within the sponge have been described.

LOCALITY: Sydney

GEOGRAPHIC REGIONS: R,N
MAJOR DESCRIPTORS: Invertebrata/Algae/Symbiosis/Photosynthesis/Physiology/

[UNISYD010]

136 Eco-physiological aspects of symbioses between algae and sponges.

June 1982 – June 1986

ORGANIZATIONS:
University of Sydney
School of Biological Sciences
Building A12,
Sydney, NSW 2006
Murdoch University
School of Environmental Life Sciences,
Murdoch, WA 6150

PROJECT LEADERS:
Dr R.T. Hinde (02) 6924035
Dr M.A. Borowitzka (09) 3322211

CONTACT OFFICER:
Dr R.T. Hinde

EXPENDITURE:
$1,500 (this year), $3,385 (all years)

MANPOWER:
0.10 (this year), 0.40 (all years)

EXTERNAL SUPPORT:
MSTGS (Part of grant of $58244)

OBJECTIVE
To establish the role of the blue-green algal symbiont of the tropical marine sponge *Dysidea herbacea* in the synthesis of halogenated secondary metabolites which may have anti-feedant activity.

METHODOLOGY
1. The amounts of the secondary metabolites present in isolated algal cells and sponge tissue will be determined by quantitative chromatographic techniques.
2. If the algae contain the metabolites of interest, incorporation of radioactively labelled precursors will be investigated to identify the site(s) of synthesis of the compounds.

STATUS
The halogenated metabolite of the One Tree Island population has been identified, and occurs in both the algal and animal tissue. Studies of its synthesis are proceeding.

CO-ORDINATION WITH OTHER PROJECTS
Collaboration with Dr R.J. Quinn (Griffith University)

LOCALITY: One Tree Island
GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Invertebrata/Algae/Symbiosis/Physiology/Sponges/

[UNISYD107]

137 Light-harvesting pigment-proteins of algae.

January 1974 –

ORGANIZATION:
University of Sydney
School of Biological Sciences
Building A12
Sydney, NSW 2006

PROJECT LEADERS:
Assoc. Prof. A.W.D. Larkum (02) 692 3369
Ms J. Chrystal (02) 692 2277

CONTACT OFFICER:
Assoc. Prof. A.W.D. Larkum

EXPENDITURE:
$14,500 (this year), $29,000 (all years)

MANPOWER:
1.00 (this year), 2.00 (all years)

EXTERNAL SUPPORT:
ARGS – $7,000 (Grant to Dr R.G. Hiller and A.W.D. Larkum)
CSIRO — $7,500 (Postgraduate scholarship for Ms J Chrystal)

OBJECTIVE
To investigate the mechanisms of light-harvesting in algae, with particular reference to the role of light- harvesting pigment proteins.

METHODOLOGY
Pigment proteins are separated by gel electrophoresis and density gradient fractionation. Algae are cultured under different light intensities and colours in the laboratory, or are brought up from various depths and types of water.

STATUS
Previous work on systems based on phycobiliproteins has been extended to systems using chlorophyll a + c complexes and in the case of Eustigmatophyta and chlorophyll a complexes.

CO-ORDINATION WITH OTHER PROJECTS
This work is being carried out in close collaboration with Dr R.G. Hiller, Macquarie University (ARGS Grant)

GEOGRAPHIC REGIONS: R,Q,N
MAJOR DESCRIPTORS: Algae/Photosynthetic pigments/Proteins/Plant physiology/

[UNISYD009]

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138 **Nitrogen fixation on a coral reef.**

January 1979 – December 1985

ORGANIZATION:
University of Sydney
School of Biological Sciences,
Building A12,
Sydney N.S.W. 2006

PROJECT LEADER:
Assoc. Prof. A.W.D. Larkum (02) 6923369

EXPENDITURE:
$44,000 (this year), $113,000 (all years)

MANPOWER:
2.20 (this year), 7.20 (all years)

EXTERNAL SUPPORT:
MSTGS – $104,000

OBJECTIVES
To assess the role of cyanobacteria in providing significant amounts of dissolved nitrogen nutrients to the waters of a coral reef.
To assess the importance of various areas of a coral reef to nitrogen fixation.
To investigate the effects of depth, season and other factors.
To identify the organisms involved and to study them in laboratory culture.

METHODOLOGY
Nitrogen fixation is follwed by the acetylene reduction technique in small incubation chambers using individual algae or small blocks of substratum.

STATUS
Nitrogen fixation has been found in a number of algal communities of One Tree Reef. Such communities are dominated by cyanobacteria but not all are hetercystons. Significant nitrogen fixation has also been found associated with larger benthic algae such as *Laurencia obtusa* . A number of papers are in press.

Completed Project – This project will remain in the computerized Register for another 5 years but will not be included in future issues of the Compendium.

LOCALITY: One Tree Island
GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Nitrogen fixation/Bacteria/Coral reefs/Abiotic factors/

[UNISYD022]

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139 **Prokaryotic algal symbionts on a coral reef.**

January 1984 –

ORGANIZATION:
University of Sydney
School of Biological Sceinces,
Building A12,
Sydney, N.S.W. 2006

PROJECT LEADERS:
Assoc Prof A.W.D. Larkum (02) 6923369
Dr G.C. Cox (02) 692 3176

CONTACT OFFICER:
Assoc Prof A.W.D. Larkum

EXPENDITURE:
$7,000 (this year), $14,000 (all years)

MANPOWER:
1.30 (this year), 1.30 (all years)

EXTERNAL SUPPORT:
ARGS – $14,000

OBJECTIVE
To search for novel prokaryotic algae in symbiotic associations on coral reefs.

METHODOLOGY
Algae are released from host tissues by gentle homogenisation. Electron microscopy is carried out on original samples and on isolated algal cells. The photosynthetic pigments are investigated by thin layer chromatography.

STATUS
Research began in association with Dr R G Hiller (Macquarie University) and Dr G C Cox (Sydney University) on the association of prochloron with didemnid ascidians. Attention was then curved to other prokaryotic algae in certain of these ascidians. The algae are similar to the previously described *Syneccocystis trididemni*. They contain novel phycobiliproteins (Cox, Hiller and Larkum, Mar. Biol. 89, 149 (1985). Probably identical algae have been found in some crustose sponges. Filamentous cyanophytes with similar phycobiliproteins are now being studied (Mr D Parry, Chemistry Department, University of Queensland is also collaborating in this work).

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Ascidiacea/Algae/Symbionts/Coral reefs/

[UNISYD047]

See also: 34*, 37*, 41*, 73, 171*

140 Mangroves: Major Program.

ORGANIZATION:
Australian Institute of Marine Science
PMB No. 3
Townsville, M.C. Qld 4810

PROJECT LEADER:
Dr K.G. Boto (077) 789233

CONTACT OFFICERS:
Dr J.T. Baker (077) 789 211
Dr J.C. Andrews (077) 789377 (Research)

MANPOWER:
3.98 (this year)

OBJECTIVES

Major Objective 1. To determine the manner in which mangrove forest structure in the Australian region changes with time.
Sub–Project 1. To complete studies of forest structure, species distributions and changes over time.
Sub–project 2. To initiate studies of the mangrove systems of Van Diemen's Gulf and the Cobourg Peninsula Marine Park should this be feasible with available resources.
Major Objective 2. To identify and quantitatively measure the effect of the environmental variables controlling forest development and primary production in the short and long term.
Sub–Project 3. To complete studies of soil factors affecting large scale geographic variations in mangrove forest productivity.
Sub–Project 4. To continue collections of data on mangrove photosynthetic characteristics under natural conditions and to begin testing of a climate–productivity model.
Major Objective 3 (a): To study the initial fate of mangrove primary production in terms of microbial degradation and utilization of mangrove–derived organic matter.
Sub–Project 5. To continue and complete chemical characterisation of dissolved organic matter in mangrove waters.
Sub–Project 6. (a) To complete analyses of samples arising from the *Avicennia* and *Rhizophora* decomposition studies; (b) To complete chemical analyses and subsequent data analyses of the samples arising from the microbial community structure studies; (c) To carry out a laboratory study of DOM released in early stages of litter decomposition.
Major Objective 3(b): To demonstrate the socio– economic significance of Australian mangrove systems including correlation with fisheries resources.
Sub–Project 7. To study the role of protozoa and meiofauna in the trophodynamics and regeneration of nutrients within mangrove food webs.
Sub–Project 8. To continue studies of mangrove food webs.

STATUS

A detailed set of 'Projected Research Activities 1985/86' is available on application to the Australian Institute of Marine Science.

GEOGRAPHIC REGIONS: R,C,Y
SHIP TIME REQUIREMENTS: 15
MAJOR DESCRIPTORS: Coastal zone management/Mangrove swamps/Community composition/Ecosystems/

[AIMS—001]

141* Microbial Ecology on a Coral Reef: Workshop.

July 1984 –

ORGANIZATION:
Australian Institute of Marine Science
PMB No 3,
Townsville M.C., Qld 4810

PROJECT LEADER:
Dr C. Wilkinson (077) 789211

EXPENDITURE:
$30,000 (this year)

MANPOWER:
2.00 (this year)

EXTERNAL SUPPORT:
National Science Foundation U.S.A. – $20,000 (US Dollars; Under US/Australia Science and Technology Agreement.)

OBJECTIVES

An intensive study of coral reef microbial ecology with the specific objectives to elucidate:
1. Temporal and spatial variations in microbial populations and productivity on a coral reef.

2. The sources of nutrition for these microorganisms and the role that microorganisms play in carbon cycling in coral reef ecosystems.
3. The effects of microbial populations on remineralisation and biogeochemical processes in sediments, on surfaces and within the fluid environment.
4. The trophic role of microorganisms in coral reef ecosystems and the major consumers of microorganisms.

METHODOLOGY

The Microbial Ecology on a Coral Reef Workshop was an interdisciplinary study involving 35 investigating scientists. Davies Reef was chosen as a dedicated field site and research revolved around a central week of discussion in a period of seven weeks. Research groups investigated water Movements, Microbial Biomass and Productivity, Materials Budgeting, Nitrogen Budgeting, Detrital and Mucus Consuption and Conversion, Water Column Trophodynamics, Benthic Trophodynamics and Anoxic Biogeochemical Processes.

STATUS

Field work completed, interim reporting in progress.

GEOGRAPHIC REGION: R

SHIP TIME REQUIREMENTS: 49 ship days

MAJOR DESCRIPTORS: Coral reefs/Ecology/Micro-organisms/

[AIMS—007]

142 Reef Ecology: Major Program.

ORGANIZATION:

Australian Institute of Marine Science
PMB No. 3
Townsville M.C. Qld 4810

PROJECT LEADER:

Dr R.H. Bradbury (077) 789382

CONTACT OFFICERS:

Dr J.T. Baker (077) 789 211
Dr J.C. Andrews (077) 789377 (Research)

MANPOWER:

6.17 (this year)

EXTERNAL SUPPORT:

GBRMPA – $24,000 (Salary of a project leader)

OBJECTIVES

Major Objective 1. Biogeography and taxonomy.
Sub–Project 1. To complete publication of the general book "Corals of Australia and the Indo–Pacific".
Sub–Project 2. To establish and analyse world–wide patterns of coral biogeography and taxonomy.
Sub–Project 3. Intensive study of sponge taxonomy on the Great Barrier Reef.
Major Objective 2. Patterns over ecologically significant spatial scales.
Sub–Project 4. Analyse results from broad–scale surveys of benthic life forms over micro– and meso–scales and from macro–scale studies of coral and fish distribution down the length of the Great Barrier Reef.
Sub–Project 5. Initiate micro– and meso– scale studies of benthic infaunal communities in the central Great Barrier Reef.
Sub–Project 6. Initiate a macro– scale survey of sponge distributions in the Caribbean.
Major Objective 3. Patterns over ecologically significant temporal scales.
Sub–Project 7. Micro–, meso–and macro–scales studies of coral reef communities with emphasis on the effects of perturbations.
Major objective 4. Factors determining and changing communities.
Sub–Project 8. Complete field experiments on major biotic and abiotic factors suggested by earlier pattern characterization studies.
Sub–Project 9. Initiate field and laboratory experiments on the relationship between larval behaviour physiology and recruitment.
Major Objective 5. Explanatory models of system structure.
Sub–Project 10. (a) Generate models of system structure to explain known patterns and factors within the Great Barrier Reef ecosystem and (b) explore the behaviour of the models in comparison with those of other ecosystems.
Major Objective 6. Predictive models of system dynamics.
Sub–Project 11. (a) Generate models of system dynamics to predict the response of the Great Barrier Reef ecosystem to pertubations and (b) explore the behaviour of the models in comparison with those of other ecosystems.

STATUS

A detailed set of 'Projected Research Activities 1985/86' is available on application to the Australian Institute of Marine Science.

CO-ORDINATION WITH OTHER PROJECTS

Dr. D.G. Green (Australian National University)

GEOGRAPHIC REGIONS: R,P,I

SHIP TIME REQUIREMENTS: 127

MAJOR DESCRIPTORS: Coral reefs/Community composition/Abundance/Anthozoa/Distribution/

[AIMS—002]

143 Reef Metabolism: Major Program.

ORGANIZATION:

Australian Institute of Marine Science
PMB No. 3
Townsville M.C. Qld 4810

PROJECT LEADER:

Dr B. Chalker (077) 789 275

CONTACT OFFICERS:

Dr J.T. Baker (077) 789 211
Dr D.W. Kinsey (077) 789377 (External Collaborations)

MANPOWER:

5.53 (this year)

OBJECTIVES

Major Objective 1. Community productivity, calcification and trophodynamics.
Sub–Project 1. Processing data and writing up results for seasonal light response curves and resulting integrated production and calcification rates by area across the shallow reef flats of Rib and Myrmidon Reefs Extension of these studies to Bowl and Hopkinson Reefs.
Sub–Project 2. Surveys of *in situ* primary production and calcification of corals on the fore– reef slopes of AIMS transect reefs for eventual integration of individual rates across communities. Intensive data acquisition with three respirometers with extension of initial surveys to common genera in addition to *Acropora* .
Sub–Project 3. A study of reef trophodynamics will commence with defining the basic food resources of coral reefs.
Sub–Project 4. Quantification of algal production and intensity of grazing by herbivores on coral reefs.
Major Objective 2. Primary productivity and calcification in selected organisms.
Sub–Project 5. Modelling bathymetric photo–adaptation including: (1) analysis of the relationship between light and photosynthesis using data previously collected. (2) analysis of photosynthetic pigment and UV–B blocking compounds in hermatypic scleractinians.
Sub–Project 6. Description of primary production and calcification in *Halimeda* and modelling light fields affecting primary productivity *in situ* .
Sub–Project 7. Completion of data analysis for publications to report the contribution of sponges to productivity consumption across Davies Reef and for the fore–reef slopes of reefs across the continental shelf. To assay variations in sponge productivity between different species of cyanobacteria–bearing sponges and at different depths.
Major Objective 3. Organic carbon in reef waters.
Sub–Project 8. Continuing quantitative studies of organic carbon in reef waters.
Major Objective 4. Marine biochemical technology.
Sub–Project 9. Synthetic design of commercial UV–B blocking compounds. Development of an Australian patent.
Sub–Project 10. Survey of UV–B blocking compounds in algae and reef invertebrates.
Major Objective 5. Nutrient fluxes with emphasis on phosphorus.
Sub–Project 11. Conclusion of field studies of the fluxes of dissolved and particulate organic phosphorus in water moving across the reef flat at Pandora Reef and its relationship to fluxes of carbon and other nutrients. Data analysis and manuscript preparation.
Major Objective 6. Physical oceanography of coral reefs.
Sub–Project 12. Initial investigations on the physical oceanography of coral reefs including (1) a description of wind–driven surface gravity waves impinging on coral reefs, initially at Myrmidon and Rib Reefs. (2) measurement of the surf beat, wave set and current profiles over reef flats initially at Bowl and Rib Reefs. (3) implementation of the Falconer and Wolanski computer model of flow separation in shallow waters.

STATUS

A detailed set of 'Projected Research Activities 1985/86' is available on application to the Australian Institute of Marine Science.

CO-ORDINATION WITH OTHER PROJECTS

University of Melbourne; Australian National University, UCLA.

GEOGRAPHIC REGION: R

SHIP TIME REQUIREMENTS: 98

MAJOR DESCRIPTORS: Coral reefs/Ecosystems/Nutrient cycles/Primary production/Energy flow/

[AIMS—005]

144 Shelf Seas: Major Program.

ORGANIZATION:
Australian Institute of Marine Science
PMB No. 3
Townsville M.C. Qld 4810

PROJECT LEADER:
Dr J.C. Andrews (077) 789295

CONTACT OFFICER:
Dr J.T. Baker (077) 789 211

MANPOWER:
4.60 (this year)

OBJECTIVES

Major Objective 1. Physical environment.

Sub–Project 1. To study the large–scale vertical and horizontal water motion in the central GBR with focus on: (a) concluding studies of the large–scale structure of upwelling intrusions; (b) concluding a numerical study of the barotrophic tides; (c) continuing numerical studies of low frequency motion; (d) conducting a field experiment to study the vertical structure of horizontal currents on a transect from Townsville to the Flinders reefs.

Sub–Project 2. To study the occurence of topographically– generated upwellings and the fate of patches of shelf break water advected through the reef matrix. In particular to conduct field experiments postponed from 1984–85 to study tidally induced vortices behind narrow reef passages in the outer barrier at the latitude of Cooktown, and to study nutrient status and the spatial distribution of *Halimeda* associated with the vortices.

Major Objective 2. Upwelling and its biological consequences.

Sub–Project 3. To determine the responses of selected benthic communities to periodic nutrient supply involving: (a) Laboratory studies of uptake, storage, utilisation and subsequent release of nutrients by inter– reefal *Halimeda* as mechanisms providing both primary organic production and integration of periodic nutrient pulses from upwellings; (b) (i) biological and chemical studies of the relationship of the spatial distribution of *Halimeda* (and associated sediments) to nutrient intrusions from the Coral Sea through narrow reef passages in the northern GBR; (ii) species composition and sediment generating capacity of large *Halimeda* meadows recently discovered at 100–135 m at the shelf break off Townsville; (c) Initiating a time–series study of the degree of coherence of alterations in rates of reef metabolism with wind–driven bottom intrusions (Secondary objectives are to estimate seasonal changes in reef flat metabolism and to estimate the gas velocity transfer coefficient in an open water system.)

Sub–Project 4. To study the trophodynamics and nutrient dynamics of marine food chains within the Shelf Sea with focus on: (a) The productivity and composition of short–lived reef lagoon phytoplankton populations and the role of lagoons in generating seed populations for phytoplankton populations in inter–reefal waters; (b) Comparing phytoplankton biomass, size structure and primary productivity in the shelf sea of the GBR with other shelf areas bordering the Coral Sea and the open Coral Sea; (c) Estimating rates of nitrogen uptake and remineralisation by microplankton (100 μm) in waters of the shelf sea and open Coral Sea.

Major Objective 3. Faunal recruitment.

Sub–Projects 5. To study dispersal and recruitment of selected reef dwelling animals with focus on: (a) completing the study of settlement patterns of juvenile corals on artificial habitats around Helix Reef, an isolated reef in the central GBR towards determining the degree to which reefs are connected, both to each other and to the Shelf Sea; (b) spatial and temporal abundance of zooplankton and of larval fish in the central GBR; (c) patterns in the recruitment of larval fish to reef environments.

STATUS

A detailed set of 'Project Research Activities 1985/86' is available on application to the Australian Institute of Marine Science

CO-ORDINATION WITH OTHER PROJECTS

James Cook University of North Queensland; Great Barrier Reef Marine Park Authority; Griffith University; University of Sydney.

GEOGRAPHIC REGION: R

SHIP TIME REQUIREMENTS: 115

MAJOR DESCRIPTORS: Shelf dynamics/Upwelling/Nutrients (mineral)/Production (biological)/Coral reefs/

[AIMS—003]

145 The Nearshore Environment: Major Program.

ORGANIZATION:

Australian Institute of Marine Science
PMB No. 3
Townsville M.C. Qld 4810

PROJECT LEADER:

Dr D.W. Kinsey (077) 789242

CONTACT OFFICER:

Dr J.T. Baker (077) 789 211

EXPENDITURE:

$979,000 (this year)

MANPOWER:

2.73 (this year)

OBJECTIVES

Objective 1. To develop an understanding of the processes and trophic inter–actions within the nearshore environment.

Sub–Project 1. For the Bowling Green Bay/Burdekin River outfall system to continue the development of a full annual cycle for primary production, total community carbon consumption and trophic balance for the total open system. To complete the benthic dome study of carbon flux at the sediment/water interface. To complete seasonal study and data analysis for standing stocks of organic matter, microbial biomass, organic and inorganic phosphate levels, and identification of organic source tracers. To carry out the calculation of diel, seasonal, and annual fluxes for all parameters studied. To complete the study of key processes in microbial decomposition.

Sub– Project 2. To complete the development of equipment facilities and expertise to allow the consideration of physical phenomena associated with shallow water over variable–slip muddy bottom. To carry out detailed field testing during this development.

Sub–Project 3. To extend the scope of present Reef Metabolism Program objectives for Pandora Reef to encompass carbon and phosphorus cycles.

Objective 2 and 3. To determine the response of the nearshore environment to fluvial input (wet season). To determine the interaction between the nearshore environment and the coastal wetlands (dry season).

Sub–Project 4. For the Northern River systems. To carry out a one month detailed study of the dry season patterns in the Port Musgrave (Wenlock–Ducie) system considering those ecological parameters covered by objective 1 and suitable parameters of physical flow and mixing. To consider in brief, by excursions during the one month period, the dry season patterns in the Escape River, the Embley River and the Norman River systems. To continue analytical examination of wet season materials taken during the 1984/85 Northern Rivers trip.

Sub–Project 5. To investigate physical phenomena associated with the formation of a coastal boundary layer and associated fronts. To investigate nutrient distributions and productivity enhancement patterns associated with a chosen strongly developed front. While the wet weather coastal boundary layer is entirely an in–house study, the dry weather study is dependent on US National Science Foundation funds for the interaction with Professor Kjertve to proceed.

STATUS

A detailed set of 'Projected Research Activities 1985/86' is available on application to the Australian Institute of Marine Science.

CO-ORDINATION WITH OTHER PROJECTS

Dr. M. Heron, James Cook University of North Queensland; Dr. T. Torgersen, Australian National University; Dr. B. Johns, University of Melbourne; Dr. J. Chappell, Australian National University.

GEOGRAPHIC REGIONS: R,C

SHIP TIME REQUIREMENTS: 62

MAJOR DESCRIPTORS: Coastal zone management/Primary Production/Biomass/Nutrient cycles/Nearshore circulation/

[AIMS—004]

146 Biogeography and ecology of northern Great Barrier Reef Islands.

February 1979 –

ORGANIZATION:
Australian Mineral Development Laboratories
ASPECT Environmental Consultants
P.O. Box 114
Eastwood, S.A. 5063

PROJECT LEADER:
Dr R.C. Buckley (08) 791662

EXPENDITURE:
$100,000 (all years)

MANPOWER:
0.30 (this year), 2.00 (all years)

EXTERNAL SUPPORT:
Australian Institute of Marine Science (Boat time and facilities, 1979)
CSIRO (Research fellowship Dr Buckley, 1979.)
Department of Administrative Services, Survey Division (Aerial photography 1979-1982.)

OBJECTIVE
Describe, map and inventory the geomorphology, soils, vegetation and fauna of reef islands within the Great Barrier Reef province north of Lizard Island, and interpret floristic pattern in terms of the habitat unit model of island biogeography.

METHODOLOGY
Inventories of June 1979 and December 1979 from Australian Institute of Marine Science. Experimental work 1979–81 at Lizard Island Research Station. Aerial photography (1:3000 colour) by Department of Administrative Services, Brisbane, completed 1982.

STATUS
Final specimen verification completed at the Smithsonian Institute, Washington. Text and tables for final monograph 75% complete as of 30.11.1985

CO-ORDINATION WITH OTHER PROJECTS
Data provided to Qld National Parks and Wildlife Service and to Division of National Mapping as requested at intervals.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Ecology/Biogeography/Islands/

[AMDEL–002]

147 Polychaete recruitment to coral reefs.

January 1976 – December 1986

ORGANIZATION:
Australian Museum
6–8 College Street,
Sydney, N.S.W. 2000

PROJECT LEADER:
Dr P. Hutchings (02) 3398111 Ext 243

EXPENDITURE:
$4,000 (this year), $45,371 (all years)

MANPOWER:
0.10 (this year), 0.60 (all years)

EXTERNAL SUPPORT:
ARGS – $45,371

OBJECTIVE
To study the spatial and temporal patterns of polychaete recruitment to coral reefs.

METHODOLOGY
Placing of replicate coral blocks on the reef at intervals and collecting after various exposure periods and extracting all polychaetes.

STATUS
The majority of the work has been completed and is published however the final analysis of 5 yrs of recruitment still has to be completed.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Polychaeta/Recruitment/Coral reefs/Distribution patterns/

[AUSMUS012]

148* Reproductive biology and post–nesting migration of the flatback turtle *Chelonia depressa* .

November 1979 –

ORGANIZATION:
Capricornia Institute of Advanced Education
Department of Biology,
Rockhampton, Qld 4700

PROJECT LEADER:
Dr C.J. Parmenter (079) 361177 Ext 222

EXPENDITURE:
$4,000 (this year), $11,500 (all years)

MANPOWER:
0.75 (this year), 2.05 (all years)

EXTERNAL SUPPORT:
Queensland National Parks and Wildlife Service. (Equipment loan and logistics assistance.)

OBJECTIVES

To determine reproductive parameters of fecundity (intra– and inter– season), egg and hatchling mortality at the major eastern Queensland rookeries of *Chelonia depressa* .
To accumulate information on the post–nesting migration of females from these major rookeries.
To conduct annual monitoring of rookery cohort sizes.

METHODOLOGY

Research teams of student volunteer assistants monitor up to three rookeries simultaneously in Dec/Jan.
Turtles are tagged and all nesting beach activity recorded in standardised format.

STATUS

Four seasons data have been collected. Numerous long distance post– nesting recaptures (including some that subsequently returned to their respective rookeries in later seasons) have allowed the refutation of previous speculations on the reproductive biology of this species.

CO–ORDINATION WITH OTHER PROJECTS

Marine Turtle Research Project of the Queensland National Parks and Wildlife Sevice.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Chelonia/Population dynamics/Geographical distribution/Reproduction (biological)/

[CIAE—001]

149 Behavioural ecology of reef–associated piscivores.

ORGANIZATION:
CSIRO
Division of Fisheries Research,
P.O. Box 1538,
Hobart, Tas. 7001

PROJECT LEADER:
Mr R. Thresher (002) 206222

EXPENDITURE:
$3,413 (this year), $3,413 (all years)

MANPOWER:
0.10 (this year), 0.10 (all years)

OBJECTIVE

To assess spatial and temporal variation in density, feeding ecology and behaviour of reef–associated piscivores in the family *Carangidae* (Trevally). Ultimately to identify factors that determine abundance and distribution of such fishes.

METHODOLOGY

Variable distance line transect visual censuses, combined with limited standard and acoustic tagging and other standard ecological techniques.

STATUS

Comparative study of effectiveness of alternative visual census techniques completed. Next phase will examine small scale spatial and temporal variation in abundance of numerically dominant species, and also attempt to assess extent of individual mobility.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Pisces/Population density/Feeding/Behaviour/Ecology/

[CSIRO–105]

150 Lobster larval distribution.

May 1979 –

ORGANIZATION:
CSIRO
Division of Fisheries Research
CSIRO Marine Laboratories
P.O. Box 20
North Beach, W.A. 6020

PROJECT LEADER:
Dr B.F. Phillips (09) 4471388

EXPENDITURE:
$2,500 (this year), $30,500 (all years)

MANPOWER:
1.00 (this year), 4.00 (all years)

OBJECTIVES

To study the vertical movements and distribution of the macro–zooplankton associated with warm core eddies and oceanic fronts, especially in south–eastern Australian waters.
Special attention is being paid to crustacean species including the phyllosoma larvae of the Scyllaridae and Palinuridae (the slipper and rock lobsters) to examine mechanisms of dispersal and recruitment of these animals.

METHODOLOGY

Systematic sampling of the plankton using 50cm, opening and closing, bongo nets. This allows discrete samples at selected depths. These data are integrated with environmental information including light levels in the ocean. Part of this work involves the preparation of a guide to the phyllosoma larval stages present in the plankton of the waters around Australia.

STATUS

All field sampling has been completed and the data are being analysed and prepared for publication.

GEOGRAPHIC REGIONS: W,C,R,Q,N

MAJOR DESCRIPTORS: Zooplankton/Malacostraca/Larvae/Life history/Distribution patterns/

[CSIRO–015]

151 Census and population biology of the mud crab *Scylla serrata* in the Narrows, Central Queensland.

March 1981 –

ORGANIZATION:
Esso Australia Ltd
Coal & Synthetic Fuels Department
127 Kent Street
Sydney, NSW 2000

PROJECT LEADER:
Mr R.D. Tait (02) 2362187

EXPENDITURE:
$1,000 (this year), $65,000 (all years)

MANPOWER:
0.10 (this year), 2.80 (all years)

OBJECTIVE

To establish baseline population estimates and population biology of the mud crab *Scylla serrata* in an area adjacent to the proposed Rundle oil shale project.

METHODOLOGY

Capture, mark, release and recapture (CMRR) techniques are employed at five locations on a bi–monthly basis to provide data for population estimates, growth, movement, and biology. Jacknife population estimates are used.

STATUS

Report prepared. Further data analysis continuing. Papers in preparation for publication in journals.

LOCALITY: Rundle

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Scyllaridae/Malacostraca/Population dynamics/Oil shale/Environmental impact/

[ESSO—001]

152 Mangrove litter fall as an estimate of the status of mangroves adjacent to the Rundle oil shale project.

June 1981 – December 1985

ORGANIZATION:
Esso Australia Ltd
Coal & Synthetic Fuels Department
127 Kent Street
Sydney, NSW 2000

PROJECT LEADER:
Mr R.D. Tait (02) 2362187

EXPENDITURE:
$1,000 (this year), $26,000 (all years)

MANPOWER:
0.10 (this year), 1.00 (all years)

OBJECTIVE
To establish natural seasonal variation in litter production from various mangrove species in the Narrows, Central Queensland.

METHODOLOGY
One metre square litter traps were suspended under selected mangroves to collect litter fall. These traps were cleared every four weeks and the litter identified. Wet and dry weights were recorded for separate components.

STATUS
Analysis and report completed. Papers in preparation for publication in journals.

Completed Project – This project will remain in the computerized Register for another 5 years but will not be included in future issues of the Compendium.

LOCALITY: Rundle
GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Mangrove swamps/Oil shale/Environmental impact/

[ESSO—003]

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153 **A review of crown of thorns starfish control programs in Japan.**

November 1985 – June 1986

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810
Griffith University
Australian Institute of Environmental Studies
Nathan Qld 4111

PROJECT LEADERS:
Dr L. Zann (077) 818811
Ms L. Worland (07) 2757111

CONTACT OFFICER:
Dr L. Zann

EXPENDITURE:
$841 (this year), $841 (all years)

OBJECTIVES
To interview Japanese scientists and officials engaged in central programs.
To collect and translate reports, survey techniques and control methods and assess their relevance to the Great Barrier Reef.

METHODOLOGY
Interviews with Japanese experts. Literature translation and review.

LOCALITY: Japan
GEOGRAPHIC REGIONS: R,P
MAJOR DESCRIPTORS: *Acanthaster planci* /Pest control/Monitoring/

[GBRMPA116]

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154 **Bacterial populations associated with crown of thorns starfish – identification and assessment of their ecological role.**

January 1986 –

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810
James Cook University of North Queensland
Townsville Qld 4811

PROJECT LEADERS:
Dr L. Zann (077) 818811
Dr D.C. Sutton (077) 814111

CONTACT OFFICER:
Dr L. Zann

EXPENDITURE:
$18,737 (this year), $18,737 (all years)

EXTERNAL SUPPORT:
MSTGS
COTSAC

OBJECTIVES
To identify bacteria associated with *Acanthaster planci*.
To determine whether the unique bacterial flora on these animals or other marine bacteria contribute to starfish survival or death.

METHODOLOGY
Laboratory studies on Fijian and Australian bacterial isolates collected to date. Collection of further isolates and development of taxonomic and diagnostic procedures.

STATUS
Cultures of bacteria from diseased Fijian and Great Barrier Reef specimens islated for identifcation. Descripton underway.

GEOGRAPHIC REGIONS: R,P
MAJOR DESCRIPTORS: *Acanthaster planci* /Hosts/Bacteria/Interspecific relationships/

[GBRMPA118]

155 Coral recruitment on fringing reefs near Cape Tribulation.

December 1985 –

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810
Reef Research and Information Services
(Subcontract)
PO Box 108
Kuranda Qld 4872

PROJECT LEADERS:
Mr I.M. Dutton (077) 818811
Dr V. Harriott (070) 937383

CONTACT OFFICER:
Mr I.M. Dutton

EXPENDITURE:
$4,600 (this year), $4,600 (all years)

OBJECTIVES
To determine coral recruitment patterns in the vicinity of Cape Tribulation.
To assess whether sediment runoff from Cape Tribulation Road has affected recruitment.

METHODOLOGY
Assessment will be made of the composition of spat recruitment on the settlement plates at sites adjacent to the Cape Tribulation Road.

STATUS
Settlement plates have been placed. Monitoring has commenced.

LOCALITY: Cape Tribulation
GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Construction/Environmental impact/Coastal reefs/Recruitment/Corals/

[GBRMPA148]

156 Coral reef metabolism and calcification.

September 1983 – September 1986

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
P.O. Box 1379,
Townsville, Qld 4810
James Cook University of North Queensland
Department of Marine Biology,
Post Office,
Townsville, Qld 4811

PROJECT LEADERS:
Dr W. Craik (077) 818811
Assoc Prof M. Pichon (077) 814111
Dr J. Morrissey (077) 814111

CONTACT OFFICER:
Dr W. Craik

EXPENDITURE:
$3,800 (all years)

OBJECTIVE
To obtain baseline data on coral reef metabolic and calcification rates to ascertain whether a coral reef contributes to the pool of organic matter in shallow water marine environments or whether it is a consumer of organic matter.

METHODOLOGY
Reef metabolism will be assessed by rates of oxygen production over daily cycles. Changes in oxygen concentration in waters flowing over the reef (upstream/downstream technique) will be measured by an oxygen polarographic electrode.
Calcification will be derived directly from changes measured in seawater total alkalinity (analyses by wet chemistry according to the method of Culbertson *et al*, 1979).

GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Coral reefs/Metabolism/Calcification/

[GBRMPA102]

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157 **Crown of thorns starfish monitoring and experimental control studies.**

July 1984 – June 1986

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810
Royal Australian Navy

PROJECT LEADERS:
Mr P. McGinnity (077) 818811
Mr K. McClymont

CONTACT OFFICER:
Ms S. Driml (077) 818811

EXPENDITURE:
$15,947 (this year), $15,947 (all years)

MANPOWER:
0.10 (this year), 0.10 (all years)

OBJECTIVES
To monitor crown of thorns starfish populations on selected reefs including tourist areas and areas known to have been infected by crown of thorns starfish.
To test effectiveness of hand collection of starfish at Beaver Reef.

METHODOLOGY
Surveys using manta tow technique: (i) in the Central Section in conjunction with the Royal Australian Navy; (ii) in the Swain Reefs area; (iii) in the Cormorant Pass Section; and (iv) at Beaver Reef along with hand collection of starfish.

LOCALITIES: Swain Reefs; Beaver Reef
GEOGRAPHIC REGION: R
SHIP TIME REQUIREMENTS: 14 days
MAJOR DESCRIPTORS: *Acanthaster planci* /Monitoring/Pest control/

[GBRMPA144]

158* **Hereditary structure and genetic exchange in coral populations.**

January 1984 – December 1985

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
P.O. Box 1379,
Townsville, Qld 4810
James Cook University of North Queensland
(Subcontract)
Department of Marine Biology,
Post Office,
Townsville, Qld 4811

PROJECT LEADERS:
Dr W. Craik (077) 818811
Mr A. Heyward (077) 814111
Mr R. Babcock (077) 814111

CONTACT OFFICER:
Ms E. Eager (077) 818811

EXPENDITURE:
$1,800 (all years)

MANPOWER:
2.00 (all years)

OBJECTIVE
To determine the degree of larval dispersal between reefs by documenting genetic variation within populations and genotypic frequency variation between separate populations.

METHODOLOGY
This study will investigate the genetic structure of populations of three species of coral, *Montipora ramosa*, *Goniastrea aspera* and *G. favulus* using a ten locus electrophoretic system. Preliminary studies have determined ten enzyme loci which show electrophoretic activity in corals. Sampling sites for the corals will be at Magnetic and Palm Islands.

STATUS

Completed Project – This project will remain in the computerized Register for another 5 years but will not be included in future issues of the Compendium.

LOCALITIES: Magnetic Island; Palm Island
GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Corals/Population dynamics/Larvae/Genetics/

[GBRMPA108]

159 Investigation into the relationship between breeding and feeding of seabirds around reef environments.

January 1983 –

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
P.O. Box 1379
Townsville, Qld 4810
Griffith University (Subcontract)
School of Australian Environmental Studies,
Nathan, Qld 4111

PROJECT LEADERS:
Dr W. Craik (077) 818811
Mr G.C. Smith (07) 2757111

CONTACT OFFICER:
Ms E. Eager (077) 818811

EXPENDITURE:
$900 (this year), $2,800 (all years)

MANPOWER:
1.00 (this year), 3.00 (all years)

OBJECTIVE
To test if food is a limiting resource to reproductive output and chick growth in tropical seabirds. To test if weather, tides, inter–specific competition and prey availability affect consumption.

METHODOLOGY
Four species (bridled tern, lesser crested tern, crested tern, brown booby) will be examined in the Lizard Island area and Raine Island and the findings compared with data from Capricornia.
Field work will involve locating breeding pairs, mapping of nest distributions in colonies, collection of data for calculating breeding parameters, banding young, monitoring growth rates of chicks, monitoring feeding behaviour, establishing weather recording equipment. Experiments to investigate supplementary feeding and nestling number manipulation may be undertaken.

STATUS
Field work continuing. Interim reports received.

GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Aves/Feeding/Food availability/Breeding/

[GBRMPA060]

160 **Monitoring juvenile crown of thorns starfish on the Great Barrier Reef (pilot study).**

June 1986 –

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810
James Cook University of North Queensland
Townsville Qld 4811

PROJECT LEADERS:
Dr L. Zann (077) 818811
Mr R. Bell (077) 814111

CONTACT OFFICER:
Dr L. Zann

EXPENDITURE:
$5,000 (this year), $5,000 (all years)

OBJECTIVE
To study population dynamics of juvenile starfish on Rib Reef and Pelorus Island (pilot study).

METHODOLOGY
Survey of selected reefs. Detailed study at Pelorus Reef.

LOCALITIES: Pelorus Reef; Rib Reef
GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: *Acanthaster planci* /Juveniles/Population dynamics/

[GBRMPA114]

161 **Monitoring of Cape Tribulation fringing reefs.**

December 1985 –

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810
Sea Research (Subcontract)
PMB No. 1
Daintree Qld 4873

PROJECT LEADERS:
Mr I.M. Dutton (077) 818811
Dr A.M. Ayling (070) 986118

CONTACT OFFICER:
Mr I.M. Dutton

EXPENDITURE:
$33,500 (this year), $33,500 (all years)

OBJECTIVES
To determine and monitor biological patterns and processes in the vicinity of Cape Tribulation.
To assess whether sediment runoff from the Cape Tribulation road has affected these patterns.

METHODOLOGY
Survey by line transects of fringing reefs adjacent to both established and newly constructed sections of the road.

STATUS
Biological processes monitored through two wet seasons.

LOCALITY: Cape Tribulation
GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Biological surveys/Environmental impact/Construction/Coastal reefs/

[GBRMPA147]

162 **Population dynamics of crown of thorns starfish on Suva Barrier Reef, Fiji.**

September 1985 – October 1986

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810
University of the South Pacific
Box 1168
Suva, Fiji

PROJECT LEADERS:
Dr L. Zann (077) 818811
Mr J. Brodie

CONTACT OFFICER:
Dr L. Zann

EXPENDITURE:
$4,651 (this year), $4,651 (all years)

OBJECTIVES
To monitor growth, abundance and distribution of populations of juvenile and adult crown of thorns starfish on a coral reef.
To continue the monitoring program started in 1979.

METHODOLOGY
Monthly sampling of distribution and abundance of starfish.

STATUS
Monthly reports have been produced. Initial results to be published in the Bulletin of Marine Science.

LOCALITY: Fiji
GEOGRAPHIC REGION: P
MAJOR DESCRIPTORS: *Acanthaster planci* /Population dynamics/Distribution/Abundance/Growth/

[GBRMPA115]

163 Potential human causes of *Acanthaster planci* aggregations in the South Pacific.

May 1986 –

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810
University of the South Pacific
Box 1168
Suva, Fiji

PROJECT LEADERS:
Dr L. Zann (077) 818811
Ms G. Brodie

CONTACT OFFICER:
Dr L. Zann

EXPENDITURE:
$12,000 (this year), $12,000 (all years)

OBJECTIVES
To identify commonalities among widely separated geographic areas which have experienced crown of thorns starfish outbreaks.
To test the predator removal' hypothesis.

METHODOLOGY
A database of Pacific infestations is to be set up from reports of previous infestations and information obtained from surveys and questionnaires.

STATUS
Surveys, questionnaires, distribution and database construction have commenced. Literature survey is in process.

GEOGRAPHIC REGIONS: R,P
MAJOR DESCRIPTORS: *Acanthaster planci* /Distribution patterns/Sociological aspects/

[GBRMPA123]

164 Role of *Acanthaster planci* in reef degradational processes: historical perspective and current influence.

June 1985 –

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810
James Cook University of North Queensland
Department of Geology
Townsville Qld 4180

PROJECT LEADERS:
Dr L. Zann (077) 818811
Dr R. Henderson (077) 814111

CONTACT OFFICER:
Dr L. Zann

EXPENDITURE:
$49,500 (this year), $79,540 (all years)

MANPOWER:
1.20 (this year), 3.00 (all years)

OBJECTIVES
To elucidate the prehistory of *Acanthaster planci* in the Great Barrier Reef Region
To determine the rates and process of reef degradation which follow destruction of hard coral communities.

METHODOLOGY
Field survey and collection of sediment and core samples for examination and ^{14}C dating.

STATUS
Atlas of skeletal elements has been produced. Surface sediments have been analysed from Green Island and John Brewer reefs (which have experienced *A. planci* infestations) and Heron Island (central). Examination for skeletal elements is underway.

CO-ORDINATION WITH OTHER PROJECTS
The sampling program was designed in close consultation with the Bureau of Mineral Resources who has provided a vibrocore, raft and technician.

LOCALITIES: Green Island; Heron Island; John Brewer Reef
GEOGRAPHIC REGION: R
SHIP TIME REQUIREMENTS: 20 days
MAJOR DESCRIPTORS: *Acanthaster planci* /Coral reefs/Damage/Geological history/

[GBRMPA127]

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165 Studies of diseases of the crown of thorns starfish.

January 1986 –

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810
James Cook University of North Queensland
Townsville Qld 4811

PROJECT LEADERS:
Dr L. Zann (077) 818811
Prof R.S.F. Campbell (077) 814111

CONTACT OFFICER:
Dr L. Zann

EXPENDITURE:
$23,389 (this year), $23,389 (all years)

EXTERNAL SUPPORT:
MSTGS
COTSAC

OBJECTIVE
To obtain data on naturally occuring diseases (bacteria, viral, and parasitic) by identifying and characterising specific diseases and gathering epidemiological data.

METHODOLOGY
Collection, statistical planning and analysis of epidemological through laboratory studies involving tissue culture and virus isolation.

STATUS
Diseased specimens from Fiji and the Great Barrier Reef (GBR) examined and pathology described.

GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: *Acanthaster planci* /Pathology/

[GBRMPA119]

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166 Study of crown of thorns starfish predators on the Great Barrier Reef.

June 1986 –

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810
University of Queensland
Zoology Department
St. Lucia Qld 4067

PROJECT LEADERS:
Dr L. Zann (077) 818811
Assoc Prof R. Endean (07) 3772482

CONTACT OFFICER:
Dr L. Zann

EXPENDITURE:
$13,000 (this year), $13,000 (all years)

OBJECTIVES
To identify crown of thorns starfish predators.
To survey identified predators over several reefs subject to a range of activities.

METHODOLOGY
In situ enclosure and aquarium studies to establish generalist and specialist predators. Census techniques to be determined by the species of predator involved.

STATUS
Preliminary surveys underway.

CO-ORDINATION WITH OTHER PROJECTS

Coordination with AIMS, James Cook University and COTSAC studies.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: *Acanthaster planci* /Predation/Interspecific relationships/

[GBRMPA125]

167 Survey of the crown of thorns starfish in the Capricorn and Capricornia sections of the Great Barrier Reef.

November 1985 – June 1986

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

Sea Research (Subcontract)
PMB No. 1
Daintree Qld 4873

PROJECT LEADERS:

Ms. S. Driml (077) 818811
Dr A.M. Ayling (070) 986118
Dr A.L. Ayling (070) 986118

CONTACT OFFICER:

Ms. S. Driml

EXPENDITURE:

$15,000 (this year), $15,000 (all years)

OBJECTIVE

To survey selected reefs in the Capricorn and Capricornia sections for crown of thorns starfish. Surveys will be made in conjunction with coral and coral trout surveys.

METHODOLOGY

Maintain two surveys of each reef perimeter. Counts of crown of thorns starfish using straight line transect surveys.

STATUS

Survey undertaken between December 1985 and February 1986.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: *Acanthaster planci* /Biological surveys/

[GBRMPA126]

168 The relationships between crown of thorns starfish outbreaks and water mass characteristics in the Great Barrier Reef region.

February 1986 –

ORGANIZATION:

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

PROJECT LEADER:

Mr D.van.R. Claasen (077) 818811

CONTACT OFFICER:

Dr L. Zann (077) 818811

EXPENDITURE:

$38,000 (this year), $38,000 (all years)

OBJECTIVES

To determine broad scale patterns of productivity and of terrestrial water discharge using coastal zone colour scanning and other remotely sensed imagery.
To relate these patterns to *Acanthaster planci* distributions.

METHODOLOGY

Analysis of coastal zone colour scan images to delineate areas showing chlorophyll a' and water colour distribution over the region.

STATUS

Hardware and software has been acquired. Some imagery has been retrieved. NOAA tapes on order.

CO-ORDINATION WITH OTHER PROJECTS

Coordination with AIMS and COTSAC studies.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: *Acanthaster planci* /Distribution patterns/Coastal waters/Correlation analysis/

[GBRMPA124]

169 Trial control of crown of thorns starfish on the Great Barrier Reef.

May 1986 –

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

Australian Institute of Marine Science
PMB No. 3 MSO
Townsville Qld 4810

Royal Australian Navy

PROJECT LEADERS:

Dr L. Zann (077) 818811
Dr P. Moran (077) 789211

CONTACT OFFICER:

Dr L. Zann

EXPENDITURE:

$5,000 (this year), $5,000 (all years)

OBJECTIVES

To test feasibility of crown of thorns starfish control by hand.
To assess cost/benefits.
To establish contingency plans for infestations and conduct a variety of related experiments.

METHODOLOGY

Site of trial control determined in conjunction with AIMS survey results. Volunteer divers (RAN) will then be used to destroy the starfish to evaluate the efficiency of control methods. Several methods of killing to be examined.

STATUS

Trial control using RAN volunteers held in July 1986 with post control checks to be made during surveys by AIMS.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: *Acanthaster planci* /Pest control/

[GBRMPA117]

170 Population biology of the tropical gastropod *Strombus luhuanus*, and its resilience to human exploitation.

September 1980 –

ORGANIZATIONS:

Griffith University
Australian Environmental Studies
Nathan, Qld 4111

CSIRO
Cleveland Marine Labs
Division of Fisheries
P.O. Box 120
Cleveland, Qld 4163

PROJECT LEADERS:

Dr C.P. Catterall (07) 2757111
Dr I.R. Poiner (07) 2862022

CONTACT OFFICER:

Dr C.P. Catterall

EXPENDITURE:

$49,000 (this year), $112,000 (all years)

MANPOWER:

1.50 (this year), 4.00 (all years)

EXTERNAL SUPPORT:

MSTGS – $76,281 (1984 & 1985)

OBJECTIVE

To use *Strombus luhuanus* as a 'model' tropical coral–reef gastropod, for a population–level investigation into a variety of ecological questions concerning resource limitation, strategies of spatial dispersion and effects of human exploitation. Strombid gastropods have been chosen for this purpose because they can be easily tagged, sexed, aged and experimentally manipulated, as well as living mainly in simply–structured shallow–water habitats.

METHODOLOGY

1. Descriptive monitoring by means of transect sampling (density, age–structure, recruitment rates, temporal variations, habitat parameters.
2. Mark–recapture techniques (growth rates, movements).
3. Behavioural observations (food, feeding, short–term movements).
4. Experimental manipulations (density effects, predation rates, effects of human exploitation).

STATUS

Documentation of basic biology (growth–curve, feeding, reproduction, predators, longevity, seasonality), is nearing completion. Individuals are characteristically clumped; 4 types of aggregation occur (mixed age–class; juvenile only; mating; contact clustering), each type being characterized by a particular density, age–structure, area and temporal persistance. There is significant variation in the

mean sizes of individuals among local populations; this variation is correlated with population density; field experiments suggest a causal relationship. We predict that populations should be resilient to collection of a large proportion of adults, but not pre–adult stages. An experiment to test the effect of various intensities of human exploitation is currently in progress.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: *Strombus luhuanus* /Gastropoda/Population dynamics/Exploitation/

[GRIFFI010]

171* Ecology and physiology of the molluscan (Gastropoda) genera *Cellana* and *Siphonaria*

January 1977 –

ORGANIZATION:
James Cook University of North Queensland
Department of Zoology
Post Office
Townsville, Qld 4811

PROJECT LEADER:
A/Prof R.P. Kenny (077) 814265

EXPENDITURE:
$460 (this year), $1,600 (all years)

MANPOWER:
0.20 (this year), 0.70 (all years)

OBJECTIVES

1. To determine effects of temperature and desiccation in relation to the distribution of these intertidal gastropods.
2. To examine the respiratory physiology of these gastropods in relation to temperature and tidal patterns.
3. To study the relationship between temperature and growth of the genus *Cellana* .
4. To determine the taxonomy of the coral sea species of the genus *Siphonaria* .

METHODOLOGY

1. Field investigation of distributions relative to tidal patterns and microclimate.
2. Laboratory determination of respiratory rates.
3. Examination of growth characteristics from latitudinally differing populations.
4. Scanning electron microscopy of radulae.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: *Cellana* / *Siphonaria* /Gastropoda/Ecological distribution/Geographical distribution/

[JAMESC019]

172* Spatial and temporal distribution of soft–bottom epibenthos across the Great Barrier Reef shelf.

August 1976 –

ORGANIZATION:
James Cook University of North Queensland
School of Biological Sciences
Post Office
Townsville, Qld 4811

PROJECT LEADERS:
Mr R.A. Birtles (077) 814234
A/Prof M. Pichon (077) 814432
Prof C. Burdon–Jones (077) 814530

CONTACT OFFICER:
Mr R.A. Birtles

EXPENDITURE:
$28,868 (this year), $117,300 (all years)

MANPOWER:
2.25 (this year), 8.25 (all years)

EXTERNAL SUPPORT:
MSTGS – $28,868
AMSTAC–FAP – $6,250

OBJECTIVES

1. To record soft bottom epibenthic species.
2. To define patterns of distribution of soft bottom benthos.
3. To document natural variability of the benthos through time.
4. To conduct selected autecological studies on component fauna.

METHODOLOGY

Sampling effort off Townsville has been concentrated between the coast and inner reefs 80 km offshore (depths 3– 55m). The majority of samples was collected with a modified Ockelmann sledge hauled along the central portion of each side of a one nautical mile square; 92 sites have been thus sampled. Additional samples were collected by 12m otter trawl, Smith–McIntyre grab, Porcupine and Charcot naturalist dredges, and by SCUBA diving. Sediment samples were taken at sites across the shelf and echosounder traces are available for all stations. We have also extended coverage across the outer shelf (depths 60–100m) and down the continental slope to almost 200m.
Two central transects on the inner shelf have been sampled annually since 1977 to study long term temporal variation.
Fine scale distribution was studied at four sites where eight samples were taken within the square as well as along each side.
An otter trawl transect was run to collect megafauna.
A permanent site has been established off Orpheus Island to study temporal variation effect of hard substratum limitation, and selected environmental parameters.

STATUS

A marked faunal discontinuity occurs at about 22m, corresponding closely to the maximum depth of wind–generated resuspension of sediment. Inshore, macrobenthos is primarily infaunal, with a few specialised epibenthic species; macro flora is much reduced and primarily seagrass. Offshore, epibenthos species–diversity is high. This results from a suite of generally distributed species, especially large echinoderms, as well as localized complexes of algae, bryozoans, sponges, ascidians, and foraminiferans which we call "natural isolates". These act as foci of diversity for hard–substratum–limited species.
The inshore–offshore discontinuity is also apparent from our data on megafauna, especially fishes.
Certain echinoderms have shown an uniformity in abundance through our sampling period, with a suite of eight species remaining as co–dominants. The recruitment of several echinoderm species has been followed since 1977.

LOCALITIES: Townsville; Orpheus Island
GEOGRAPHIC REGION: R
SHIP TIME REQUIREMENTS: 14
MAJOR DESCRIPTORS: Benthos/Continental Shelf/Check lists/Temporal distribution/Geographical distribution/

[JAMESC025]

173 A study of habitat selection by larval damsel fishes, *Dascyllus aruanus* and *D. reticulatus*.

– December 1985

ORGANIZATION:
Macquarie University
Centre for Environmental and Urban Studies,
North Ryde, N.S.W. 2113

PROJECT LEADER:
Mr H. Sweatman (02) 889232

MANPOWER:
1.00 (this year), 3.00 (all years)

EXTERNAL SUPPORT:
GBRMPA – $787

OBJECTIVE

To investigate the behaviour of larvae and adults that result in the clumped distributions shown by these species.

METHODOLOGY

The sedentary nature of these species allowed experimental coral heads with different numbers of resident adult *Dascyllus* spp. to be set up in the field. The influence of residents on settlement of conspecific larvae, and those of a range of other species were measured. Juvenile *Dascyllus* spp. were transplanted to experimental corals in different locations and with different combinations of residents. The growth rates of transplanted juveniles was used as a measure of relative fitness in assessing the adaptive significance of choices of settling sites.

STATUS

The field experiments have been carried out over two settlement seasons. Analysis of the data is complete and a thesis describing the project is in an advanced state. Two manuscripts have been prepared and one has been provisionally accepted.

Completed Project – This project will remain in the computerized Register for another 5 years but

will not be included in future issues of the Compendium.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: *Dascyllus* /Ecology/Pisces/Behaviour/

[MACQUA008]

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174 **A study of the social system of the sharp-nosed Pufferfish *Canthigaster valentini*.**

– December 1985

ORGANIZATION:
Macquarie University
Centre for Environmental and Urban Studies,
North Ryde, N.S.W. 2113

PROJECT LEADER:
Mr W. Gladstone (02) 889232

MANPOWER:
1.00 (this year), 4.00 (all years)

EXTERNAL SUPPORT:
GBRMPA – $787

OBJECTIVE
To describe the social system of *C. valentini*, and to identify the underlying selective forces.

METHODOLOGY
The social organisation and demography of *Canthigaster valentini* was followed for 3 years in 2 sites at Lizard Island, Queensland. Some field experiments were carried out to elucidate the processes underlying the social system.

STATUS
A thesis describing the project is in an advanced state of preparation.

Completed Project – This project will remain in the computerized Register for another 5 years but will not be included in future issues of the Compendium.

LOCALITY: Lizard Island

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: *Cathigaster valentini* /Pisces/Population structure/Population dynamics/ Ecology/

[MACQUA010]

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175 **Ecology of coral reef fishes.**

– December 1985

ORGANIZATION:
Macquarie University
Centre for Environmental and Urban Studies
North Ryde, N.S.W. 2113

PROJECT LEADER:
Prof F.H. Talbot (02) 889705

EXPENDITURE:
$27,077 (this year), $159,797 (all years)

MANPOWER:
5.50 (this year), 15.00 (all years)

OBJECTIVE
To study the social organisation, recruitment of larval fishes, sex change, effects of reduction of predation, day night movements of fish predators.

METHODOLOGY
Work on Besser Block simulated reefs, determining recruitment, loss and interaction, by regular observation.
Predator reduction by caging, and by differential spatial placing of reefs in high predator/low predator areas.
Computer modelling of assemblage structure with different forms of recruitment and loss.
Sex change by field manipulation and subsequent behavioural and laboratory (histological) checking.
Movements of fishes by sonic marking tags and directional hydrophones.

STATUS
Significant progress in our understanding of the maintenance of assemblages of fishes on reef isolates.
Finding of a Pomacanthid exhibiting haremic social structure with protogynous sex change.
Rejection of certain settling hypotheses to isolated patch reef fish assemblages.

Completed Project – This project will remain in the computerized Register for another 5 years but will not be included in future issues of the Compendium.

LOCALITY: Lizard Island
GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Coral reefs/Pisces/Population dynamics/Predation/Sex reversal/

[MACQUA006]

176 Giant clam populations.

December 1984 – December 1986

ORGANIZATIONS:
Queensland Department of Primary Industries
Fisheries Research Branch,
GPO Box 46,
Brisbane, Qld. 4001
James Cook University of North Queensland
Townsville, Qld. 4811

PROJECT LEADERS:
Mr R.G. Pearson (07) 2276432
Dr J. Munro

CONTACT OFFICER:
Mr R.G. Pearson

EXTERNAL SUPPORT:
GBRMPA – $9,900

OBJECTIVE
To establish population parameters (growth, recruitment and natural mortality) for the giant clams *Tridacna gigas* and *Tridacna derasa* .

METHODOLOGY
All field work will take place on Michaelmas Reef in January 1985 when a tagged population of over 1 200 giant clams will be recensused. Particular emphasis will be given to juvenile *T. gigas* and *T. derasa* (3 to 20cm shell length) in terms of predation and microhabitat within the 2.7 ha study area.

STATUS
Several previous censuses beginning in 1978/79 – provided data on rates of growth, recruitment and natural mortality for *T. gigas* and *T. derasa* . Field work complete. Report being prepared.

CO-ORDINATION WITH OTHER PROJECTS
With Dr. J.S. Lucas, ACIAR/JCUNQ project on giant clam mariculture.

LOCALITY: Michaelmas Reef
GEOGRAPHIC REGION: R
SHIP TIME REQUIREMENTS: 21
MAJOR DESCRIPTORS: Tridacna/Ecology/Population dynamics/

[QDPI—024]

177 Studies on toxic dinoflagellates responsible for formation of ciguatoxin.

ORGANIZATION:
Queensland Department of Primary Industries
Fisheries Research Branch
Southern Fisheries Research Centre
P.O. Box 76
Deception Bay, Qld 4508

PROJECT LEADER:
Dr N.C. Gillespie (07) 2031444

EXPENDITURE:
$39,000 (this year), $93,000 (all years)

MANPOWER:
3.00 (this year), 12.00 (all years)

EXTERNAL SUPPORT:
FIRTA – $9,700

OBJECTIVES
1. Determine the distribution of the known elaborator of ciguatoxin, the dinoflagellate *Gambierdiscus toxicus* in ciguateric areas on the Queensland coast.
2. Investigate factors influencing the distribution of the organism.
3. Isolate and culture the organisms with a view to producing ciguatoxin.

METHODOLOGY
1. Collection of macroalgal specimens in coral reef locations along Queensland coast, processing and sieving to obtain fraction containing *G. toxicus* .
2. Counting of *G. toxicus* and other benthic dinoflagellates by microscopic methods.
3. Identification of algae from which *G. toxicus* is isolated.
4. Toxin assay of wild and cultured cells by solvent extraction and animal bioassay using mice.
5. Culture of isolated strains under varying conditions of temperature and substrate.

STATUS

The distribution of benthic dinoflagellates along the Queensland coast is now well understood. The toxicity of a wild population of *G. toxicus* from Flinders Reef in southern Queensland was assayed and while maitotoxin was present, no ciguatoxin was found. Subsequently a number of experiments linking reef disturbance with ciguatera outbreaks has resulted in the detection of a toxic fraction in laboratory culture of *G. toxicus* that would appear chemically similar to ciguatoxin.

GEOGRAPHIC REGIONS: R,Q

SHIP TIME REQUIREMENTS: 20 days

MAJOR DESCRIPTORS: *Gambierdiscus toxicus* /Dinoflagellata/Ciguatoxins/Poisonous organisms/Distribution patterns/

[QDPI—016]

178 Chemical approaches to food chain studies.

January 1982 –

ORGANIZATION:
University of Melbourne
Chemistry School
Parkville, Vic 3052

PROJECT LEADER:
Dr R.B. Johns (03) 3446490

EXPENDITURE:
$9,560 (this year)

MANPOWER:
1.00 (this year)

EXTERNAL SUPPORT:
MSTGS

OBJECTIVE

To determine, by the use of chemical biological markers, the likely food sources of the zooplankton and vertebrates studied.

METHODOLOGY

Centres primarily on the isolation and purification of geo– and bio–lipids, which is achieved by the adaptation of conventional techniques of lipid chemistry. Structural determinations are carried out. Non–contaminatory methods of handling materials are necessary.

STATUS

A study of larger fish important to the commercial fishing industry in Corner Inlet has been completed in conjunction with a biological study of their food chain. Lipid content and SC^{13} fractionations have been the chosen tools. The data reflects most strongly on the inefficiency of the absorption processes at these trophic levels. A study of zooplankton, especially acartia species, is underway. This has placed emphasis on an understanding of inputs to the particulate matter fraction which is likely to be consumed by the zooplankton. The study has been over seagrass beds in Victoria and also from the Lizard Island lagoon. Some conclusions as to inputs are proving to be quite firm; more tentative conclusions require a broader data base.

LOCALITIES: Corner Inlet; Lizard Island

GEOGRAPHIC REGIONS: B,R

MAJOR DESCRIPTORS: Chemical analysis/Food chains/Zooplankton/Pisces/

[UNIMEL068]

179 Ecology of marine parasites.

January 1973 –

ORGANIZATION:
University of New England
Department of Zoology
Armidale, N.S.W. 2351

PROJECT LEADER:
A/Prof K. Rohde (067) 732 888

EXPENDITURE:
$22,000 (this year), $100,000 (all years)

MANPOWER:
2.50 (this year), 25.00 (all years)

EXTERNAL SUPPORT:
ARGS – $12,800
ABRS – $8,000

OBJECTIVES

To study latitudinal gradients in species diversity, niche utilization, competition and causes of niche restriction in marine parasites.
To study zoogeography and economic importance of marine parasites.

METHODOLOGY

Taxonomy of marine parasites using histological techniques. Electron– microscopy, computer modelling. Pathology.

STATUS

Approximately 45 papers published in internatial journals; book 'Ecology of Marine Parasites' (Univ. Qld. Press, 1982); book chapter on 'Helminth Diseases of Marine Fishes' (in , Kinne, O. ed: 'Diseases of marine animals', 1984; several invited review lectures. 150 species of Monogenea, Copepoda and endoparasites described (including those by postgraduate students).

CO-ORDINATION WITH OTHER PROJECTS

Collaboration with CSIRO Cronulla, various state fisheries departments, Antarctic Division

GEOGRAPHIC REGIONS: B,G,R,Q,N

MAJOR DESCRIPTORS: Parasites/Biogeography/Distribution patterns/Economics/Ecological distribution/

[UNIARM002]

180* **Ecology of the Swain Reefs.**

ORGANIZATION:
University of New England
Department of Zoology,
Armidale, N.S.W. 2351

PROJECT LEADER:
Mr H. Heatwole (067) 733333

EXPENDITURE:
$25,000 (this year), $45,000 (all years)

EXTERNAL SUPPORT:
USF (U.S.A.)
Mayers Foundation
MSTGS – $72,460

OBJECTIVES

1. To study the community ecology of the coral cays, especially the influence upon the vegetation of sea birds, turtles, substrate instability and salt.
2. To study factors affecting the local distribution of marine organisms on the reef.

METHODOLOGY

Quantitative sampling along transects on the islands and underwater.

STATUS

162 scientific publications including 3 books.

LOCALITY: Swain Reefs

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Ecology/Cays/Coral reefs/Community composition/

[UNIARM005]

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181 **Abundance, Schooling Behavior and Population Composition of Sprats (Clupeidae) and Silversides (Atherinidae).**

November 1982 – November 1985

ORGANIZATION:
University of Queensland
Zoology Department
St. Lucia, Qld, 4067

PROJECT LEADER:
Dr K. Warburton (07) 3772979

CONTACT OFFICER:
Ms P. Dupee (07) 3772992

EXPENDITURE:
$1,550 (this year), $3,500 (all years)

MANPOWER:
1.00 (this year), 1.50 (all years)

EXTERNAL SUPPORT:
Australian–American Educational Foundation (Fullbright Exchange Program) – $750 (Provides monthly stipend, and home host courtesy, transpo. Supplement allowance of $750 is provided for research needs.)

GBRMPA — $900 (Provides for bench fees and return transport to One Tree Island, GBR.)

OBJECTIVES

1. Quantifications of temporal and spatial variation in abundance and biomass of atherinids and clupeoids.
2. Interspecific comparison of variaton in schooling behavior, school density, and school structure between atherinids and clupeoids.
3. Assessment of the population composition and predation mortality of atherinids and clupeoids.

METHODOLOGY

1. Assessed by way of transect censusing (visual observation) and sampling of study species.
2. Assessed by way of visual observation and photography of fish schools.
3. Assessed by length and weight frequency analysis relative age, and sex identification.

STATUS

Completed Project – This project will remain in the computerized Register for another 5 years but will not be included in future issues of the Compendium.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Atherinidae/Dussumieriidae/Pisces/Population dynamics/Schooling behaviour/

[UNIQLD036]

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182 An examination of the feeding biology of gastropods that prey on scleractinian corals.

July 1984 – July 1986

ORGANIZATION:
University of Queensland
Zoology Department,
St. Lucia, Qld. 4067

PROJECT LEADER:
Mr A.J. Page (07) 3772475

EXPENDITURE:
$2,650 (this year), $2,950 (all years)

MANPOWER:
1.10 (this year), 1.70 (all years)

EXTERNAL SUPPORT:
Hawaiian Malacological Society – $950

OBJECTIVES

1. To closely monitor the feeding behaviour of corallivorous gastropods and relate observed behaviour to their morphology.
2. To look for adaptations in gastropods to a corallivorous existence.
3. To monitor the effect predatory gastropods have on their coral hosts.

METHODOLOGY

1. Make detailed observations of the feeding behaviour of gastropods in the field and in the laboratory.

2. Analyse gut contents of gastropods by dissection and make a microscopical examination of animals by histological techniques.
3. Mark host corals, and photograph them, to determine the effects of gastropod predation.

STATUS

Five species of corallivorous gastropods and their coral hosts have been identified and a feasible line of study worked out.

GEOGRAPHIC REGIONS: R,Q,N

MAJOR DESCRIPTORS: Gastropoda/Predation/Corals/Ecology/

[UNIQLD058]

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183 Benthic community structure and organization in Heron Island Lagoon soft sediments.

July 1983 –

ORGANIZATION:
University of Queensland
Department of Zoology
St Lucia, Qld 4067

PROJECT LEADER:
Mr B.G. Longong

CONTACT OFFICER:
Dr T.S. Hailstone (07) 3772508 (Supervisor)

EXPENDITURE:
$750 (this year), $1,650 (all years)

MANPOWER:
0.90 (this year), 1.90 (all years)

OBJECTIVES

To investigate biological characteristics of the communities of benthic macrofauna associated with Heron Island lagoon sediments.
To study in detail the spatial and temporal variability of these communities and their more common species.
To investigate factors which are postulated to have major influences on community organization.
Comparison with similar communities associated with One Tree Island lagoon sediments is also being attempted.

METHODOLOGY

Grid–marked study areas are sampled repeatedly with replicate grab–sampling techniques. Species abundance data are accumulated from these samplings and are subjected to computerized analyses which reveal community groupings and various salient aspects of community structure. Monitoring of abiotic variables that are suspected of influencing community structure and distribution is also being undertaken. Biological determinants of community organization are being investigated with a series of specially designed field cage–experiments.

STATUS

Much of the preliminary field work and analyses of community structure and relationships to abiotic variables has been completed, but further sampling will continue. Cage–experiments have been designed and tested, and are now proceeding. When field studies are completed, this project will be presented as a PhD thesis.

LOCALITIES: Heron Island; One Tree Island

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Community composition/Benthos/Sediments/Abiotic factors/

[UNIQLD078]

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184 Ecological importance of patterning in the emergence of demersal zooplankton.

February 1984 – December 1986

ORGANIZATION:
University of Queensland
Zoology Department,
St. Lucia, Qld. 4067

PROJECT LEADERS:
Dr J.G. Greenwood (07) 377 2491
Dr C.A. Jacoby (07) 377 2491

CONTACT OFFICER:
Dr C.A. Jacoby

EXPENDITURE:
$12,000 (this year), $26,700 (all years)

MANPOWER:
1.00 (this year), 3.20 (all years)

EXTERNAL SUPPORT:
ARGS – $10,000
Harbour Branch Foundation, Florida, USA (Loan of traps.)

OBJECTIVE
Characterize patterns of emergence in demersal zooplankton and examine environmental factors that are correlated with these patterns.

METHODOLOGY
Rotary emergence traps which take 12 separate samples over preset intervals have been set over differing substrata (coral, sand, seagrass). Organisms captured are being classified and enumerated. Analysis of variance is being used to determine whether patterns in emergence exist and are affected by various environmental factors.

STATUS
Data from various substrata in Great Barrier Reef waters (Heron I) are currently being analysed. Sorting of comparable samples from the Morton Bay region continues.

CO-ORDINATION WITH OTHER PROJECTS
Queen's Fellowship research project on demersal zooplankton as submitted by Dr C.A. Jacoby.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Zooplankton/Ecology/Distribution patterns/Benthic zone/

[UNIQLD052]

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185 **Effects of parasite infection on the population dynamics of a pomacentrid fish at Heron Island.**

December 1984 – December 1987

ORGANIZATION:
University of Queensland
Department of Parasitology,
St. Lucia, Qld. 4067

PROJECT LEADERS:
Dr R.J.G. Lester (07) 3773305
Dr C. Dobson (07) 3772572

CONTACT OFFICER:
Dr R.J.G. Lester

EXTERNAL SUPPORT:
MSTGS – $28,607 (for 1986)

OBJECTIVE
To analyse the effects of parasite infection on the population dynamics of a pomacentrid at Heron Island, and to test the effectiveness of the analysis by reference to a second site with a different parasite load.

LOCALITY: Heron Island

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Pomacentridae/Pisces/Parasites/Population dynamics/

[UNIQLD068]

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186 **Horizontal distributions of demersal zooplankton as related to type of substratum.**

February 1984 – February 1986

ORGANIZATION:
University of Queensland
Zoology Department,
St. Lucia, Qld. 4067

PROJECT LEADER:
Dr C.A. Jacoby (07) 377 2491

EXPENDITURE:
$2,500 (this year), $4,800 (all years)

MANPOWER:
1.25 (this year), 2.50 (all years)

EXTERNAL SUPPORT:
American Philosophical Society – $1,000
MSTGS – $2,500

OBJECTIVE
Characterize distributions of demersal zooplankton from different substrata and examine possible causes of observed patterns.

METHODOLOGY
Emergence traps capture zooplankton migrating into the water column at night. Samples preserved and enumerated. Distributions compared statistically.

STATUS
Samples analysed from Heron Island and Moreton Bay indicate patchy distributions but some taxa are associated with certain substrata. More complex substrata appear to have more demersal zooplankton associated with them. Seven new calanoids, genus *Stephos*, have been described.

CO-ORDINATION WITH OTHER PROJECTS
ARGS funded study of emergence patterns of demersal zooplankton as submitted by Dr J.G. Greenwood and Dr C.A. Jacoby.

GEOGRAPHIC REGIONS: R,Q

MAJOR DESCRIPTORS: Zooplankton/Distribution patterns/Benthic environment/

[UNIQLD070]

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187 **Population dynamics of parasites on reef fish.**

December 1985 – December 1987

ORGANIZATION:
University of Queensland
Department of Zoology
St Lucia, Qld 4067

PROJECT LEADERS:
Dr H.I. McCallum (07) 3772450
Dr R.J.G. Lester (07) 3773305

CONTACT OFFICER:
Dr H.I. McCallum

EXPENDITURE:
$5,000 (this year), $5,000 (all years)

MANPOWER:
0.25 (this year), 0.25 (all years)

OBJECTIVE
To examine the population dynamics of the interaction between small reef fish (*Pomacentrus wardi* or *Chromis nitida*) and several species of parasite, using an approach integrating field surveys, laboratory experiments and theoretical modelling.

METHODOLOGY
Fish will be collected using quinaldine, and parasite burdens compared between age classes, sampling sites and sampling times. Life cycles of suitable parasites will be established in the laboratory, and short term experiments to determine important life history parameters will be undertaken.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Reef fish fisheries/Pisces/Parasites/Population dynamics/Pomacentridae/

[UNIQLD075]

188* **Research on biting midges.**

July 1965 –

ORGANIZATION:
University of Queensland
Department of Entomology
St. Lucia, Qld 4067

PROJECT LEADER:
E.J. Reye (07) 3773644

EXTERNAL SUPPORT:
Up to about 30 local authorities and industries; variable year to year. Currently 24. – $200,000

OBJECTIVE
Taxonomy, biology, and control of biting midges (Diptera, ceratopogonidae) of the inter–tidal zone.

METHODOLOGY
Development of methods of survey of adult and larval populations. Exploitation of life–cycle characteristics to modify larval habitats so the resulting adult populations is below pest level with minimal interference to adjacent ecosystems.

STATUS
Larval habitats of most pest species are more or less known for general characteristics.
Quantitative estimations can be made of larval densities in sand or sand–mud substrates.
Quantitative estimations can be made of adult emergence rates.
tidal planes can be defined using tides themselves in reference to nearest tide gauge.
Vertical intervals of beach slopes can be measured over distances of about 20m.
Several types of light–traps for adults using 240v arc in operation – can be used singly or in formation.
Two types of emergence trap for inter–tidal use have been developed.
Considerable collection of material in alcohol – mostly catalogued – in a standard filing storage.

GEOGRAPHIC REGIONS: C,R,Q,N
MAJOR DESCRIPTORS: Diptera/Insecta/Taxonomy/Life cycle/Pest control/

[UNIQLD049]

189 Demographic studies of "Aquarium" reef fish.

July 1983 – June 1986

ORGANIZATION:
University of Sydney
School of Biological Sciences,
Sydney, N.S.W. 2006

PROJECT LEADERS:
Assoc Prof P.F. Sale (02) 6922440
Mr B. Mapstone
Mr T. Jones
Mr D. Ferrell
Mr A. Fowler

CONTACT OFFICER:
Assoc Prof P.F. Sale

EXPENDITURE:
$12,000 (this year), $26,000 (all years)

MANPOWER:
1.00 (this year), 1.00 (all years)

EXTERNAL SUPPORT:
GBRMPA – $41,300

OBJECTIVE
To obtain demographic data on selected species potentially important to aquarium trade, and to assess impact on stocks of commercial collection to provide management recommendations based on these data.

METHODOLOGY
Standard observational and manipulative field ecological methods used to document recruitment, growth, mortality. Analysis of otoliths and other morphological features to age samples of fish.

STATUS
Equipment has been obtained, and techniques for aging young and adult fish are being explored. Data on recruitment of selected species from field censuses. Some manipulative studies to assess effect of collection of juveniles are being commenced.

LOCALITY: One Tree Island
GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Population dynamics/Coral reefs/Pisces/Commercial species/

[UNISYD042]

190 Demography and population ecology of Pomacentrids.

January 1983 – December 1986

ORGANIZATION:
University of Sydney
School of Biological Sciences,
Sydney, N.S.W. 2006

PROJECT LEADERS:
Mr B. Mapstone
Assoc Prof P.F. Sale (02) 6922440

CONTACT OFFICER:
Assoc Prof P.F. Sale

EXPENDITURE:
$1,000 (this year), $2,900 (all years)

MANPOWER:
1.00 (this year), 2.00 (all years)

EXTERNAL SUPPORT:
ACRS – $500

OBJECTIVE
To investigate the population biology of *Pomacentrus molluccensis* and other benthic but non–territorial pomacentrids with particular emphasis on social organization, habitat use, and demography.

METHODOLOGY
Standard field observational and manipulative techniques. Data on juvenile recruitment gathered at several spatial scales.

STATUS
Techniques for marking individuals for field recognition have been perfected. Recruitment, growth, and survivorship have been monitored over 30 months.

LOCALITIES: One Tree Island; Capricorn Group
GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Pomacentridae/Population dynamics/Ecology/

[UNISYD045]

191 Impact of trophic interaction on benthic–feeding reef fish and on their invertebrate prey.

December 1984 –

ORGANIZATION:
University of Sydney
School of Biological Sciences,
Sydney, N.S.W. 2006

PROJECT LEADERS:
Assoc. Prof. P.F. Sale (02) 6922440
Dr G.P. Jones (02) 6922387

CONTACT OFFICER:
Assoc. Prof. P.F. Sale

EXPENDITURE:
$28,676 (this year), $28,676 (all years)

MANPOWER:
2.20 (this year), 2.20 (all years)

EXTERNAL SUPPORT:
MRAAC – $28,676

OBJECTIVE
This project explores the trophic interaction between various benthic–feeding carnivorous reef fish and their molluscan and crustacean prey. We seek to elucidate effects of the feeding on distribution and abundance of the prey community as well as evidence of food limitation on the fish.

METHODOLOGY
Manipulative field experiments to modify intensity of feeding, or density of prey will supplement quantitative descriptive data on the fish and invertebrate components of the system. Field based on One Tree Reef.

STATUS
Field techniques have been tested and patterns of distribution of predators and prey are being explored.

LOCALITY: One Tree Reef

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Pisces/Predation/Invertebrata/Trophic relationships/Benthic environment/

[UNISYD058]

192* Nutritional and eco-physiological aspects of symbioses between algae and invertebrates.

June 1982 – June 1986

ORGANIZATIONS:

University of Sydney
School of Biological Sciences,
Building A12,
Sydney N.S.W. 2006

Murdoch University
School of Environmental and Life Sciences
Murdoch, W.A. 6150

PROJECT LEADERS:

Dr R.T. Hinde (02) 6924035
Dr M.A. Borowitzka (09) 3322211

CONTACT OFFICER:

Dr R.T. Hinde

EXPENDITURE:

$2,885 (this year)

MANPOWER:

0.36 (this year)

EXTERNAL SUPPORT:

MSTGS – $43,819 (Grant administered through University of Sydney.)

OBJECTIVE

To establish the role of the blue-green algal symbiont of the tropical marine sponge *Dysidea herbacea* in the synthesis of halogenated secondary metabolites which may have anti-feedant activity.

METHODOLOGY

1. The amounts of the secondary metabolites present in isolated algal cells and sponge tissue will be determined by quantitative chromatographic techniques.
2. If the algae contain the metabolites of interest, incorporation of radioactively labelled precursors will be investigated to identify the site(s) of synthesis of the compounds.

STATUS

The halogenated metabolites of the One Tree Island population of *D. herbacea* have been identified. Isolated algae and sponge tissue are being accumulated for analyses.

LOCALITY: One Tree Island

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: *Oscillatoria spongeliae* /Cyanophyta/ *Dysidea herbacea* /Porifera/Symbiosis/

[UNISYD031]

193 Population dynamics, distribution and abundance of *Rhinoclavis aspera*, *R. fasciata*, *R. vertagus* (Mollusca, Cerithiidae)

March 1985 – March 1989

ORGANIZATIONS:

University of Sydney
School of Biological Sciences
Sydney, NSW 2006

Australian Museum
6–8 College Street
Sydney, NSW 2001

PROJECT LEADERS:

Assoc Prof P.F. Sale (02) 6922440
Mr G. Skilleter (02) 6924178
Dr W. Ponder (02) 3398111

CONTACT OFFICER:

Assoc Prof P.F. Sale

EXPENDITURE:

$1,000 (this year), $1,000 (all years)

MANPOWER:

1.00 (this year), 1.00 (all years)

EXTERNAL SUPPORT:

Linnean Society of New South Wales – $500

OBJECTIVE
To examine aspects of ecology of three species important in the fauna of sandy lagoonal sites at One Tree Reef.

METHODOLOGY
Standard ecological techniques for assessing molluscan populations will be used. The possible effect of predation by fishes will be assessed experimentally.

STATUS
Field techniques have been tested and a sampling program to assess seasonal changes in abundance, distribution and reproductive activity has commenced.

LOCALITY: One Tree Reef
GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Mollusca/Population dynamics/Distribution/Abundance/Seasonal variations/

[UNISYD110]

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194 Population ecology of chaetodontid fishes.

January 1984 – December 1987

ORGANIZATION:
University of Sydney
School of Biological Sciences,
Sydney, N.S.W. 2006

PROJECT LEADERS:
Mr A. Fowler
Assoc Prof P.F. Sale (02) 6922440

CONTACT OFFICER:
Assoc Prof P.F. Sale

EXPENDITURE:
$1,000 (this year), $1,900 (all years)

MANPOWER:
1.00 (this year), 1.00 (all years)

EXTERNAL SUPPORT:
ACRS – $500

OBJECTIVE
To determine the social organization, the habitat use, and the life history of selected species of butterfly fish at One Tree Reef.

METHODOLOGY
Standard field observational and manipulative ecological techniques.

STATUS
Methods for marking fish have been established and studies of habitat and social organization have begun on three lagoonal species of chaetodontid. Recruitment, growth and survivorship have been monitored over 18 months.

LOCALITIES: One Tree Island; Capricorn Group
GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Chaetodontidae/Population dynamics/Ecology/Life history/

[UNISYD044]

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195 Recruitment of herbivorous reef fishes.

January 1984 – December 1986

ORGANIZATIONS:
University of Sydney
School of Biological Sciences,
Sydney, N.S.W. 2006
University of Auckland
Department of Zoology,
Private Bag,
Auckland, New Zealand

PROJECT LEADERS:
Dr J.H. Choat University of Auckland
Assoc Prof P.F. Sale University of Sydney

CONTACT OFFICER:
Assoc Prof P.F. Sale

EXPENDITURE:
$3,609 (this year), $8,909 (all years)

MANPOWER:
0.25 (this year), 0.25 (all years)

EXTERNAL SUPPORT:
MSTGS – $8,909

OBJECTIVE
To describe and quantify patterns of juvenile recruitment of herbivorous reef fishes, esp. scaridae, with emphasis on spatial and temporal variation in rate of recruitment. Consequences for intensity of herbivory and for size of standing stocks will be considered.

METHODOLOGY
Standard observational and manipulative field ecological techniques applied to taxonomically "difficult" juvenile scarid fauna.

STATUS
Scarid recruitment was quantified at northern mid–shelf, northern outer barrier, and southern sites in 1983–84, and follow–up censuses were done during 1985. Recruits show high patchiness related to microhabitat features.

LOCALITIES: One Tree Island; Lizard Island
GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Scaridae/Osteichthyes/Herbivores/Recruitment/

[UNISYD038]

196 Role of detritus in the nitrogen budget of Coral Reef Lagoon.

January 1984 – December 1986

ORGANIZATION:
University of Sydney
School of Biological Sciences,
Building A12,
Sydney, N.S.W. 2000

PROJECT LEADER:
Assoc Prof A.W.D. Larkum (02) 6923369

EXPENDITURE:
$51,240 (this year), $51,240 (all years)

MANPOWER:
1.00 (this year), 1.00 (all years)

EXTERNAL SUPPORT:
MSTGS – $51,240 (Research studentship to Mr R. Johnstone)

OBJECTIVES
Investigation of the pathways and role of bacteria in the transfer of material, particularly nitrogen, from the products of primary production back into the water column of a coral reef. In particular the following processes will be studied.
1. Concentrations of particulate material in reef waters.
2. Settlement of particulate material onto the lagoon floor.
3. Decomposition of organic material in the water column, on the lagoon floor and in the lagoon sediments.
4. Processes of mineralisation.
5. Fluxes of material into and out of the water column.

METHODOLOGY
Particulate matter is collected in litter traps and analysed for C/N content. Sediments are analysed *in situ* for C/N content, bacterial type and numbers, oxygen, pH and eH to a depth of 25cm. Fluxes of nutrients are measured using domes placed over the lagoon floor.

STATUS
A number of papers are in press.

CO-ORDINATION WITH OTHER PROJECTS

This project is co-ordinated with the project "Fluxes of inorganic nitrogen through benthic sediments on a coral reef". (R.W. Johnstone)

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Nitrogen fixation/Bacteria/Coral reefs/Abiotic factors/

[UNISYD046]

197 Sexual patterns and competitive interactions in species of labrid genus *Thalassoma* .

February 1981 – December 1985

ORGANIZATION:

University of Sydney
School of Biological Sciences,
Sydney, N.S.W. 2006

PROJECT LEADERS:

Ms G. Eckert
Assoc Prof P.F. Sale (02) 6922440

CONTACT OFFICER:

Assoc Prof P.F. Sale

EXPENDITURE:

$500 (this year), $8,000 (all years)

MANPOWER:

1.00 (this year), 4.00 (all years)

EXTERNAL SUPPORT:

GBRMPA – $1,673

OBJECTIVE

To investigate social organization, and life history strategy in species of *Thalassoma* , and to explore recruitment patterns in these species.

METHODOLOGY

Standard field observational and manipulative techniques are used. Some gonad histology.

STATUS

Changes in social organization dependent on physical environment have been documented. Development and maintenance of social groups has been explored. Patterns of juvenile recruitment have been documented at several spatial scales.

Completed Project – This project will remain in the computerized Register for another 5 years but will not be included in future issues of the Compendium.

LOCALITIES: One Tree Island; Capricorn Group

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: *Thalassoma* /Ecology/Life history/Sexual reproduction/Competition/

[UNISYD043]

198 Structure in coral reef fish communities.

January 1972 –

ORGANIZATION:

University of Sydney
School of Biological Science,
Sydney, N.S.W. 2006

PROJECT LEADER:

Assoc Prof P.F. Sale (02) 6922440

EXPENDITURE:

$26,349 (this year), $200,000 (all years)

MANPOWER:

1.40 (this year), 15.00 (all years)

EXTERNAL SUPPORT:

ARGS – $26,349

OBJECTIVE

To assess the predictability and constancy of structure of reef fish assemblages with emphasis on whether these species-rich groupings are equilibrial or non-equilibrial in organization.

METHODOLOGY

Standard observational and manipulative field ecological techniques plus some computer simulations.

STATUS

Assemblages studied have occupied isolated coral heads (1972–77) or lagoonal patch reefs. Data on groups using continuous habitat now commenced. Role of microhabitat features in determining assemblage structure has been examined. Geographic variation in structure of patch reef assemblages has been assessed using data from Lizard Island and Caribbean sites with primary data from One Tree. Important role of variable juvenile recruitment has been identified.

LOCALITY: One Tree Island

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Coral reefs/Pisces/Ecology/Population structure/Distribution patterns/

[UNISYD040]

See also: 75, 76*, 78, 79, 87, 89*, 96, 97*, 100, 110, 114, 116, 135, 136, 138, 202, 203, 206, 209, 216, 244, 250, 254

See: 75, 110, 172*, 211*

See: 179

See: 249

199 **Major survey research programme (M.S.R.P.) – Supplementary Barrier Reef Island survey.**

July 1982 –

ORGANIZATIONS:

Queensland Tourist and Travel Corporation
Research and Regional Development Division,
P.O. Box 328,
Brisbane, Qld 4001

Cameron McNamara Pty Ltd (Consultants)
P.O. Box 94,
Spring Hill, Qld 4000

PROJECT LEADERS:

Mr J. Weigh (07) 2210911
Mr R. O'Hara (07) 8349228

CONTACT OFFICER:

Mr J. Weigh

OBJECTIVES

To obtain information on the characteristics (demographic and socioeconomic), activities, opinions and expenditure patterns of visitors (international, interstate and intrastate) staying at least one night in commercial accommodation on islands in the Great Barrier Region.
The Barrier Reef Islands survey is a supplement to the main survey of the M.S.R.P. which also covers Barrier Reef Island Resorts. The purpose of this additional survey is to provide a sufficiently large sample to enable reliable estimation of visitor characteristics for the separately defined Barrier Reef Island Region.

METHODOLOGY

This supplementary survey of Barrier Reef Islands covers all islands on which there are resorts – from Heron Island in the south up to and including Lizard Island. Only accommodation units in establishments offering hotel or motel type facilities and services are covered in the survey.
The sample design employed is a replicated sample with stratification by season and by size of resort. The survey is administered with a self–enumeration questionnaire.

STATUS

This supplementary survey commenced in December, 1982 and the results of this first seven (7) months period of the survey to June 30, 1983 have been weighed up to represent results for the full year July 1982 to June 1983.
Results are also available for the eight (8) quarters and two (2) full year periods between July 1983 and June 30, 1985 and the survey is currently continuing throughout the 1985/86 year.
The type of data that is available by quarter and per annum is as follows: Total visitors, groups and nights, visitor activity, trip purpose, visitor origin, main attractions, information sources, recency of visit, main means of transport, rating of selected services, recommendations, expenditure, trip characteristics, age and sex of visitors and size of group.

LOCALITIES: Heron Island; Lizard Island

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Tourists/Attitudes/Sociological aspects/Surveys/

[QTTC—001]

See also: 237

200* **Fish ladder design for Queensland coastal streams.**

June 1980 –

ORGANIZATIONS:

Queensland Water Resources Commission
Mineral House
George Street
Brisbane, Qld 4000

Queensland Fisheries Service
Transport House
The Valley Centre
230 Brunswick Street
Fortitude Valley, Qld 4006

University of Queensland
Zoology Department
St Lucia, Qld 4067

PROJECT LEADERS:

Mr M.A. Wilke (07) 2247338
Dr B. Hill (07) 2244336
Mr I.C. Johnson (07) 3772474

CONTACT OFFICER:

Mr P.K. McMahon (07) 2247338 (Queensland Water Resources Commission)

OBJECTIVES

To examine methods of allowing the ascent of juvenile catadromous fish up fishladders on Queensland coastal streams.
To examine internal operation of fish ladders.

METHODOLOGY

In laboratory, determine burst swimming speeds of juvenile fish, in particular of O+ *Mugil cephalus*, by live testing in orifice jet experimental apparatus. Test response and behaviour of fish with high velocity jet flow (around 1.0 to 1.5 m/s). Use results of fish swimming speeds as input data to testing scaled models of fish ladder steps and pools. Velocity measurements taken on model. Layout of internal ladder produced from this testing.

STATUS

Engineering input complete.
Biological work continuing at University of Queensland.

GEOGRAPHIC REGIONS: R,Q,X

MAJOR DESCRIPTORS: Fishways/Catadromous migrations/Juveniles/Mugilidae/ *Mugil cephalus* /

[QWRC—001]

See also: 179

201 Survey of molluscs of continental slope of Eastern Australia and the Tasman Basin.

ORGANIZATION:
Australian Museum
6–8 College Street,
Sydney, NSW 2000

PROJECT LEADER:
Mr W.F. Ponder (02) 3398320

EXPENDITURE:
$1,000 (this year), $15,000 (all years)

MANPOWER:
0.51 (this year), 3.00 (all years)

OBJECTIVE
To survey the benthic molluscs living on the continental slope of Eastern Australia and in the Tasman Basin.

METHODOLOGY
Dredging and trawling from oceanographic vessel. Material obtained distributed to specialists world–wide.

STATUS
Sampling off Queensland and NSW coasts from HMAS 'Kimbla' and FRV 'Kapala' has revealed a rich fauna. Considerable numbers of additional species are obtained on every expedition suggesting that the fauna is still largely unknown.

CO-ORDINATION WITH OTHER PROJECTS
NSW State Fisheries benthic fish and prawn surveys have provided considerable input.

GEOGRAPHIC REGIONS: R,Q,N,B,T
SHIP TIME REQUIREMENTS: 141 days
MAJOR DESCRIPTORS: Molluscs/Surveys/

[AUSMUS016]

202 Northern pelagic fish stock research programme.

January 1984 –

ORGANIZATION:
CSIRO
Division of Fisheries Research,
CSIRO Marine Laboratories,
G.P.O. Box 1538,
Hobart, Tas. 7001

PROJECT LEADER:
Dr J.D. Stevens (002) 206222 (CSIRO)

EXPENDITURE:
$450,000 (this year), $450,000 (all years)

MANPOWER:
7.00 (this year), 7.00 (all years)

EXTERNAL SUPPORT:
FIRTA – $175,000
Northern Territory Fishing Industry Research & Development Trust Account — $125,000
State Fisheries of Queensland and Western Australia — $82,000

OBJECTIVE
To obtain information on the size, geographical distribution, mortality, recruitment and yield potential of northern pelagic stocks of shark, mackerel and tuna currently taken by the Taiwanese gillnet fishery of northern Australia. This information, together with data previously collected by the CSIRO on the growth, reproduction, population structure and dietary habits of sharks will be used by the Department of Primary Industry for improved management of the fishery.

METHODOLOGY
Work consists of a large scale tagging program, exploratory fishing, biological and electrophoretic sampling, and gear selection experiments. Sampling is being carried out between Broome and Cape York, both in inshore regions closed to Taiwanese fishing, and offshore on the main commercial grounds. 24 day cruises are conducted using a chartered 21 m commercial gillnet vessel which is also equipped for long lining and trolling.

STATUS
The initial phase of the study aimed at determining species composition, population structure and basic life– history parameters of the principal shark species in the fishery is complete. 8 cruises of the chartered gillnet vessel have covered the area between Broome and Cape York. 9,000 sharks have

been tagged and preliminary movement data is available for the major species. Smaller numbers of mackerel and tuna have been tagged. Catch–effort data from inshore areas has been collected and gear selection experiments have been conducted.

CO-ORDINATION WITH OTHER PROJECTS

Cetacean research with National Parks and Wildlife. Mackerel research with Queensland Fisheries.

GEOGRAPHIC REGIONS: E,Y,C,J,R

SHIP TIME REQUIREMENTS: 200

MAJOR DESCRIPTORS: Pelagic fisheries/Stock assessments/Fishery management/Gillnets/

[CSIRO–026]

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203 Tropical rock lobster study.

February 1980 –

ORGANIZATIONS:

CSIRO
Division of Fisheries Research
CSIRO Marine Laboratories
P.O. Box 20
North Beach, W.A. 6020

Department of Primary Industry
Fisheries Division
Edmund Barton Building
Canberra, A.C.T. 2600

PROJECT LEADERS:

Dr B.F. Phillips (09) 4471388 (CSIRO)
Mr B.V. Lilburn

CONTACT OFFICER:

Dr B.F. Phillips

EXPENDITURE:

$224,000 (this year), $694,000 (all years)

MANPOWER:

3.00 (this year), 11.25 (all years)

OBJECTIVES

To carry out research into the stocks of tropical rock lobsters (*Panulirus ornatus*) in Torres Strait and northern Great Barrier Reef waters in order to provide the information necessary for management of the various fisheries.
In particular, to examine migrations, stock differentiation and assessment, fishing and natural mortalities of stocks, growth and recruitment.

METHODOLOGY

Catch and effort data are being collected from the various fisheries which take *Panulirus ornatus*.
Tagging of adults and juveniles.
Biological data such as length, stage of maturity and breeding information are collected by sampling.

STATUS

Tagging, in collaboration with Papua New Guinea fisheries authorities is being carried out in Torres Strait. Other studies proceeding.

CO-ORDINATION WITH OTHER PROJECTS

Collaboration with Fisheries Division, Department of Primary Industry, Port Moresby, Papua New Guinea.
Use of Queensland Fisheries Service facilities in Cairns.

GEOGRAPHIC REGIONS: J,R

SHIP TIME REQUIREMENTS: 4 months

MAJOR DESCRIPTORS: *Panulirus ornatus* /Stock assessment/Population dynamics/Malacostraca/Fishery management/

[CSIRO–054]

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204 An evaluation of economic and biological aspects of coral collecting in the Great Barrier Reef Marine Park.

June 1983 – August 1986

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
P.O. Box 1379,
Townsville, Qld 4810

James Cook University of North Queensland
(Subcontract)
Post Office
James Cook University,
Townsville, Qld 4811

PROJECT LEADERS:
Dr W. Craik (077) 818811
Dr J. Baker
Mr J. Oliver (077) 814111
Prof M. Pichon

CONTACT OFFICER:
Dr W. Craik

EXPENDITURE:
$16,700 (this year), $82,000 (all years)

MANPOWER:
0.50 (this year), 3.50 (all years)

OBJECTIVES
To investigate aspects of the biology of principal commercial coral species of the Great Barrier Reef.
To determine the rates of production (supply) and collection to provide guidelines for harvesting and management.

METHODOLOGY
Biological research on production including distribution, abundance, size frequency, growth, reproductive strategies, mortality of harvested species using both experimental and lessees information.
Economic research into characteristics of commercial coral collection.

STATUS
Report received. Management implications being assessed.

GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Corals/Commercial species/

[GBRMPA082]

205 Monitoring replenishment areas: coral trout survey techniques.

April 1983 –

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
P.O. Box 1379
Townsville, Qld 4810

Queensland National Parks and Wildlife Service
P.O. Box 190
North Quay, Brisbane, Qld 4000

PROJECT LEADER:
Dr W. Craik (077) 818811

EXPENDITURE:
$10,000 (all years)

MANPOWER:
0.15 (all years)

OBJECTIVE
To monitor coral trout communities in two replenishment areas Boult, North, Heron, Wreck and Llewellyn (restricted activities) and North West reefs, Capricornia Section.

METHODOLOGY
Survey of 6 reefs (17 transects) before closure and at 6 monthly intervals thereafter, using intensive scuba search technique of surveying coral trout.
Results assessed at end of each survey and written up on comparative basis.
Reefs to be surveyed: Boult, North, Wreck, Llewellyn, North West, Heron.

STATUS
Survey occurred in June 1983, just prior to closure of replenishment areas. Survey to continue in 1986–87.

GEOGRAPHIC REGION: R
SHIP TIME REQUIREMENTS: 7 days
MAJOR DESCRIPTORS: *Plectropoma leopardis* /Teleostei/Stock assessment/

[GBRMPA049]

206 Monitoring Swain Reefs.

June 1986 – December 1986

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810
Sea Research (Subcontract)
PMB No. 1
Daintree Qld 4873

PROJECT LEADERS:
Dr L. Zann (077) 818811
Dr A.M. Ayling (070) 986118
Dr A.L. Ayling

CONTACT OFFICER:
Dr L. Zann

EXPENDITURE:
$500 (this year), $5,000 (all years)

OBJECTIVE
To monitor selected reefs of the Swain Group for coral trout, crown–of–thorns starfish, coral cover, and giant clams.

METHODOLOGY
Transect counts (50m x 20m) of coral trout, *Acanthaster planci*, *Tridacna gigas* and *T. derasa*, and chaetodontid species.

LOCALITY: Swain Reefs
GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Coral reefs/Biological surveys/Pisces/Tridacna/ *Acanthaster planci* /

[GBRMPA139]

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207 **Recensus of reef fish at Sumilon Reef, Central Philippines.**

May 1985 – August 1986

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810
Russ, Dr G. (Consultant)
PMB No 3 MSO
Townsville Qld 4810

PROJECT LEADERS:
Dr W. Craik (077) 818811
Dr G. Russ (077) 789211

CONTACT OFFICER:
Dr W. Craik

EXPENDITURE:
$500 (this year), $500 (all years)

MANPOWER:
0.08 (this year), 0.08 (all years)

OBJECTIVE
To recensus reef fish at Sumilon Reef, to determine current status of fish population. (A previously closed area of this reef was re–opened to fishing in late 1984.)

METHODOLOGY
Visual census of reef fish; evaluation of fish catch data.

CO–ORDINATION WITH OTHER PROJECTS
Coral trout and reef fish surveys in Great Barrier Reef Region.

LOCALITY: Sumilon Reef
GEOGRAPHIC REGIONS: P,R
MAJOR DESCRIPTORS: Pisces/Stock assessment/Reef fish fisheries/Fishery surveys/

[GBRMPA133]

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208 **Reef fish tagging in the Capricornia Section of the Great Barrier Reef Marine Park.**

November 1980 –

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
P.O. Box 1379
Townsville, Qld 4810

Queensland National Parks and Wildlife Service
Maritime Estate Branch,
P.O. Box 190,
North Quay, Qld 4000

Giddins, Mr R.
C/– School of Biological Sciences,
James Cook University,
Townsville, Qld 4811

PROJECT LEADERS:

Dr W. Craik (077) 818811
Mr D. Savage (077) 741211
Mr R. Giddins
Mr G.W. Mercer (07) 2276430

EXPENDITURE:

$32,500 (all years)

MANPOWER:

0.05 (this year), 0.45 (all years)

OBJECTIVES

To determine the extent of movement of reef fishes, around a reef and between reefs.
To obtain length– frequency data on reef fishes.

METHODOLOGY

Reef fishes are caught by rod and line, tagged and released, and species, the area of capture, length of fish and date are recorded. Fishermen catching tagged fish are asked to return the tag with date and place of capture for $5.00 reward. Initial and subsequent recaptures are recorded to see if fish has moved. Other data (length, frequency, catch and effort) are recorded and analysed.

STATUS

Awaiting final report.

CO-ORDINATION WITH OTHER PROJECTS

This project relates to a coral trout survey project in which population of coral trout are evaluated at different reefs.

LOCALITY: Great Barrier Reef Marine Park – Capricornia Section
GEOGRAPHIC REGION: R
SHIP TIME REQUIREMENTS: 7
MAJOR DESCRIPTORS: Reef fish fisheries/Coral reefs/Migrations/Tagging/

[GBRMPA020]

209 Survey of coral and coral trout in the Capricorn and Capricornia sections of the Great Barrier Reef Marine Park.

November 1985 – August 1986

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

Sea Research (Subcontract)
PMB
Daintree Qld 4873

PROJECT LEADERS:

Dr W. Craik (077) 818811
Dr A.M. Ayling (070) 986118
Dr A.L. Ayling

CONTACT OFFICER:

Ms S. Driml (077) 818811

EXPENDITURE:

$46,950 (this year), $46,950 (all years)

OBJECTIVE

To survey selected reefs in the Capricorn and Capricornia sections of the Marine Park for coral and coral trout. The survey will provide a comparative basis for future monitoring relevant to zoning and management.

METHODOLOGY

Counts of coral trout, butterfly fish and large clams using transect and/or area surveys. Survey of coral using a standard manta tow technique.

STATUS

Survey undertaken between December 1985 and February 1986. Data available in report form from GBRMPA.

GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Coral reefs/Pisces/Mollusca/Biological surveys/

[GBRMPA140]

210 Traditional fisheries knowledge in northern Australia.

May 1985 –

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

Commonwealth Department of Primary Industry
Australian Fisheries Service
Barton, ACT 2600

PROJECT LEADERS:

Dr D.W. Kinsey (077) 818811
Dr R. Bain (062) 725591

CONTACT OFFICER:

Dr L. Zann (077) 818811

EXPENDITURE:

$3,600 (this year), $7,600 (all years)

OBJECTIVES

To review information on Aboriginal and Torres Strait Islander fishing and marine hunting in northern Australia.
To assist in providing guidelines to agencies responsible for management of traditional fisheries.
To identify agenda of appropriate research.

METHODOLOGY

Consult relevant individuals and agencies to establish agenda, and speakers for a workshop. Arrange contributions from Aborigines and Torres Strait Islanders, antropologists, marine scientists, state and Commonwealth fisheries agencies etc. Conduct the workshop and publish the proceedings.

STATUS

Workshop conducted July 29–31, 1985. Publication of proceedings pending as part of the Authority's workshop series.

GEOGRAPHIC REGIONS: R,C,Y,J

MAJOR DESCRIPTORS: Fishery management/Fishing operations/Aborigines/Sociological aspects/ Conferences/

[GBRMPA132]

211* Studies on north Queensland fishes.

ORGANIZATION:

James Cook University of North Queensland
Department of Zoology
Townsville, Qld 4811

PROJECT LEADER:

Dr N.E. Milward (077) 814193

EXPENDITURE:

$2,000 (this year), $9,000 (all years)

MANPOWER:

0.10 (this year), 0.45 (all years)

OBJECTIVE

To survey and analyse the distribution and abundance of fishes in north Queensland waters, and to collect basic biological information of importance for their rational exploitation and management.

METHODOLOGY

Sampling, mainly by trawling from the R.V. "James Kirby" and supplemented by other methods, on a station grid system extending from the shore to the outer reefs. Samples are analysed on board boat for species present, numbers and size ranges, and series of specimens retained for later examination of gut contents and reproductive condition. Data are being utilised for determination of growth rates, trophic relationships, breeding seasons, and other aspects of population dynamics.

STATUS

Considerable data have been obtained on fish occurrences and distributions, numbers, and length/weight frequencies, and aspects of the biology of the most common species. These data are being used in the compilation of an annotated check–list and to form the bases of publications on the tropical ichthyofauna relevant to the north–eastern Australian trawl fishery.

GEOGRAPHIC REGION: R

SHIP TIME REQUIREMENTS: 12 days. (shared with other research and teaching cruises.)

MAJOR DESCRIPTORS: Osteichthyes/Life history/Fishery surveys/Check lists/

[JAMESC013]

212 Commercial fishery prediction.

ORGANIZATION:
Layamer Associates (Aust) Pty Ltd
19 Garden Grove
Carra, Qld 4211

PROJECT LEADER:
Mr P.L. Mayall (075) 581382

OBJECTIVES
To consolidate existing prediction data relating to crustaceans and pelagic species commercial interest. Such information will be of value to intelligently control fishery zones and to predict with a high degree of probability periods when lowest unit effort will produce greatest yields while not reducing breeding stock and juveniles excessively.

METHODOLOGY
Observational and internally developed sorting and testing techniques applied to commercial catches particularly at predictd time periods of fishery seasons. Data subjected to a company developed statistical process to provide meaningful population and population dynamics data for future seasons.

GEOGRAPHIC REGIONS: R,Q
SHIP TIME REQUIREMENTS: Company owned 44' vessel used when funding is available.
MAJOR DESCRIPTORS: Commercial fishing/Crustacea/Pelagic fisheries/Predictions/

[LAYAM–001]

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213 **A study of seagrass prawn nursery grounds in north Queensland.**

December 1985 – July 1987

ORGANIZATION:
Queensland Department of Primary Industries
Northern Fisheries Research Centre
c/– Post Office
Bungalow, Qld 4870

PROJECT LEADER:
Mr R.G. Coles (070) 515588

EXPENDITURE:
$41,448 (this year), $40,200 (all years)

MANPOWER:
2.50 (this year), 5.00 (all years)

EXTERNAL SUPPORT:
FIRTA – $81,648

OBJECTIVE
To survey and describe aspects of the inshore seagrass beds and the juvenile prawn population in north Queensland.

METHODOLOGY
The extent and structure of seagrass beds is sampled on transects into the coast. Where seagrasses occur a square metre of the bottom is collected for laboratory analysis. Samples of prawns are collected by trawling at night with small mesh beam trawls.

STATUS
Field data has been collected from the coast between Cairns and Cape York and around Mornington Island in the Gulf of Carpentaria. Writing of reports and papers is in progress.

CO-ORDINATION WITH OTHER PROJECTS
CSIRO are mapping seagrass beds in other parts of the Gulf of Carpentaria

GEOGRAPHIC REGIONS: C,R
MAJOR DESCRIPTORS: Seagrass/Nursery grounds/Penaeidae/Juveniles/

[QDPI—032]

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214 **A study of the sand crab *Portunus pelagicus* and its exploitation in a subtropical multi-sector fishery.**

July 1984 – June 1986

ORGANIZATION:
Queensland Department of Primary Industries
Southern Fisheries Research Centre,
PO Box 76,
Deception Bay, Qld. 4508

PROJECT LEADER:
Mr M.A. Potter (07) 2031444

EXPENDITURE:
$111,000 (this year), $207,000 (all years)

MANPOWER:
2.80 (this year), 5.60 (all years)

EXTERNAL SUPPORT:
FIRTA – $80,000

OBJECTIVE
To assess the status of the Moreton Bay sand crab stocks and prepare recommendations for the management of the fishery.

METHODOLOGY
Data is being collected by:
1. Field sampling of commercial pot crab catches;
2. Field sampling of trawl catches with a research trawler;
3. A research logbook program; and
4. Tagging studies.

STATUS
Field sampling commenced in October 1984 after some preliminary design and methodology work. One year's data has been collected for each data set. Approximately 50% of pot crabbers are participating in a voluntary logbook program. Tagging of crabs in the field commenced in March 1985. Approximately 4,500 tagged crabs have been released to date.

CO-ORDINATION WITH OTHER PROJECTS
DPI Fish Management Branch – Survey of amateur crab catches,
DPI Dairy Research Branch – Study of post harvest "mushiness" in sand crabs.

LOCALITY: Moreton Bay
GEOGRAPHIC REGION: R
SHIP TIME REQUIREMENTS: 100 days of research vessel time.
MAJOR DESCRIPTORS: *Portunus pelagicus* /Malacostraca/Fishery management/

[QDPI—025]

215 Biology and management of *Trochus niloticus*.

September 1982 – August 1986

ORGANIZATIONS:
Queensland Department of Primary Industries
Queensland Fisheries Service
C/– P.O.
Bungalow, Qld 4870
Great Barrier Reef Marine Park Authority
P.O. Box 1379
Townsville, Qld 4810

PROJECT LEADERS:
Mr R.G. Pearson (07) 2276432
Dr W. Craik (077) 712191

CONTACT OFFICER:
Mr W. Nash (070) 515588 or 516662

EXPENDITURE:
$13,625 (this year), $38,151 (all years)

MANPOWER:
1.00 (this year), 1.00 (all years)

OBJECTIVE
To determine the basic biology, reproduction, recruitment, growth, population structure and the sustainable, harvestable yield of trochus, and management principles for a possible collection fishery within the Great Barrier Reef Marine Park.

METHODOLOGY
1. To survey trochus populations in both the Cairns and Mackay regions to determine population densities, size frequency distributions, and distribution in relation to habitat.
2. To undertake basic biological studies, including growth rate (by tag–recapture), reproduction (breeding periods, spawning frequency, spawning behaviour, fecundity, size/age at maturity), and movement (in relation to recruitment into depleted areas).
3. To accompany trochus fishermen to (i) observe collecting and processing methods, and (ii) obtain estimates of the catch per unit effort on a variety of reefs, and see how this changes with repeated collecting.

STATUS

1. Significant differences in shell morphology exist between some populations. In general, Mackay trochus do not grow as large as Cairns trochus. High density (ie, commercially exploitable) populations tend to consist of small trochus with thick shells. Transplantation of stunted trochus to Cairns reef has been initiated to see if this stunting is reversible. Caging experiments to test for different growth rates at different densities are also underway.
2. Cairns trochus spawn monthly, generally 2–3 days after the new moon. Spawning is initiated by males, and females follow with a brief spawning interval of 10–15 minutes. Trochus have been successfully reared past metamorphosis. Histological analysis of the gonads of Mackay populations suggests that spawning may occur less frequently there than on the Cairns reef.
3. Growth rates are generally inversely related to shell size, although there is high variability within each size class. Management implications being assessed.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: *Trochus* /Gastropoda/Pearl fisheries/Population dynamics/Fishery data/

[QDPI—004]

216 Habitat selection and overlap by two prawn species.

January 1985 –

ORGANIZATIONS:

Queensland Department of Primary Industries
Northern Fisheries Research Centre
Post Office
Bungalow, Qld 4870

University of Queensland
Department of Zoology
St Lucia, Qld 4067

PROJECT LEADERS:

Mr J. Robertson (070) 515588
Dr G. Goeden (070) 515588
Dr K. Warburton (07) 3772979

CONTACT OFFICER:

Mr J. Robertson

OBJECTIVES

1. Determine distribution and distributional overlap of *Penaeus longistylus* and *Penaeus latisulcatus* near Townsville.
2. Describe distribution in terms of depth, sediment, temperature, salinity and time changes.
3. Determine abiotic preferences under experimental conditions in aquaria.

METHODOLOGY

Trawling at 20 sites (30 mins each site) over two years (every lunar month).
Hydrographic data collection/ sediment analysis
Aquarium studies/video.

STATUS

Preliminary analyses completed; sampling programme continuing; laboratory experiments pending.

LOCALITY: Townsville

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Penaeidae/Distribution/Habitat/Abiotic factors/

[QDPI—028]

217 Northern Queensland inshore gillnet fisheries management study.

July 1981 –

ORGANIZATION:

Queensland Department of Primary Industries
Northern Fisheries Research Centre
Post Office
Bungalow, Qld 4870

PROJECT LEADER:

Mr R.N. Garrett (070) 515588

EXPENDITURE:

$600 (this year), $107,000 (all years)

MANPOWER:

0.50 (this year), 7.50 (all years)

OBJECTIVE

This project forms part of an assessment of the consequences of management regulations introduced in 1981 to the commercial gillnet fisheries, and their biological impact on fished stocks. The research

effort has documented over a three–and–a–half year period, the biological and economic performance of the gillnet fisheries in the Gulf of Carpentaria and the north–east Pacific coast which target on barramundi *Lates calcarifer* and threadfin salmon *Polynemes sheridani* .

METHODOLOGY

1. Monitoring commercial fishery through catch per unit effort data.
2. Monitoring distribution, abundance and biology of target and bycatch species through commercial catch sampling and research gillnetting programmes.
3. Determining the identity of the stocks that contribute to the fished barramundi resource using electrophoretic procedures.

STATUS

Whilst improved catch rates in 1984 for barrumundi and threadfin in the Gulf fishery have apparently halted a decline evident in the three preceding seasons, resource stability is not yet certain. Results of gillnet mesh selectivity analyses have renewed debate of allowable mesh size and desirable fish capture size. Fishermen's calls for licence transferability, and rising costs, make a priority the speedy development of an up–to–date cost/return profile for the northern fishery.
Biochemical analyses with CSIRO show that at least five distinctly different genetic stocks of barrumundi are fished in Queensland. Data exists as hard copy (on paper) and on disc, and can be made available in future, after data analyses are completed, through Mr Garrett.

CO–ORDINATION WITH OTHER PROJECTS

Establishing the identity of Queensland's barramundi stocks is a collaborative exercise with CSIRO biochemical geneticists at Cleveland Laboratory. This work forms part of a F.I.R.T.A. – funded CSIRO investigation into the stocks identity of various northern Australian fish species (83/48, Dr J.B. Shaklee, project leader)

LOCALITIES: Karumba; Weipa; Princess Charlotte Bay
GEOGRAPHIC REGIONS: C,R
MAJOR DESCRIPTORS: Coastal fisheries/Gillnets/Potential resources/Fishery data/Fishery management/

[QDPI—005]

218* **Outer Reef Slope Dropline Fishery.**

October 1984 –

ORGANIZATION:
Queensland Department of Primary Industries
Fisheries Research Branch,
Northern Fisheries Research Centre,
C/– Post Office,
Bungalow, Qld 4870

PROJECT LEADER:
Mr G. McPherson (070) 515588

EXPENDITURE:
$6,000 (this year)

MANPOWER:
3.00 (this year)

OBJECTIVES

To record a species list of outer reef slope fish species.
To establish the available fishing area within the 160–400 metre (approximate) range off Cairns.
To assess the feasability of dropline fishing techniques in the region.

METHODOLOGY

Standard dropline fishing techniques as developed within the South Pacific Commission region using various hand reel designs.

GEOGRAPHIC REGION: R
SHIP TIME REQUIREMENTS: 25 days
MAJOR DESCRIPTORS: Reef fish fisheries/Fishery data/Fishery management/Fishing operations/

[QDPI—021]

219* **Stream and estuarine inventory and classification in relation to fish populations.**

January 1975 –

ORGANIZATION:
Queensland Department of Primary Industries
Estuarine and Foreshore Management Section,
P.O. Box 46,
Brisbane, Qld. 4000

PROJECT LEADER:
Dr J. Beumer (07) 2276483

CONTACT OFFICER:
Mr D. Mayer (07) 2276428

OBJECTIVES

1. The preparation of a classification and inventory of stream and estuarine systems in Queensland for fisheries purposes, and the co–ordination of the results whith land–use and management practices in catchments and coastal areas.
2. The preparation of management strategies based upon co–ordinated resources–based planning for the maintenance or enhancement of fisheries.

METHODOLOGY

Using a data–base on estuarine conformation, and biotic and abiotic factors likely to affect fisheries, a priority ranking is established to define areas capable of long–term conservation, areas of multiple use for purposes devoted to alternative use e.g. urban centres. Fisheries management strategies are then related to the present day inventory and future conservation of resources.

STATUS

A methodology has been established for the priority ranking of estuarine systems, based on the needs of fisheries.
The extension of site specific studies to provide a State wide management programme and to serve as base line data for assessment of the environmental impact of changes in land–use coastal development is an on–going function of this project team.

CO–ORDINATION WITH OTHER PROJECTS

1. Investigations by Q. Water Quality Council and Beach Protection Authority.
2. Regional and national ecological surveys.

GEOGRAPHIC REGIONS: C,Q,R
SHIP TIME REQUIREMENTS: 20 days
MAJOR DESCRIPTORS: Fishery resources/Coastal zone management/Estuaries/Rivers/

[QDPI—020]

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220 Studies on the trawl fishery for red–spot king prawns (*Penaeus longistylus*) in the Great Barrier Reef region.

June 1984 –

ORGANIZATION:
Queensland Department of Primary Industries
Fisheries Research Branch,
GPO Box 46,
Brisbane, Qld 4001

PROJECT LEADER:
Mr M. Dredge (071) 794155

EXPENDITURE:
$140,000 (this year), $454,000 (all years)

MANPOWER:
6.75 (this year), 20.00 (all years)

EXTERNAL SUPPORT:
FIRTA – $315,000 (3 years)
GBRMPA – $79,000 (3 years)

OBJECTIVES

To obtain data on the life cycle of *P. longistylus* .
To obtain data on the by–catch taken in the existing fishery, and compare by–catch fauna with described reef and inter reef faunas.
Describe population parameters of *P. longistylus* from catch/effort data and tag data for incorporation in production/yield per recruit models.

METHODOLOGY

Sampling estuarine localities for P. longistylus *to give data on the reproductive cycle, distribution over the lifespan, migratory patterns and growth rates.*
Sampling prawns from offshore waters for identification, sexing and measuring. Females are frozen and returned to the laboratory for subsequent examination of gonads.
Bycatch from both research and commercial trawls is sampled and held for later identification,

counting and sorting.
A mass–tag release was conducted immediately before recruitment to allow monitoring of total prawn catch and tag returns.

STATUS

Field operations for the estuarine sampling are almost completed. Raw data on size, distribution and seasonal abundance of penaeids taken in this study is now being coded and loaded onto a computer and will be analysed and written up in the coming year.
Three hundred and fifty of the 400 offshore samples scheduled have been collected. Data from these samples have been logged up on computer and broken down to monthly size–frequency sets. Some 300 female prawns have been measured, weighed and dissected. Histological preparations of about 1,500 tissue samples have been done. The raw data has been stored on the computer.
All data from bycatch samples so far are stored on computer and have been subject to preliminary analysis.
Of the tagged prawns released, some 270 recaptures had been reported as of November 1985. There has been no attempt to analyse growth data but movement information has been summarised.

GEOGRAPHIC REGION: R
SHIP TIME REQUIREMENTS: 40 days
MAJOR DESCRIPTORS: Penaeidae/Prawn fisheries/Life cycle/Stock assessment/Trawling/

[QDPI—022]

221* Coral trout survey of Capricornia Reefs.

ORGANIZATION:
Queensland National Parks and Wildlife Service
P.O. Box 1362,
Rockhampton, Qld. 4700

PROJECT LEADER:
Ms S. Osborne (079) 276511

EXPENDITURE:
$20,000 (this year), $30,000 (all years)

MANPOWER:
1.00 (this year), 1.50 (all years)

OBJECTIVES

1. To quantify numbers and size frequency of coral trout (Plectropomus) on a range of Capricornia Reefs.
2. To relate differences between reefs to fishing pressure and marine park zonation.
3. To quantify seasonal differences.

METHODOLOGY

Scuba diver counts along back reef transects.

LOCALITY: Capricorn Group
GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Plectropomus/Coral reefs/Population dynamics/Surveys/

[QNPWS–002]

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222 Stock identification and discrimination of commerically important whitings (Teleostii; Sillaginidae) in Australian waters using genetic criteria.

July 1983 – December 1986

ORGANIZATION:
University of New South Wales
School of Zoology
P.O. Box 1
Kensington, N.S.W. 2033

PROJECT LEADERS:
Dr P.I. Dixon (02) 6972112
Dr R.H. Crozier (02) 6972119

CONTACT OFFICER:
Dr P.I. Dixon

EXPENDITURE:
$54,850 (this year), $103,637 (all years)

MANPOWER:
1.70 (this year), 5.20 (all years)

EXTERNAL SUPPORT:
FIRTA – $31,000

OBJECTIVE

The project investigates the population structure of the whitings *Sillago ciliata*, *Sillago maculata*, *Sillago bassensis* and *Sillaginodes punctatus*, using allozymes detected by electrophoresis as genetic

markers. Locations within the range of each species will be sampled by beach seine, angling, and with commerical and amateur fishermen. Allele frequency heterogeneity between sexes, age classes, and seasons will be examined. Geographic variation in morphological characteristics will be examined concurrently with electrophoretic analysis. Possible extensions of this program will be to identify larval stages using electrophoresis and attempt aging to determine dispersal potential; and to investigate hybridization between *S. ciliata* and *Sillago analis*.

METHODOLOGY

It has been shown that racial differentiation within a species range often has a genetic component which may be attributable to restricted gene flow and localized adaptation. The potential of enzyme polymorhisms in fisheries population studies has been applied to stock identification problems in a number of commercially important vertebrates and invertebrates. We will be using these techniques in this project.

STATUS

1. Method Development. The suitability of our methods for use with whitings have been checked. Some methods have been modified to improve the resolution of the different enzyme variants. Starch gels, Cellogel and Titan III plates have been used.
2. Investigation of Enzyme Polymorphism in Whitings. One population of each of the above species has been used to determine which enzymes are polymorphic. Between 30 and 60 presumptive loci have been investigated in each species. All species show clean genetic polymorphisms at some loci. These loci will form the basis of the stock indentification programme. Each species has at lease four such loci which stain consistently are relatively stable and give clear result. Fixed differences have been found between all species. Comparisons have been made between populations of *S. bassensis* from St Vincents Gulf, S.A., and Eden, N.S.W. Several fixed differences occur in fish from these two localities. This is a most important finding because it indicates that the eastern and western forms of *S. bassensis* which for some time have been regarded as probable sup–species, are in fact distinct species.

CO–ORDINATION WITH OTHER PROJECTS

We are co–ordinating our activities with N.S.W. Dept. of Agriculture, Victorian Fisheries and Wildlife division and the S. Aust. Department of Fisheries.

GEOGRAPHIC REGIONS: R,Q,N,B,W

MAJOR DESCRIPTORS: Sillaginidae/Teleostei/Stock identification/Commercial species/Genetics/

[UNINSW018]

223 Movements and behaviour of coral trout at Heron Island.

October 1984 – March 1986

ORGANIZATION:
University of Queensland
Department of Zoology,
St. Lucia, Qld. 4067

PROJECT LEADER:
Miss M. Samoilys (07) 3772466

CONTACT OFFICER:
Dr T.S. Hailstone (07) 3772508 (Supervisor)

EXPENDITURE:
$1,000 (this year), $2,500 (all years)

MANPOWER:
0.80 (this year), 1.60 (all years)

EXTERNAL SUPPORT:
GBRMPA – $1,000

OBJECTIVE

The spatial and temporal distribution of *Plectropomus leopardus* are being investigated. Detailed observations of the daily activities and movements of coral trout in marked study areas at Heron Island will provide information on the occurrence and constancy of fish assemblages and their variability in time and space. Observations will also be used to investigate how fish at different stages of development partition their daily activities in relation to features such as tidal state, lunar phase, time of day, etc. Population densities will also be assessed through time to calibrate visual census techniques and measures of coral trout abundance. It is hoped that this project will contribute considerable information needed for management of the major reef fish resource.

METHODOLOGY

Study areas have been grid mapped to enable detailed recording of movements and behaviour, and to obtain precise measures of population densities. Freeze branding has been used to mark fish in order

to recognize and relocate individuals. Diving techniques are used (on repeated observation periods) to study variability in fish behaviour and variability of population de nsity assessed by visual census methods.

STATUS

Most of the field observations needed for this M.Sc project have been accumalated. Results are now being analysed prior to preparation of the thesis.

LOCALITY: Heron Island

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: *Plectropomus leopardus* /Population dynamics/Temporal distribution/ Fishery management/

[UNIQLD061]

224 Survey of Charter Boats, Great Barrier Reef Region: Stage I and Stage II.

May 1984 – June 1986

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
P.O. Box 1379,
Townsville, Qld 4810

Griffith University
Institute of Applied Social Research,
Nathan, Qld 4111

PROJECT LEADERS:

Dr W. Craik (077) 818811
Mr T. Hundloe (07) 275 7444

CONTACT OFFICER:

Ms S. Driml (077) 818811

EXPENDITURE:

$2,500 (this year), $37,000 (all years)

MANPOWER:

0.20 (this year), 0.50 (all years)

OBJECTIVE

To design and conduct a survey of Charter Boats operating in the Great Barrier Reef Region to investigate activity patterns, fish catch and economic characteristics. (Stage 1 was limited to the Central Section).

METHODOLOGY

A questionnaire will be developed in conjunction with GBRMPA staff and surveys by personal interview of charter boat operators will be conducted.

STATUS

The final report has been received.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Tourism economics/Fishery surveys/Recreation surveys/

[GBRMPA104]

225 Traditional uses of Marine Resources by Aboriginal Communities on the East Coast of Cape York Peninsula: Stage I and Stage II.

October 1983 –

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
P.O. Box 1379,
Townsville, Qld 4810

James Cook University of North Queensland
Sir George Fisher Centre for Tropical Marine Studies,
Department of Marine Biology, and
Department of Behavioural Sciences,
Post Office,
James Cook University,
Townsville, Qld. 4811

PROJECT LEADERS:

Dr W. Craik (077) 818811
Mr A. Smith (077) 814111

CONTACT OFFICER:

Ms S. Driml (077) 818811

EXPENDITURE:

$20,600 (this year), $67,000 (all years)

MANPOWER:

1.00 (this year), 2.50 (all years)

OBJECTIVE

To document the current and traditional hunting and fishing practices of the Hope Vale and Lockhart River Aboriginal Communities. To acquire indigenous knowledge of the biology and behaviour of tropical marine food resources. To utilise this information in the development of a management program for Aboriginal use of marine resources within the Great Barrier Reef Marine Park.

METHODOLOGY

Field work in the Hope Vale and Lockhart River Communities will include observation, participation, and interview. Library searches will be undertaken in Canberra, Brisbane and Townsville.

STATUS

The report on Stage I has been completed. Stage II has commenced.

LOCALITIES: Hope Vale; Lockhart River

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Fishery resources/Aborigines/Fishing operations/Sociological aspects/

[GBRMPA088]

226 An assessment of the Queensland east coast prawn trawling closure.

November 1984 – July 1986

ORGANIZATION:
Queensland Department of Primary Industries
Northern Fisheries Research Centre
c/– Post Office
Bungalow, Qld 4870

PROJECT LEADERS:
Mr R.G. Coles (070) 515588
Mr A. Johnston (07) 2275428

CONTACT OFFICER:
Mr R.G. Coles

EXPENDITURE:
$25,000 (this year), $36,000 (all years)

MANPOWER:
1.00 (this year), 2.00 (all years)

OBJECTIVES

1. To provide industry and management authorities with an assessment of the effect of cessation of trawling on the number and size of prawns on the fishing grounds.
2. To assess the possibility that emigration and natural mortality will result in a net loss of prawns to the fishery during the closed period, and
3. To examine how appropriate the timing of the closures are in preventing capture of juvenile prawns for each of the species involved.

METHODOLOGY

Samples have been collected using the research vessel the "Gwendoline May" on fishing grounds at Princess Charlotte Bay, Cape Bedford, Cairns and Townsville. Prawns caught are sorted into species, weighed, and carapace length measured.

STATUS

Data from the 1985 closure is on IBM format floppy disk. Data has been analysed and a report for fishermen prepared. The 1985/86 closure is currently being assessed.

LOCALITIES: Cairns; Townsville; Cape Bedford; Princess Charlotte Bay

GEOGRAPHIC REGIONS: R,Z

SHIP TIME REQUIREMENTS: 25 days

MAJOR DESCRIPTORS: Prawn fisheries/Trawling/Stock assessment/Fishery resources/Fishery management/

[QDPI—030]

227 Pilot hatchery programme for barramundi, *Lates calcarifer*.

October 1981 – December 1985

ORGANIZATION:
Queensland Department of Primary Industries
Fisheries Research Station
Walkamin, Qld 4872

PROJECT LEADERS:
Mr M.R. MacKinnon (070) 933733
Mr R.N. Garrett (070) 515588
Mr D.J. Russell (070) 515588

CONTACT OFFICER:
Mr M.R. MacKinnon

EXPENDITURE:
$64,800 (this year), $104,800 (all years)

MANPOWER:
1.50 (this year), 4.00 (all years)

OBJECTIVE

To develop successful and practical barramundi hatchery and culture systems applicable to a Queensland marine coastal aquaculture industry.

METHODOLOGY

1. In 1984 at Northern Fisheries Research Centre, develop appropriate propagation techniques using overseas (Thailand) hatchery technology as a guide. Gain practical experience in broodstock care and maintenance, fry hatching and rearing, and mass fry food culture production. Collect broodstock for future induction experiments.
2. In 1985, refine the rearing techniques applicable to mass culturing. Obtain fertilized eggs for hatchery culture by stripping of running–ripe wild fish and hormone induction of near–ripe wild fish

held in cages. Attempt viable egg production in captive broodstock through hormone induction. Attempt within the limitations of existing facilities, production of sufficient numbers of fingerlings for a trial stocking of a large freshwater storage.

STATUS

In 1984, the research team successfully reared a small number of barramundi through from fertilized egg to fingerling stage. These eggs were obtained by stripping running–ripe wild fish caught on a spawning ground at Weipa, on northern Cape York Peninsula. Mature broodstock fish collected at Weipa and around Cairns for planned 1985 work.
The rearing techniques will be further developed in 1985. In 1986–87, information about the hatchery technology necessary to produce large numbers of fingerlings under Queensland conditions will be made available for public distribution.

Completed Project – This project will remain in the computerized Register for another 5 years but will not be included in future issues of the Compendium.

CO-ORDINATION WITH OTHER PROJECTS

As part of the development of hatchery technology, Dr J.W. Tucker, a visiting researcher from Harbor Branch Foundation, Florida USA, will conduct trials, in association with team members, on feeding of advanced fry on artificial diets.

GEOGRAPHIC REGIONS: C,R

MAJOR DESCRIPTORS: Aquaculture/Commercial Species/ *Lates calcarifer* /Hatcheries/Fishery development/

[QDPI–029]

228 Tuna fishing and handling techniques.

ORGANIZATION:

Queensland Department of Primary Industries
Fisheries Research Branch
c/– Queensland Food Research Laboratories,
19 Hercules Street
Hamilton, Qld 4007

PROJECT LEADER:

Dr H.C. Deeth (07) 268 2421

EXPENDITURE:

$10,500 (this year), $21,500 (all years)

MANPOWER:

2.00 (this year), 4.00 (all years)

OBJECTIVES

1. To examine alternative methods of catching, killing and handling tuna in order to maximize quality and sale price for the Japanese sashimi trade.
2. To devise physical and biochemical tests to aid tuna fishermen in selecting fish which are most acceptable to Japanese buyers.

METHODOLOGY

Catch Northern blue–fin or longtail tuna in Moreton Bay using different fishing/ handling techniques to assess their effects on tuna meat quality. Perform physical and biochemical analyses on the meat in order to devise a test which can be easily and reliably used for assessing quality and selecting fish for market. Apply experience and information obtained using longtail tuna to the larger tuna species, yellowfin and bigeye.

STATUS

Several biochemical and physical parameters of tuna meat have been measured on yellowfin and longtail tuna. Some correlations of these parameters with market prices in Japan have been made. More fish are required to complete this work.
Temperature measurements have been made on fish caught and handled under different conditions to assess the effects of fish being hauled aboard immediately after hookup and being left to 'cool off' for some time before landing.

CO-ORDINATION WITH OTHER PROJECTS

This project has been run in conjunction with two tuna long–line trials off Southern Queensland supported by FDTA funding.

GEOGRAPHIC REGIONS: Q,R

SHIP TIME REQUIREMENTS: 25 days

MAJOR DESCRIPTORS: Tuna fisheries/Fishing operations/Fishery products/Food technology/

[QDPI—033]

229 Development of barramundi *Lates calcarifer* (Bloch) hatchery and farming techniques.

July 1983 – December 1985

ORGANIZATIONS:

Sea Hatcheries Ltd
3 Pine Tree Close
Bayview Heights
Cairns, Qld 4870

Ryall, J.C.
C/– Post Office
Gordonvale, Qld 4865

PROJECT LEADERS:

Dr M.P. Heasman (070) 514 959 (W/H); (070) 543 387 (A/H)
Mr J.C. Ryall (070) 514 959 (W/H); (070) 561 738 (A/H)

CONTACT OFFICER:

Dr M.P. Heasman

EXPENDITURE:

$200,000 (this year), $350,000 (all years)

MANPOWER:

4.00 (this year), 6.00 (all years)

EXTERNAL SUPPORT:

FIRTA – $48,500 (1983/85)

OBJECTIVES

1. To identify major practical constraints to the development of a commercially viable barramundi hatchery and farming enterprise in Northern Australia.
2. To use this practical experience in formulating a longer term cost and time efficient program of research and development.
3. To demonstrate that hatchery rearing of native barramundi constitutes a practical alternative to importation of exotic species such as nile perch (*Lates niloticus*) as a means of improving freshwater angling in Queensland.
4. To identify simple low cost techniques enabling routine small scale production of larval and post–larval barramundi for research purposes.
5. To assess the utility of hatchery and cage reared barramundi as the basis of a recreational/tourist angling enterprise.

METHODOLOGY

A research hatchery/laboratory was established in Cairns during 1983/84. Broodstock of a dwarf race of *L. calcarifer* collected from Weipa in June 1984 will be subjected to spawning induction trails during the 1984/85 breeding season. Information on the time and location of spawning of wild barramundi gained during the 1983/84 breeding season will be used to facilitate collection of ripe running fish during the current 1984/85 spawning season. Cost and labour efficient techniques and equipment for the mass culture of larval food and for larval juvenile *L. calcarifer* developed in 1983/84 will be expanded and refined in 1984/85.

STATUS

Mean hatch to 20 mm total length times of 23 days and survival rates of 60–90% were achieved with 'pigmy' barramundi stock from the Hey/Embly River estuary, Weipa, and east coast stock from the Cairns region in the 1984/85 breeding season. Successful hormonal spawning induction with near term (ovary stage 3) wild fish was achieved in 1983/ 84, 1984/85 and 1985/86 (current) spawning seasons. Fertilization and hatch rates were however variable and generally lower than those from fish which were stripped at natural spawning times. Food conversion rates as low as 2.8–4:1 wet to wet were achieved with fish held in both marine and freshwater.

Completed Project – This project will remain in the computerized Register for another 5 years but will not be included in future issues of the Compendium.

CO-ORDINATION WITH OTHER PROJECTS

In the order of 30–50 thousand hatchlings from the Cairns region stocks were donated to the Fisheries Division of the Queensland Dept. of Primary Industries for research purposes on 2nd December, 1985.

GEOGRAPHIC REGIONS: R,J,C,Y,E

SHIP TIME REQUIREMENTS: 20 days

MAJOR DESCRIPTORS: *Lates calcarifer* /Latidae/Hatcheries/Fishery development/

[SEAHAT001]

See: 228

230 Gladstone Harbour Model.

December 1981 –

ORGANIZATION:
Queensland Department of Harbours and Marine
Queensland Government Hydraulics Laboratory
P.O. Box 2195
Brisbane, Qld 4001

PROJECT LEADERS:
Mr D.A. Robinson (07) 2278856
Mr R. McGuire (07) 2278856

CONTACT OFFICER:
Mr D.A. Robinson

EXTERNAL SUPPORT:
Gladstone Harbour Board

OBJECTIVES

1. To examine the pattern of tidal current patterns around major wharves in Gladstone Harbour under various tidal conditions.
2. To investigate ways of improving conditions to allow safe mooring of ships at these berths.
3. To consider effects of future harbour dredging and reclamation schemes on the tidal current patterns near the wharves.

METHODOLOGY

Extensive tidal current data collection in the field to calibrate physical model. Physical hydraulic model constructed at 1:100 vertical scale and 1:200 horizontal scale.
Fixed–bed, steady–state model represents 4000 ha of Gladstone Harbour, and covers 1000 m^2.
Current patterns in model in the area of interest are correctly simulated by using scaled wharf structures and 3 scale ship models of 140,000 DWT, 107,000 DWT and 70,000 DWT respectively.

STATUS

The model was constructed in September 1982. Calibration of the model to July 1978 conditions was completed in April 1983.

CO-ORDINATION WITH OTHER PROJECTS

Calibration and operation of the model is undertaken using discharges predicted by numerical modelling carried out by Oceanics Australia Pty Ltd with their 'ESTRY' network model.

LOCALITY: Gladstone
GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Tidal currents/Harbours/Mooring systems/Ships/

[QDHM—005]

231 Checklist of the effects of offshore developments.

October 1985 – April 1986

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

Olson, Ms M. (Subcontract)

PROJECT LEADERS:

Dr W. Craik (077) 818811
Ms M. Olson (077) 727215

CONTACT OFFICER:

Mr I.M. Dutton (077) 818811

EXPENDITURE:

$1,500 (this year), $1,500 (all years)

MANPOWER:

0.20 (this year), 0.20 (all years)

OBJECTIVES

To gather and synthesize information on environmental effects of offshore developments (urban infrastructure, engineering works etc.)
To prepare checklist of environmental effects according to types of development.
To outline criteria for use in determining significance of future developments.

METHODOLOGY

Literature review and desk–top study. Consultation with international agencies involved in coastal and offshore developments.

STATUS

Some difficulties encountered in accessing overseas studies which are not published externally.

CO–ORDINATION WITH OTHER PROJECTS

Follows on from GBRMPA – funded study by Cameron McNamara and Coastal Ecosystems.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Offshore structures/Environmental effects/Check lists/Development projects/

[GBRMPA137]

232 Guidelines and methodologies for environmental assessment of offshore development.

February 1985 – August 1985

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

Cameron McNamara Pty Ltd (Consultants)
PO Box 94
Spring Hill Qld 4001

Coastal Ecosystems (Consultants)
PO Box 157
Lismore NSW 2480

PROJECT LEADERS:

Mr I.M. Dutton (077) 818811
Mr P. Roe (07) 8349228
Dr P. Saenger (066) 212267

CONTACT OFFICER:

Mr I.M. Dutton

EXPENDITURE:

$7,500 (this year), $32,500 (all years)

OBJECTIVES

To determine the potential environmental effects of offshore developments.
To develop guidelines for environmental impact assessment (EIA), monitoring and management recommendations.

METHODOLOGY

Desk–top study, with limited field assessment of *in–situ* structures and operations. Review of legislation and administrative measures for EIA. Review and determine potential environmental impacts associated with the range of offshore developments and proposals within the Great Barrier Reef Region.

STATUS

The recommendations and findings are being incorporated into the offshore development assessment and management processes of the Great Barrier Reef Marine Park Authority.

Completed Project – This project will remain in the computerized Register for another 5 years but

will not be included in future issues of the Compendium.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Offshore structures/Environmental impact/Coral reefs/Resource management/

[GBRMPA153]

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233 **History of the Great Barrier Reef.**

December 1985 –

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

James Cook University of North Queensland
(Subcontract)
Townsville Qld 4811

PROJECT LEADERS:

Ms S. Driml (077) 818811
Ms M. Guilfoyle (077) 814111

CONTACT OFFICER:

Ms S. Driml

EXPENDITURE:

$6,000 (this year), $6,000 (all years)

OBJECTIVE

To prepare an outline for a history of use of the Great Barrier Reef to the 1920's and produce a bibliography.

METHODOLOGY

Literature review and investigation of sources of historical information.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Coral reefs/Sociological aspects/History/Bibliographies/

[GBRMPA158]

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234 **Oral history of human use of the Great Barrier Reef, and experience with crown of thorns starfish.**

March 1986 –

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

Griffith University
School of Humanities
Nathan Qld 4111

PROJECT LEADERS:

Dr W. Craik (077) 818811
Dr A. Chase (07) 2757444
Ms R. Ganter

CONTACT OFFICER:

Ms C. Dalliston (077) 818811

EXPENDITURE:

$9,000 (this year), $9,000 (all years)

OBJECTIVE

To undertake an oral history study to investigate human use of the reef and experience with crown of thorns starfish.

METHODOLOGY

A socio–historian will interview contacts and establish a network of knowledge bearers regarding the extractive industries of the reef. The interviews will be complemented by archived manuscripts and correspondence.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Coral reefs/Sociological aspects/History/ *Acanthaster planci* /

[GBRMPA120]

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235 **Past, present and future changes in the Cairns and Townsville urban coastlines.**

February 1985 –

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810
James Cook University of North Queensland
(Subcontract)
Department of Geography
Townsville Qld 4811

PROJECT LEADERS:
Dr W. Craik (077) 818811
Ms J. Spriggs (077) 814111
CONTACT OFFICER:
Ms C. Dalliston (077) 818811
EXPENDITURE:
$900 (this year), $1,725 (all years)
MANPOWER:
1.00 (this year), 2.00 (all years)

OBJECTIVES
To analyse long-term physical coastal changes along the Cairns and Townsville urban coastlines from the time of first settlement.
To locate sites with most rapid changes and investigate possible causes.
To study current management policies.

METHODOLOGY
Study of maps, photographs and written records including local and state government records, in Brisbane, Cairns and Townsville.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Long term changes/Coasts/Urbanization/Coastal zone management/

[GBRMPA156]

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236 Reef user survey of crown of thorns starfish.

January 1982 –

ORGANIZATION:
Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

PROJECT LEADER:
Dr L. Zann (077) 818811
CONTACT OFFICER:
Mr P. McGinnity (077) 818811

OBJECTIVES
To monitor the situation with regard to:
(i) the spread of crown of thorns starfish throughout the Great Barrier Reef region,
(ii) the intensity of crown of thorns starfish predation of reefs throughout the Great Barrier Reef region.
To provide an historical database of (i) and (ii) above.

METHODOLOGY
Reef users are provided with crown of thorns sighting forms which they complete for individual reefs visited.

STATUS
Replies have been entered onto a computerized database which is updated regularly.

MAJOR DESCRIPTORS: *Acanthaster planci* /Distribution/Predation/User surveys/Data collections/

[GBRMPA145]

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237 Reef walking capability assessment.

July 1984 – December 1986

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810
Griffith University (Subcontract)
School of Australian Environmental Studies
Nathan Qld 4111

PROJECT LEADERS:
Mr I.M. Dutton (077) 818811
Dr M. Liddle (07) 2757111
Dr A. Kay
CONTACT OFFICER:
Mr I.M. Dutton
EXPENDITURE:
$5,000 (all years)

OBJECTIVES
To develop assessment techniques for evaluating the impact of reef walking and to determine the capability of reef areas for walking activities.
To produce a field manual.

METHODOLOGY
Preparation of practical handbook based on previous field studies on Heron Island and Hardy Reefs.

STATUS
Publication of manual pending.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Walking/Reefs/Environmental impact/Recreational opportunities/Manuals/

[GBRMPA152]

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238 **Seaplanes at Green Island.**

May 1986 – June 1986

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810
Griffith University (Subcontract)
Australian Environmental Studies
Nathan Qld 4111

PROJECT LEADERS:
Ms S. Driml (077) 818811
Dr A.L. Brown (07) 2757111

CONTACT OFFICER:
Ms S. Driml

EXPENDITURE:
$8,600 (this year), $8,600 (all years)

OBJECTIVE
To investigate noise of, and attitudes to, seaplane landings on Green Island.

METHODOLOGY
Survey of visitor perceptions of sea planes. Map the intensity and type of use of areas of Green Island with regards to visitors, vessels, and sea planes.

LOCALITY: Green Island

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Aircraft/Environmental impact/User surveys/Attitudes/

[GBRMPA159]

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239 **Socio–economic consequences of major populations of crown of thorns starfish.**

May 1986 –

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810
Griffith University (subcontract)
Institute of Applied Social Reseach
Nathan Qld 4111

PROJECT LEADERS:
Ms S. Driml (077) 818811
Dr T. Hundloe (097) 2757444

CONTACT OFFICER:
Ms S. Driml

EXPENDITURE:
$25,000 (this year), $25,000 (all years)

OBJECTIVES
To ascertain the financial, employment and net economic effects of major populations of crown of thorns starfish on users of the Great Barrier Reef.
To assess users' attitudes to crown of thorns starfish.

METHODOLOGY
Design and development of questionnaires and subsequent analysis and modelling of data resulting from field surveys.

STATUS
Surveying of tourists, divers and tourist operators has commenced.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: *Acanthaster planci* /Sociological apsects/Economics/User surveys/

[GBRMPA122]

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240 **Terrigenous sedimentation and change on Low Isles since 1929.**

February 1985 –

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810
James Cook University of North Queensland
(Subcontract)
Department of Geography
Townsville Qld 4811

PROJECT LEADERS:
Dr W. Craik (077) 818811
Ms C. Rasmussen (077) 814111

CONTACT OFFICER:
Ms E. Eager (077) 818811

EXPENDITURE:
$700 (this year), $700 (all years)

MANPOWER:
1.00 (this year), 1.00 (all years)

OBJECTIVE
To determine the accuracy of reports of increased sedimentation from the land and deterioration of reef flat communities since the first Royal Society Expedition in 1929.

METHODOLOGY
Field survey and collection of samples for laboratory analysis.

LOCALITY: Low Isles
GEOGRAPHIC REGION: R
MAJOR DESCRIPTORS: Sedimentation/Coastal reefs/Environmental impact/

[GBRMPA157]

241* Toxicity of Oil Shale wastewaters to Algae.

December 1983 – December 1985

ORGANIZATION:
CSIRO
Division of Energy Chemistry,
Private Mail Bay 7,
Sutherland, N.S.W. 2232

PROJECT LEADERS:
Dr T.M. Florence (02) 5433267
Dr G.E. Batley (02) 5433325

CONTACT OFFICER:
Dr T.M. Florence

EXPENDITURE:
$50,000 (this year), $50,000 (all years)

MANPOWER:
1.50 (this year), 1.50 (all years)

EXTERNAL SUPPORT:
MSTGS – $41,000

OBJECTIVES

1. To measure the toxicity of waste waters from the mining, processing, and refining of oil shale deposits on the central Queensland coast.
2. To investigate the types of compounds causing the toxicity.
3. To determine the mechanisms of toxicity.
4. To study methods of removing the most toxic compounds before disposal of the wastewaters.

METHODOLOGY

The marine diatom, *Nitzschia closterium*, is the main organism used for the study. Toxicity is measured by inhibition of growth rate, photosynthesis, ATP and chlorophyll production. Model compounds, both organic and inorganic, as well as laboratory–produced oil shale waste waters are used. HPLC will be used to determine organics in the waste waters.

STATUS

Oil shale retort waters were found to be highly toxic to *Nitzschia*, a 1:1,000 dilution in seawater causing 50% depressions in growth. Shale and spent shale leachates were less toxic. Separation of organics in retort water into chemical classes showed that most toxicity resided in the acidic class, basic and neutral fractions being less toxic.

Completed Project – This project will remain in the computerized Register for another 5 years but will not be included in future issues of the Compendium.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Toxicity/Oil shale/Pollution effects/Algae/Environmental impact/

[CSIRO–075]

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242 Crown of thorns starfish control – biological and economic risk analysis study.

May 1986 –

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810
Griffith University (Subcontract)
Institute of Applied Social Research
Nathan Qld 4111

PROJECT LEADERS:
Ms S. Driml (077) 818811
Dr T. Hundloe (07) 2757444

CONTACT OFFICER:
Ms S. Driml

EXPENDITURE:
$25,000 (this year), $25,000 (all years)

OBJECTIVE

To undertake a risk analysis to contribute to the assessment of the need for control of crown of thorns starfish.

METHODOLOGY

Consultation and literature review followed by development of bio–economic models.

STATUS

Data gathered on cost of clearance. Modelling of ecological data commenced.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: *Acanthaster planci* /Pest control/Analysis/Models/

[GBRMPA121]

243 Effects of disturbed rainforest catchments on adjacent fringing reefs in the Cape tribulation area, North Queensland.

September 1985 –

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

James Cook University of North Queensland
Department of Geography
Townsville Qld 4811

PROJECT LEADERS:

Mr I.M. Dutton (077) 818811
Assoc Prof D. Hopley (077) 814111

CONTACT OFFICER:

Mr I.M. Dutton

EXPENDITURE:

$15,541 (this year), $15,541 (all years)

MANPOWER:

1.50 (this year), 1.50 (all years)

OBJECTIVES

To evaluate the impact of unsealed roads and related earthworks on fringing reefs in the Cape Tribulation area.
To measure change caused by roadworks, both within catchments and in the nearshore zone.

METHODOLOGY

A literature search on sedimentation/runoff problems on fringing reef will be followed by aerial photographic analysis of changes to the coast over the period 1940–1985. Rainfall, stream level and sediment yield in the catchment area will be monitored and the geological record contained in the Cape Tribulation Reefs will be studied with a drilling program and subsequent laboratory analysis.

STATUS

Cores have been taken from site transects. Field equipment, including stream sediment samplers and reef sediment traps, has been installed.

CO-ORDINATION WITH OTHER PROJECTS

This project forms part of the integrated Cape Tribulation Fringing Reefs Research and Monitoring Program.

LOCALITY: Cape Tribulation

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Environmental impact/Construction/Coastal reefs/

[GBRMPA146]

244 Initial site survey of Cape Tribulation coast fringing reef.

January 1985 – September 1985

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

Sea Research
PMB No. 1
Daintree Qld 4873

James Cook University of North Queensland
Townsville Qld 4811

PROJECT LEADERS:

Mr I.M. Dutton (077) 818811
Dr A.M. Ayling (07) 986118
Dr V. Harriott (077) 814111

CONTACT OFFICER:

Mr I.M. Dutton

EXPENDITURE:

$2,200 (all years)

OBJECTIVE

To determine precise monitoring locations prior to detailed surveys of the reef to determine the impact of run– off from the Cape Tribulation road.

METHODOLOGY

Reconnaissance of fringing reef sites by manta towing, diving, and reef walking.

STATUS

Completed Project – This project will remain in the computerized Register for another 5 years but will not be included in future issues of the Compendium.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Construction/Environmental impact/Monitoring/Coastal reefs/

[GBRMPA151]

245 Investigation of the presence of chlorinated hydrocarbon residues in Great Barrier Reef birds.

January 1986 –

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

Griffith University (Subcontract)
School of Australian Environmental Studies
Nathan Qld 4111

PROJECT LEADERS:

Dr W. Craik (077) 818811
Mr N. Waldron (07) 2757430

CONTACT OFFICER:

Ms C. Dalliston (077) 818811

EXPENDITURE:

$650 (this year), $650 (all years)

OBJECTIVES

To collect birds of different trophic classes in the Capricornia section of the reef and isolate, identify and quantify any chlorinated hydrocarbons present.
To relate the presence of any chlorinated hydrocarbons to possible sources, physicochemical properties of the compounds, trophic class and possible detrimental effects.

METHODOLOGY

Chlorinated hydrocarbons will be isolated by column chromatography. Compounds will be subsequently identified and quantified. Data obtained will be related to trophic class of bird, physicochemical properties of the compounds and possible sources.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Aves/Hydrocarbons/Bioaccumulation/

[GBRMPA161]

246 Organochlorine pesticide levels in selected sediments of the Great Barrier Reef.

February 1985 – December 1985

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

University of Melbourne (Subcontract)
Department of Organic Chemistry
Parkville Vic 3052

PROJECT LEADERS:

Dr W. Craik (077) 818811
Mr R. Dyall (03) 3416490

CONTACT OFFICER:

Ms E. Eager (077) 818811

EXPENDITURE:

$800 (this year), $800 (all years)

MANPOWER:

1.00 (this year), 1.00 (all years)

OBJECTIVE

To analyse marine sediments to determine the extent of accumulation and distribution of organochlorine pesticides.

METHODOLOGY

Collection of core samples for laboratory analysis of sediment extracts using gas chromatography with electron capture detection.

STATUS

Completed Project – This project will remain in the computerized Register for another 5 years but will not be included in future issues of the Compendium.

LOCALITY: Lizard Island

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Organochlorine contaminants/Pesticides/Bioacculmulation/Sediment analysis/ Coral reefs/

[GBRMPA155]

247 Survey of shell collecting on the Great Barrier Reef.

March 1986 –

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

Barnett, Ms B. (Subcontract)

PROJECT LEADERS:

Dr L. Zann (077) 818811
Ms B. Barnett (077) 818811

CONTACT OFFICER:

Dr L. Zann

EXPENDITURE:

$6,500 (this year), $29,000 (all years)

OBJECTIVES

To establish a profile of the specimen shell industry on the Great Barrier Reef.
To identify major target species and collection localities and to identify those species/localities susceptible to over collection.
To develop appropriate guidelines for management and to identify future monitoring needs.

METHODOLOGY

Review internal studies and scientific literature. Develop and disseminate questionnaire and analyse subsequent results. Prepare management recommendations.

STATUS

A review of the literature and internal reports has been completed. The principal collector groups have been identified, personal contact established with shell club groups between Cairns and Brisbane, and a questionnaire developed and circulated. Field work has included three shell collecting trips with members of Cairns and Townsville Shell clubs.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Shells/Sociological aspects/Check lists/Resource management/

[GBRMPA138]

248* Chemical and biological processes associated with oil spills in tropical waters.

January 1983 –

ORGANIZATION:

James Cook University of North Queensland
Sir George Fisher Centre for Tropical Marine Studies
J.C.U., Townsville, Qld 4811

PROJECT LEADERS:

Dr J. Baker (077) 814111
Dr J.L. Reichelt (02) 932247 or (077) 814111
Dr P.T. Murphy (077) 814111

CONTACT OFFICER:

Dr J. Baker

EXTERNAL SUPPORT:

QFMRAAC/MSTGS – $194,428 (1983 : 68530; 1984 : 71941; 1985 : 53957)
Partial overseas (private fund) – $29,000

OBJECTIVE

To determine existing "background" levels of oil in tropical waters – harbours, shipping channels, near–reef and mangrove areas, to characterize oil types, to detect movement of oil in the water and in transport to sediment and selected marine organisms. Studies will include the physical and chemical changes of different oils with time and pay particular attention to the role of, and impact on, microalgae and marine bacteria when oil spills occur in chronic or acute situations. The impact of approved oil–dispersants will be studied in different situations.

METHODOLOGY

Samples of all commercial oils have been obtained as standards. Water and sediment samples are being collected in regions in the vicinity of Ports of Cairns and of Townsville. Samples are analyzed by g.c. and h.p.l.c. techniques. Microalgae and marine bacteria are identified at sample sites and hydrocarbon–metabolizing microorganisms studied under laboratory conditions. Microorganisms will also be grown in aquaria conditions and controlled experiments effected.

GEOGRAPHIC REGION: R

SHIP TIME REQUIREMENTS: 12 days
MAJOR DESCRIPTORS: Oil spills/Environmental impact/Pollution effects/

[JAMESC068]

249 Survey of polychlorinated biphenyls (PCBs) in Australian coastal waters.

January 1980 – December 1985

ORGANIZATION:
La Trobe University
Microbiology Department,
Bundoora, Vic 3083

PROJECT LEADER:
Prof J.S. Waid (03) 4792229

EXPENDITURE:
$30,000 (this year), $207,625 (all years)

MANPOWER:
1.50 (this year), 8.50 (all years)

EXTERNAL SUPPORT:
AMSTAC–FAP – $118,883

OBJECTIVE
To determine the extent of PCB contamination in biota of the Great Barrier Reef and Australian coastal waters.

METHODOLOGY
Samples of biota were collected from The Great Barrier Reef and at other sites around Australia. Material was prepared for analysis by clean up on florisil after extraction using soxhlet or blender.
Analysis of PCBs was carried out on a HP5880 GC equipped with 25M capillary column, detected using Finnigan Ion Trap Detector.

STATUS
Analysis of samples (sharks, clams, coral, fish) is now completed. All samples contained detectible concentrations of PCB. Levels were higher in sharks and carnivores than coral and small fish. Generally concentrations in biota were an order of magnitude lower than concentrations in biota from the northern hemisphere.
Several papers arising from this work are in preparation.

Completed Project – This project will remain in the computerized Register for another 5 years but will not be included in future issues of the Compendium.

LOCALITY: Port Phillip Bay
GEOGRAPHIC REGIONS: R,B
MAJOR DESCRIPTORS: PCB/Pollution monitoring/Sediment sampling/Bioaccumulation/Pollution legislation/

[LATROB006]

250 Effects of dredging and ocean spoil disposal on marine biota.

September 1985 –

ORGANIZATION:
New South Wales State Pollution Control Commission
Marine Biology Unit
GPO Box 4036
Sydney, NSW 2001

PROJECT LEADER:
Mr P.J. Anink (02) 2658045

EXPENDITURE:
$15,775 (this year), $48,922 (all years)

MANPOWER:
1.50 (this year)

EXTERNAL SUPPORT:
Maritime Services Board of New South Wales – $48,922

OBJECTIVES
1. To monitor the effects of dredge spoil dumping on macrobenthic faunal community structure on the sub–tidal slopes of islands close to the dumping sites, and to monitor any ensueing recovery after dumping has ceased.
2. To ascertain whether the dredge spoil dumping can affect the structure of rocky reef fish communities within the Five Island group.

3. Minor objectives are to ascertain the effects of in–harbour dredging on macrobenthic faunal communities within the the harbour and to look for bio–accumulation of heavy metals released from contaminated dredge spoil into the water column.

METHODOLOGY

Macrobenthos.
Four study sites adjacent to the dump site and two control sites were surveyed immediately before dumping commenced and then at six week intervals SCUBA divers lay a 30 m transect in 22 m depth at the base of the island slope. Sixteen random colour transparencies of area 800 x 600 mm are taken at each survey using a quadrat frame supporting a camera and lighting.
Fish
Visual surveys of reef fish are made from 60 m x 2 m transects. Cryptic species are surveyed at fixed observer speeds, active visual species are surveyed on an instantaneous basis.

STATUS

Pre–dumping macrobenthic surveys and fish surveys have been completed. Macrobenthic surveys are proceeding at six week intervals as dumping continues. Identification of species and macrobenthic community structure is proceeding. The next fish survey will not commence until dumping ceases.

LOCALITIES: Port Kembla; Five Islands Group
GEOGRAPHIC REGIONS: N,R
SHIP TIME REQUIREMENTS: 18 days
MAJOR DESCRIPTORS: Dredging/Ocean dumping/Environmental impact/Benthos/Biological surveys/

[NSWPCC004]

251 Monitoring of Lady Musgrave Island Reef following stranding of the vessel TNT Alltrans.

April 1985 –

ORGANIZATIONS:

Queensland National Parks and Wildlife Service
PO Box 1362
Rockhampton Qld 4700

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

Sea Research
PMB 1
Daintree Qld 4873

PROJECT LEADERS:

Dr J. Davie
Dr L. Zann (077) 818811
Dr A.M. Ayling (070) 986118

CONTACT OFFICER:

Dr L. Zann

EXPENDITURE:

$1,920 (this year)

MANPOWER:

0.03 (this year)

OBJECTIVES

To assess damage resulting from stranding of the bulk ore carrier TNT Alltrans (25 March 1985) and salvage attempts.
To monitor recovery of affected areas.

METHODOLOGY

Underwater mapping and photography: line transect recording of benthos and fish populations.

STATUS

Initial survey April 9 1985. Monitoring ongoing at approximately yearly intervals.

LOCALITY: Lady Musgrave Island
GEOGRAPHIC REGION: R
SHIP TIME REQUIREMENTS: 6 days
MAJOR DESCRIPTORS: Wrecks/Biological impact/Recovery/

[QNPWS–003]

252 Aromatic hydrocarbons in the marine environment.

– December 1985

ORGANIZATION:
University of Melbourne
Marine Chemistry Laboratory,
Department of Inorganic Chemistry,
Department of Industrial Chemistry,
Parkville, Vic. 3052

PROJECT LEADERS:
Dr J.D. Smith (03) 3451844
Dr J. Bagg

CONTACT OFFICER:
Dr J.D. Smith

MANPOWER:
1.00 (this year)

EXTERNAL SUPPORT:
AMSTAC

OBJECTIVE
To determine the distribution of aromatic hydrocarbons in the marine environment. To understand the source of these compounds, their pathways and fate. Study of the polycyclic aromatic hydrocarbons as priority pollutants, and other aromatic hydrocarbons as indicators of oil pollution. To develop improved methods for measuring aromatic hydrocarbons in marine samples.

METHODOLOGY
Solvent extraction, HPLC and fluorescence spectroscopy applied to tissues, sediments and waters.

STATUS
Results reported for Great Barrier Reef and Port Phillip Bay region.

Completed Project – This project will remain in the computerized Register for another 5 years but will not be included in future issues of the Compendium.

GEOGRAPHIC REGIONS: A,B,R

MAJOR DESCRIPTORS: Hydrocarbons/Oil pollution/Pollution monitoring/

[UNIMEL062]

See also: 32, 37*, 57*, 121*, 124, 151, 152, 155, 157, 161, 163, 169

253 Evaluation of central section public participation program.

December 1985 – August 1986

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
PO Box 1379
Townsville Qld 4810

James Cook University of North Queensland
(Subcontract)
Townsville Qld 4811

PROJECT LEADERS:

Ms S. Driml (077) 818811
Dr P.L. Pearce (077) 814111
Ms G. Moscardo
Mr G. Ward

CONTACT OFFICER:

Ms S. Driml

EXPENDITURE:

$4,000 (this year), $4,000 (all years)

OBJECTIVES

To evaluate the impact on the general public of the Great Barrier Reef Marine Park Authority's television advertisement.
To evaluate attitudes of people who sent in representations to the draft zoning plan public participation program.

METHODOLOGY

Telephone and mail surveys of selected sections of the population.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Marine parks/Zoning/Sociological aspects/Attitudes/

[GBRMPA128]

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254 Methods for the Re–establishment of Hard Corals in Denuded Reef Systems.

August 1983 –

ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
P.O. Box 1379,
Townsville, Qld 4810

James Cook University of North Queensland
Sir George Fisher Centre for Tropical
Marine Studies,
Post Office,
Townsville, Qld 4811

PROJECT LEADERS:

Dr W. Craik (077) 818811
Dr V. Harriott (077) 814111 or (070) 937383

CONTACT OFFICER:

Dr L. Zann (077) 818811

EXPENDITURE:

$28,000 (this year), $67,000 (all years)

MANPOWER:

0.50 (this year), 3.50 (all years)

OBJECTIVE

To compile, from available knowledge, a set of procedures for the re–establishment of hard corals on an area of reef where corals once flourished. To test these procedures and evaluate their effectiveness. To prepare a practical handbook.

METHODOLOGY

In phase 1 a draft report which outlines suggested methods for coral community re–establishment, will be prepared after consultation with appropriate scientists and others e.g. tourist/resort operators, Marine Park field staff. A field trip will be undertaken to select suitable study sites to field test the methods proposed in the report (Phase 2). Revision of these methods for handbook.

STATUS

Phase 1 has been completed, and progress reports of field tests have been received.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Coral reefs/Reef formation/

[GBRMPA101]

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255 Study of participation in the Cairns section public participation program.

June 1985 – December 1985

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
Po Box 1379
Townsville Qld 4810
James Cook University of North Queensland
(Subcontract)
Geography Department
Townsville Qld 4811

PROJECT LEADERS:
Ms S. Driml (077) 818811
Mr P. Jenner (077) 814111

CONTACT OFFICER:
Ms S. Driml

EXPENDITURE:
$1,072 (this year), $1,072 (all years)

MANPOWER:
1.00 (this year), 1.00 (all years)

OBJECTIVES
To analyse characteristics of individuals and groups who participated in the Cairns Section Public Participation Program and reasons for participation.
To analyse whether the participants differ from the Cairns' population in general.

METHODOLOGY
Data collection by mail questionnaire and personal interview of representative sample of Cairns' population.

STATUS

Completed Project – This project will remain in the computerized Register for another 5 years but will not be included in future issues of the Compendium.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Marine parks/Surveys/Attitudes/Environmental management/Long term planning/

[GBRMPA129]

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256 User Survey, Capricornia Section: Stage I and Stage II.

May 1984 – June 1986

ORGANIZATIONS:
Great Barrier Reef Marine Park Authority
P.O. Box 1379,
Townsville, Qld 4810
Environment Science and Services
P.O. Box 107,
Spring Hill, Qld. 4000

PROJECT LEADERS:
Dr W. Craik (077) 818811
Dr D. Pitts (07) 3711357

CONTACT OFFICER:
Ms S. Driml (077) 818811

EXPENDITURE:
$16,000 (this year), $40,200 (all years)

MANPOWER:
0.20 (this year), 0.25 (all years)

OBJECTIVE
To design and conduct a survey of users of the Capricornia Section of the Great Barrier Reef Marine Park to ascertain perceptions and impacts of Marine Park planning and management.

METHODOLOGY
Design survey and select sample frame for all user groups, undertake pilot survey, review, and conduct survey using a combination of mail survey and personal interviews.

STATUS
The final report has been received.

LOCALITY: Great Barrier Reef Marine Park – Capricornia Section

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Resource management/Marine parks/User surveys/

[GBRMPA089]

See also: 65, 225

See: 60, 140, 219*

257* Shipping Risk Simulation Study.

March 1981 –

ORGANIZATIONS:

James Cook University of North Queensland
Department of Civil & Systems Engineering
Post Office
Townsville, Qld 4811

Det Norske Veritas
8th Floor, 77 Pacific Highway
North Sydney, N.S.W. 2060

PROJECT LEADERS:

Dr M.K. James (077) 814224
Mr T.K. Jenssen (02) 9221966

CONTACT OFFICER:

Mr N. Lamberton (077) 814166 (James Cook University)

EXTERNAL SUPPORT:

GBRMPA – $7,000 (84/85)

OBJECTIVE

To develop a generalized approach to risk assessment in relation to shipping accidents. Application to specific regions will result in risk–zone maps showing the manner in which risks from shipping accidents are distributed in the region.

METHODOLOGY

Problems addressed by this project involve estimating the probabilities of occurrence of very rare events for which no historical statistical base exists. A probabilistic computer–based model is under development, to enable realistic simulation of shipping traffic, environmental conditions, navigation aids, ship manoeuvrability, collision avoidance, and degree of severity of accidents. During 1984/85 this approach will be developed to the stage where validation against shipping casualty statistics from high traffic density areas such as the North Sea will be possible.

STATUS

An extensive survey of the literature on risk analysis and marine navigation has enabled a review of methodologies so far developed for the assessment of risks associated with very low probability events. A computer based model has been developed which simulates the navigation of vessels between Lizard Island and Cape Sidmouth. The logical structure and data requirements of the model are being refined through discussions with ship's masters and pilots experienced in this region. Significant data on shipping casualties in Western European waters have been acquired. These data provide the basis for a fault–free analysis of potential accident situations, now under way.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Risks/Ships/Accidents/Mathematical models/

[JAMESC003]

See: 230

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ORGANIZATIONS:

Great Barrier Reef Marine Park Authority
P.O. Box 1379
Townsville, Qld 4810

CSIRO (Subcontract)
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Davies Laboratory
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PROJECT LEADERS:

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EXPENDITURE:

$600 (this year), $8,750 (all years)

MANPOWER:

0.20 (all years)

OBJECTIVE

To produce an on-line, interactive bulletin of research-related information. This is a pilot study.

METHODOLOGY

The development of specifications for the bulletin was undertaken and software to produce the bulletin is being prepared. Potential users are being surveyed to evaluate potential use before implementation.

STATUS

The system has been superceded by developments in electronic mail systems.

Completed Project - This project will remain in the computerized Register for another 5 years but will not be included in future issues of the Compendium.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Research programmes/Information retrieval/

[GBRMPA044]

Great Barrier Reef Marine Park Authority