101 COASTAL PELAGIC RESOURCES: Taxonomy of baitfish.

June 1987 - June 1991

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

PROJECT LEADERS:
Dr D. Williams (077) 789211
Dr J. Benzie
Dr A. Robertson

CONTACT OFFICER:
Dr D. Williams

OBJECTIVE

To clarify the systematics of clupeid baitfish and associated billfish through the application of biochemical genetic techniques.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Bait fish/Taxonomy/Stock assessment/Population genetics/

TAXONOMIC TERMS: Clupeidae

[AIMS10607]

102 POPULATION GENETICS AND EVOLUTION IN CORALS: DNA hybridisation in corals.

June 1986 - June 1991

ORGANIZATIONS:
Australian Institute of Marine Science
PMB No. 3
MC Townsville,
Qld 4810.
James Cook University of North Queensland

PROJECT LEADERS:
Dr J. Veron (077) 789211
Dr D. Yellowlees
Dr D. Miller

CONTACT OFFICER:
Dr J. Veron

OBJECTIVE

To use the technique of DNA hybridisation to test taxonomic affinities of corals.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Coral/DNA/Chemotaxonomy/

[AIMS20905]

103** Humpback whale songs and related behaviour.

January 1986 - December 1988

ORGANIZATIONS:
Australian Museum
Vertebrate Zoology
6-8 College Street
Sydney NSW 2000
Defence Science and Technology Organisation
Ocean Sciences Group
PO Box 706
Darlinghurst, NSW 2016

PROJECT LEADERS:
Dr W.H. Dawbin (02) 3398111 (Museum)
Dr D.H. Cato (02) 6921483

CONTACT OFFICER:
Dr D.H. Cato

EXPENDITURE:
$10,000 (this year)

MANPOWER:
1.00 (this year)

EXTERNAL SUPPORT:
MSTGS - $10,000

OBJECTIVES

1. To record humpback whale sounds during migration along east and west coasts of Australia concurrently with behavioural observations relating sound production and behaviour.
2. To analyse the sounds to determine the song pattern.
3. To determine temporal (monthly and yearly) variation and geographical variation of the song.
4. To compare the songs with those described from other regions such as Hawaii, California and the West Indies to identify the scale of regional differences.
5. To evaluate the value of songs for delimiting separate breeding stock.

METHODOLOGY

Sounds will be tape recorded using a hydrophone suspended from a boat in vicinity of a headland where observers will monitor whale movements and behaviour. A theodolite will be used on the headland for position fixing. Locations and times of monitoring will be chosen from known migration patterns of the whales. Spectrograms (sonagrams) and frequency spectra will be produced from the recordings using Kay and Hewlett Packard equipment, from which an analysis of song pattern and acoustic characteristics will be made.

STATUS

Data obtained in 1986 showed fundamental differences in songs off eastern Australia compared with those off western Australia.

CO-ORDINATION WITH OTHER PROJECTS

There is 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,W,E

SHIP TIME REQUIREMENTS: 20 days.

MAJOR DESCRIPTORS: Mammals/Sound production/Behaviour/Comparative studies/

TAXONOMIC TERMS: Cetacea

[AUSMUS018]

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

November 1983 - May 1989

ORGANIZATIONS:

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

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

PROJECT LEADERS:

Ms C. Baldwin (077) 818811
Dr H.D. Marsh (077) 814242

CONTACT OFFICER:

Dr H.D. Marsh

EXPENDITURE:

$4,133 (this year), $181,181 (all years)

MANPOWER:

0.50 (this year), 3.00 (all years)

OBJECTIVES

To develop an effective regime for monitoring dugong populations in northern Australia.
To obtain relevant management information on dugongs.
To coordinate 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

Field work completed. Final report submitted to GBRMPA.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Mammals/Population characteristics/Mortality/Man-induced effects/Resource management/

TAXONOMIC TERMS: Dugong dugon

[GBRMPA084]

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105 Distribution and abundance of larval fishes in the nearshore waters of Lizard Island.

January 1987 -

ORGANIZATIONS:

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

Griffith University, School of Australian
Environmental Studies (Subcontract)
Nathan, Qld 4111

PROJECT LEADER:

Ms M. Milicich (07) 2757111

EXPENDITURE:

$1,680 (all years)

EXTERNAL SUPPORT:

Lizard Island Research fellowship - $4,000

OBJECTIVE

To examine various facets of the light trap sampling technique. To test for integrity and consistency of patchiness in fish distribution. To relate distribution of fish in the nearshore environment to distribution measured after settlement.

METHODOLOGY

Light traps will be deployed to sample the supply of larvae from neighbouring reefs. Current drogues will be deployed concurrently to the major programme to describe the small scale current patterns around the study sites.

STATUS

Fish larvae have been sampled for the period Summer 1986-87.

CO-ORDINATION WITH OTHER PROJECTS

To be coordinated with the study by Mr M. Meekan on recruitment rates of coral reef fisheries at Lizard Island.

LOCALITY: Lizard Island

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Fish larvae/Population number/Biological sampling/Coastal zone/Samplers/

[GBRMPA180]

106 Population dynamics of crown of thorns starfish on Suva Barrier Reef, Fiji.

September 1985 - December 1990

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:

$3,000 (this year), $7,400 (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. Continued sampling in 1989 subject to recruitment. Annual monitoring of recruitment continuing. Results 1979-87 published.

LOCALITY: Fiji

GEOGRAPHIC REGION: P

MAJOR DESCRIPTORS: Population dynamics/Crown of thorns starfish/Coral reefs/Monitoring/

TAXONOMIC TERMS: Acanthaster planci

[GBRMPA115]

107 Population dynamics of eastern Australian green turtles: Capricornia Section Breeding Unit.

November 1986 -

ORGANIZATIONS:

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

Queensland National Parks and Wildlife Service
Department of Environment and Conservation
POBox 155
Brisbane North Quay, Qld 4002

PROJECT LEADERS:

Ms C. Baldwin (077) 818811
Dr C. Limpus (077) 741411

CONTACT OFFICER:

Ms C. Baldwin

EXPENDITURE:

$20,000 (this year), $60,000 (all years)

OBJECTIVE

To study population dynamics of green turtles in the southern Great Barrier Reef; to develop models and monitoring regime.

METHODOLOGY

Feeding ground surveys, nesting population survey; genetic analysis of breeding unit; hatching productivity; population models at Heron and adjacent reefs and Shoalwater and northern Repulse Bays.

STATUS

Field work for 1987/88 involving sampling, tagging of green turtles in the Capricornia and Shoalwater and northern Repulse Bay feeding grounds; and studies of population and incubation success in Capricornia nesting beaches. Data analysis proceeding as planned.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Turtle fisheries/Population dynamics/Mathematical models/Biological surveys/

TAXONOMIC TERMS: Cheloniidae

[GBRMPA177]

108 Spawning, recruitment and juvenile ecology of coral reef fishes at Lizard Island, northern Great Barrier Reef.

January 1987 -

ORGANIZATIONS:

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

Griffith University, School of Australian Environmental Studies (Subcontract)
Nathan, Qld 4111

PROJECT LEADER:

Mr M. Meekan (07) 2757111

EXPENDITURE:

$1,720 (all years)

OBJECTIVES

To measure rates of larval production of a common reef fish.
To examine settlement rates of the species over three years.
To examine post-settlement mortality and growth.

METHODOLOGY

The study will utilize proven sampling methods to measure the production of larval *Pomacentrus amboinensis* , the settlement rate of that larvae, and then priority of settlement and survivorship.

STATUS

A pilot study to examine patterns of settlement of reef fishes to coral heads in three different habitats has been completed. Further investigations will focus on those pomacentrid species which settled in relatively higher numbers.

CO-ORDINATION WITH OTHER PROJECTS

To be coordinated with the study by Ms M. Milicich on spatial and temporal abundance of larvae.

LOCALITY: Lizard Island

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Reef fish/Spawning/Recruitment/Juveniles/Larval settlement/

TAXONOMIC TERMS: Pomacentridae; Pomacentrus amboinensis

[GBRMPA181]

109 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
Post Office
James Cook University, Qld 4811

PROJECT LEADERS:
Dr L. Zann (077) 818811
Prof R.S.F. Campbell (077) 814111

CONTACT OFFICER:
Dr L. Zann

EXPENDITURE:
$7,000 (this year), $69,954 (all years)

EXTERNAL SUPPORT:
MSTGS
COTSAC

OBJECTIVE
To obtain data on naturally occurring 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
Study continuing. Diseased juveniles and adults from Fiji collected and EMs prepared. Pathogen identified as sporazoan. Diseased/moribund specimens from Great Barrier Reef and aquaria have been collected. Production of tissue cultures for growth studies underway. Atlas of *Acanthaster planci* organs and tissues in preparation.

GEOGRAPHIC REGION: R

MAJOR DESCRIPTORS: Crown of thorns starfish/Pathology/Diseases/Coral/Predator control/Epidemiology/

TAXONOMIC TERMS: Acanthaster planci

[GBRMPA119]

110** Feeding and breeding ecology of seabirds.

August 1973 -

ORGANIZATION:
Griffith University, School of Australian Environmental Studies
Nathan, Qld 4111

PROJECT LEADER:
Dr K. Hulsman (07) 2757520

EXPENDITURE:
$600 (this year), $28,269 (all years)

MANPOWER:
0.10 (this year), 3.36 (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

GEOGRAPHIC REGION: R

SHIP TIME REQUIREMENTS: 54

MAJOR DESCRIPTORS: Birds/Population characteristics/Feeding behaviour/Reproductive behaviour/Biological surveys/Resource management/

[GRIFFI002]

111 Ageing techniques for the crown-of-thorns starfish, *Acanthaster planci*.

January 1987 - June 1990

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

PROJECT LEADER:
Assoc Prof J.S. Lucas (077) 814412

CONTACT OFFICER:
Mr R. Stump (077) 814883

EXPENDITURE:
$20,500 (this year), $30,000 (all years)

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

EXTERNAL SUPPORT:
AIMS/COTSAC - $30,000

OBJECTIVES

1. To test the effectiveness of marking starfish with a tetracycline skeletal band for growth measurements.
2. To validate the periodicity of natural pigment bands and internal growth lines occurring in skeletal elements.
3. To study the accumulation of age pigments in whole starfish and regenerating arms of damaged starfish.

METHODOLOGY

Captive starfish will be repeatedly sampled over long time intervals. Field starfish will be sampled and marked, and then recaptured and sampled over long time intervals. "Giant" individuals and small juvenile individuals obtained from the field will also be sampled.

STATUS

There are promising early results for age pigment analysis, internal growth lines in skeletal elements and the use of tetracycline as means of assessing age in *Acanthaster planci*.

CO-ORDINATION WITH OTHER PROJECTS

There is close collaboration with the crown-of-thorns starfish research at the Australian Institute of Marine Science and some sharing of ship-time.

GEOGRAPHIC REGION: R

SHIP TIME REQUIREMENTS: 12 days

MAJOR DESCRIPTORS: Crown of thorns starfish/Age determination/Growth/

TAXONOMIC TERMS: Acanthaster planci

[JAMESC125]