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Information needs and issues for the long term planning and management of the Great Barrier Reef World Heritage Area.

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INFORMATION NEEDS AND ISSUES FOR THE LONG TERM PLANNING
AND MANAGEMENT OF THE
GREAT BARRIER REEF WORLD HERITAGE AREA

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Abstract

Protected areas are major components of the economies of remote regions. The nature of the activities taking place in these areas, protecting the environment while providing social cultural and economic benefits, is not well accommodated by mainstream socio-demographic and economic approaches, both in terms of scale and information needs. The Great Barrier Reef World Heritage Area (GBRWHA), a region which lies off the Coast of Queensland from Bundeborg to the tip of Cape York Peninsula shares many issues and information requirements with other protected areas in Northern Australia, whilst also presenting unique challenges associated with its marine setting.

The GBRMP, which covers most of the GBRWHA, is jointly managed by the Great Barrier Reef Marine Park Authority (GBRMPA) a statutory Commonwealth body and the Queensland Department of Environment and Heritage (QDEH). Management of the Marine Park is primarily achieved by:

zoning the Marine Park into areas of permitted activities;
drafting of site management plans in consultation with users;
strategic planning with major stakeholders; and
appropriate research and public education.

Effective management of activities taking place in the GBRMP (that is ecologically, culturally, socially and economically sustainable) requires an appropriate knowledge and monitoring of the uses and users. The increase in direct use of the GBRMP, primarily tourism (Driml 1994), associated with changes in land use, demography and economic circumstances of the adjacent coastal zone now make it mandatory that accurate long term data sets are developed. Such crucial information will assist in managing negative impacts while enhancing the Area's social cultural and ecological values.

This paper presents information needs and priorities based on identified strategic directions, reviews existing research programs being undertaken by the GBRMPA and the CRC Reef on uses and users, particularly in the area of tourism research, discusses issues associated with using other sources of statistical information and identifies information needs and areas where ABS may be of assistance.

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Protected Areas: definition

Protected areas are set aside for specific purposes, most commonly to maintain protect or enhance desirable natural and cultural values. Protected areas include National Parks and nature reserves, World Heritage Areas and also Aboriginal lands ("Managed resource protected area", category VI of the IUCN classification). Northern Australia by far contains the greater percentage of protected areas. This trend is likely to continue as more land comes under Aboriginal tenure under the Native Title and other legislation (Table 1). An important consequence of the increase in Aboriginal land tenure is the priority given by Aboriginal land holders to land and resource management. The feasibility of partnerships with Aboriginal land holders to ensure the conservation and wise use of Australia's bio regions and biodiversity is currently being investigated by nature conservation agencies such as the Australian Nature Conservancy Agency.

State	Area under protected tenure (National Parks and reserves (000 Ha)	Area under Aboriginal tenure (000Ha)
Queensland	38 536	3410
Northern Territory	3 979	47 350
Western Australia	16 118	22782
Victoria	1908	3
New South Wales	3927	102
South Australia	11 165	18366
Tasmania	965	Nil

Table 1 - Protected areas per state (Adapted for Sunmap based on 1987 figures).

Protected areas and regional development

Protected areas impact on regional development in three ways:

Activities taking place in protected areas have to be compatible with the primary goals of conservation of natural and/or cultural values. Certain activities will be completely excluded (eg mining in the GBRWHA) while other activities will be enhanced because of their protected status (eg tourism and recreation)

Conditions will be placed on compatible activities, primarily in an effort to manage and minimise negative environmental, social and cultural impacts

The overall economic value of protected areas will include economic benefits associated with sustainable direct uses of resource base, but also the economic value of non market indirect uses.

Economic contribution of World Heritage Areas to northern regions' economies

In most cases, the economic value of protected areas is based on the financial value of activities taking place in these areas and does not include the non market value of indirect uses (associated with the protection of natural and cultural values). A study undertaken by S. Driml (1994) on the economic and financial values of World

Heritage Areas indicate that the financial value of those Areas is over 2.1 billion dollars, 42 % being generated by the GBRWHA. This arise from the significant tourism and recreation activity as well as a sizeable commercial fishery (Table 2).

Protected area	Purpose	Size (Kms)	Gross financial value \$ Million
GBRWHA	- Nature conservation - Conservation of cultural features - Aboriginal contemporary use - Compatible direct uses	348 700	Nil but provide resource base for sustainable direct uses which provide financial values 923
Wet Tropics	- Nature conservation - Conservation of cultural features - Aboriginal contemporary use -Compatible direct uses	9 000	Nil but provide resource base for sustainable direct uses which provide financial values 402
Kakadu	- Aboriginal contemporary use - Nature conservation -Conservation of cultural features - Compatible direct uses	19804	Nil but provide resource base for sustainable direct uses which provide financial values 122
Uluru	- Aboriginal contemporary use - Nature conservation -Conservation of cultural features - Compatible direct uses	1325	Nil but provide resource base for sustainable direct uses which provide financial values 38

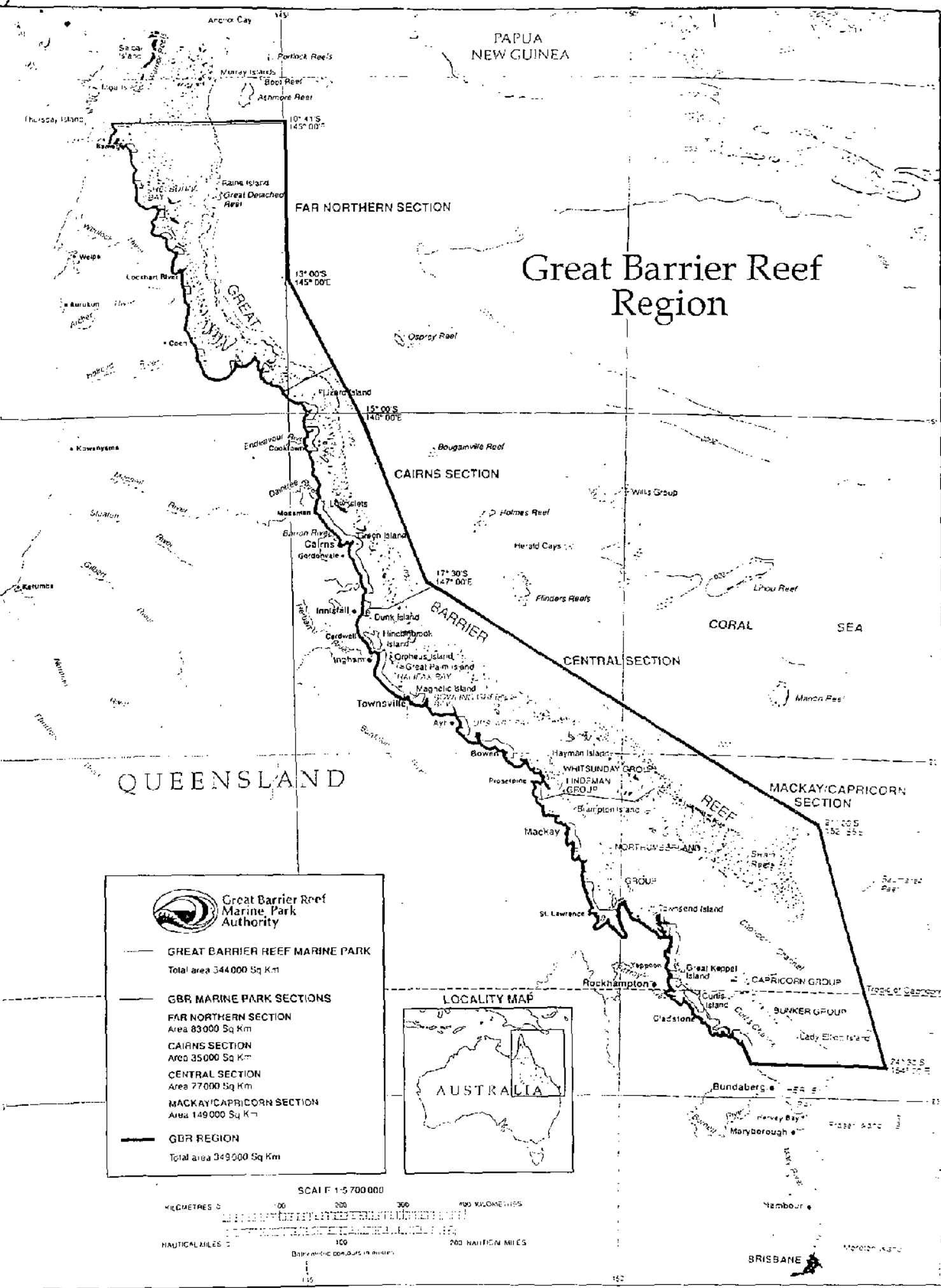
Table 2 - World Heritage Areas - Purpose, size and financial values (market values only, adapted from S. Driml 1994)

The Great Barrier Reef World Heritage Area (GBRWHA) and Great Barrier Reef Marine Park

The Great barrier Reef Marine Park includes 98% of the Great Barrier Reef World Heritage Area and extends from Bundaberg to the tip of Cape York Peninsula (figure 1).

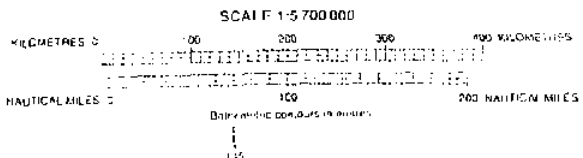
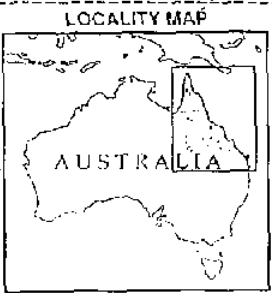
PAPUA
NEW GUINEA

Great Barrier Reef Region



**Great Barrier Reef
Marine Park
Authority**

- GREAT BARRIER REEF MARINE PARK
Total area 344 000 Sq Km
- GBR MARINE PARK SECTIONS
- FAR NORTHERN SECTION
Area 83 000 Sq Km
- CAIRNS SECTION
Area 35 000 Sq Km
- CENTRAL SECTION
Area 77 000 Sq Km
- MACKAY/CAPRICORN SECTION
Area 149 000 Sq Km
- GBR REGION
Total area 349 000 Sq Km



Its main characteristics are its large size (significantly larger than any World Heritage Area in Australia and the world) and a highly diverse Reef ecosystem which forms a bioregional unit. The GBRWHA, unlike other WHAs in Australia supports a range of direct activities including fishing, shipping, tourism and recreation which contribute significant revenue to the regional economy (Table 3).

Physical	Biological	Compatible direct uses	Level of use	*** Gross Financial value
348 700km ² 2500 km of coastline 2900 reefs 618 continental islands 300 cays	1500 species 400 species of coral 4000 molluscs 240 species of bird 6 species of turtles	Fishing	2000 commercial fishing boats	128
		Tourism and Recreation,	24 300 private boats 1.5 Millions Visitors (1994) *	94 682
		Shipping	3000 **vessel voyage (1994)	Not known
		Indigenous use	Not known	Not known
		Research	(GBRMPA and AIMS	19
		Coastal zone development	Not known	Not known

Table 3 - GBRWHA statistics. Adapted from Driml (1994). (*EMC data at 1st July 1994, **Torres Strait Shipping study (1994, *** Financial values not economic values

An important feature of the GBRWHA is its land and sea boundary. The coast is the place of complex biophysical interactions. It is also the place of human settlement expansion and associated economic activity, therefore the source of potentially significant threats. Finally, the GBRWHA is adjacent to a number of socio-economic regions and should be an important partner in integrated regional planning.

Management regime

The GBRMP was established in 1975 by an Act of Parliament (Great Barrier Reef Marine Park Act 1975) and was listed as a World Heritage Area for its natural values in 1981. The GBRMP is managed jointly by the Great Barrier Reef Marine Park Authority (GBRMPA), a Commonwealth statutory body and the Queensland Department of Environment and Heritage (QDEH). The Authority's corporate goal is:

"To provide for the protection, wise use, understanding and enjoyment of the Great Barrier Reef in perpetuity through the care and development of the Great Barrier Reef Marine Park "

The management of the GBRMP presents a challenge of maintaining the ecology of the Great Barrier Reef while providing for reasonable use. It means managing a complex, interdependent and multi dimensional Environment (natural, social and economic) and managing direct uses in ways that minimise ecological, social and cultural impacts while enhancing desirable social, cultural values of direct and vicarious, present and future users.

GREEN ISLAND % VOID SPACE
ANNUAL AVERAGES +/- 1 STD.DEV.
WITH SAMPLE MEANS +/- 1 STD.DEV.

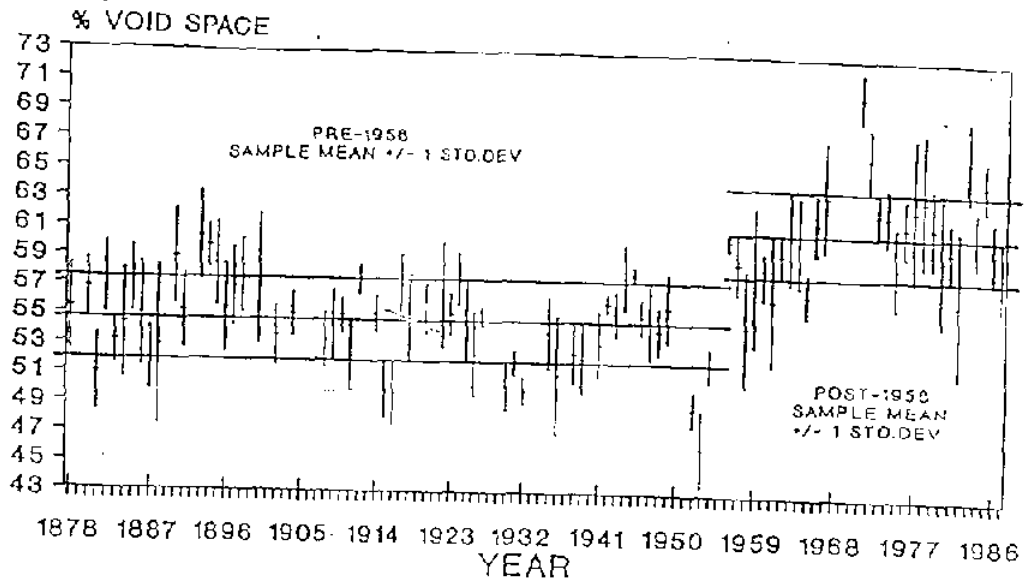


FIGURE 13 from Rasmussen et al, 1994

Appendix 1
Characteristics of major tourism statistical surveys

Survey	Method	Strengths	Weaknesses
Domestic Tourism Monitor	-Ongoing, annual (financial year) Survey of Household (face to face interview) -Multistage probability sample design based on ABS Statistical Local Areas -Australia wide	-Produced quarterly and 6-monthly data (calendar year) -Monitor changes over time -Includes VFR's -representative sample -Include GBR region as a destination	-Poor spatial disaggregation: large sample error at regional, LGA and subLGA scale
International Visitor Survey	Ongoing, annual (calendar year) survey administered prior to departure at Airport at departure lounge -Australia wide	-Year by Year comparisons -Representative sample -Provide indicator of trend -Provide mechanism for specific additions	-Limited sample size, -No progressive data available -Poor spatial disaggregation at regional and LGA, subLGA level
Survey of Tourist accommodation	Ongoing annual (financial year) -started in June 1975 -quarterly survey of all establishments (hotels, motels, holiday units, caravan parks) use monthly return forms	Quarterly monitor of guest arrivals, capacity and occupancy rates -Can be related to other survey data can -Follow up procedure of abnormal results	-97% sample size - Good spatial disaggregation at regional level, problem with confidentiality at LGA level
Overseas Arrivals and Departures (ABS)	Ongoing sample of completed immigration cards filled by all international travellers	-Sample (short term) and full enumeration (>1 year) available soon after survey	- Spatial disaggregation at state level only
Queensland visitor Survey (MRPS program) QTTC	From 1982/83 onwards reviewed in 1985 two collections major centre: face to face interviews of guests in commercial accommodation Remote areas: self administered and mailed back	-Good spatial disaggregation at regional and medium scale, LGA level	-Average response rate of 42% . -Low with with remote area -sampling, do not include VFR's

Characteristics of major statistical surveys. (Benzaken 1993)

Management of the Marine Park is primarily achieved by:

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drafting of site management plans in consultation with users;
strategic planning with major stakeholders; and
appropriate research and public education.

Information needs

There are three main categories of socio-economic information the Authority needs for informed decision making:

Area specific information on direct uses
Information about impacts of direct uses (ecological, social and economic)
Information about users (direct and indirect), values and attitudes

Existing information at GBRMPA

The focus of information collection has been on identifying and monitoring threats to the GBR ecosystem (Effect of Fishing, Water Quality, Monitoring of tourism impacts, Crown of Thorn Starfish Programs). That information is stored on Oracle databases and GIS. Socio-economic information is mainly collected and stored as issue/area specific studies, rather than as long term datasets. The Authority is currently developing a program of socio-cultural and economic research (see below).

There are three main sources of socio-economic information:

Socio-economic Databases

GBRMPA mapping units
Jurisdictional boundaries
Zoning maps
Claimable areas
Aerial surveillance database
Environmental Management Charge database (EMC)
Permits database (conditions of permits)
Human use database
Representation database (public participation)

Only the EMC and Aerial surveillance databases can be used for long term monitoring of uses (boat activity, tourism operations and mariculture). Those databases are compatible with GIS and have been used to draw up uses maps. The EMC database was designed for the purpose of administration of the fee charged to operators. The proceeds from the charge contribute to the Cooperative Research Centre for the Ecologically sustainable development of the Great Barrier Reef (CRC Reef) as indicated below.

The Representation database provides information on the views of those users participating in zoning and site management planning. Although it does not

constitute a representative sample of views of groups and individuals regionally or nationally, it provides very useful information on the salience of particular issues.

Socio-cultural and Economic Program (Research and Monitoring)

The Program is being developed to address long term information needs of the Authority. The main areas of investigation for the next 5 years include:

Socio- economic characteristics and distribution of activities taking place in the GBRWHA and adjacent coastal zone.

Values, attitudes and beliefs, knowledge and support for the GBRMP/GBRWHA, its use and its management and willingness to pay (direct and vicarious users).

Reef wide inventory of social and cultural resources/values such as tourism, recreation, heritage, indigenous, conservation, World Heritage

Evaluation of the effectiveness/appropriateness of management approaches and strategies

Risk assessment/perception/communication (perception of environmental threats to the GBR, monitoring of environmental quality using social sciences methods)

Social impact assessment and monitoring based on identification of critical indicators of social change whether associated or not with ecological change

The implementation of the program is undertaken in conjunction with the CRC Reef

Cooperative Research Centre for ecologically Sustainable Development of the Great Barrier Reef (CRC Reef)

Member institutions of the CRC Reef include the Association of Marine Park Tourism Operators (AMPTO), the Australian Institute of Marine Science (AIMS), Queensland Department of Primary Industry (QDPI), the Great Barrier Reef Marine Park Authority (GBRMPA) and James Cook University (JCU). The Centre's objective is:

" to undertake an integrated program of applied research and development, training and extension aimed at enhancing the viability of, and expanding sustainable reef based industries and economic activity, with particular emphasis on tourism, and providing an improved scientific basis for Reef management and regulatory decision making."

The Centre includes three major research programs, the Regional Environmental Status, Operations and Engineering programs. Relevant projects under Operations are:

- Review of visitor Use Patterns
- Analysis of Great Barrier Reef Marine Park Authority visitors: attitudes motivations, socio demographic profiles and activity preferences
- Socially and Ecologically acceptable levels of Use
- Socio-economic impacts of the reopening of Bramble Reef to line fishing.

GBRMPA Information issues

A number of key factors needs to be considered for informed decision making. They relate to the nature and quality of the information, its relationship to other information sources and the format in which it is to be used. Those key factors include:

- Forecasting , long term datasets on uses and users
- Linking biophysical and socio- economic datasets
- Defining appropriate management scale/spatial unit (bioregion)
- Format/GIS requirements
- Compatibility with existing datasets at regional and national levels
- Access/information sharing/protocols with GBRMP stakeholders and other agencies
- Disseminating and interpreting the information for decision making and education

Using ABS and other national datasets

ABS offers a enormous amount of longitudinal socio-economic data at a scale and depth that cannot be achieved by management agencies. GBRMPA and other management agencies however have expert knowledge of environmental issues and associated information needs as well as access to area/activity specific datasets. There are at present major limitations on the use of ABS data resulting from a combination of factors such as sampling procedures, spatial unit, type of information being collected, compatibility with GIS and cost effectiveness.

Sampling/ spatial unit

Information cannot always be disaggregated at regional level with sufficient confidence in the case of sampled populations. This is the case of most tourism national surveys.(see Appendix 1). This is further complicated by the fact that tourism nodes do not necessarily conform to statistical regions. In the case of full enumeration, relevant information needs to be aggregated to reflect management planning spatial unit. for example, ABS demographic data on coastal zone population forecasts are essential to the management of downstream ecological impacts and use of the Area provided they reflect "catchment areas" rather than statistical boundaries.

Categories:

Instruments used do not address specifically management needs primarily because of the industry focus of information collections. While that type of information is useful for decision making, it has to refer specifically to the Area or to relevant activities in the Area. For example, information on tourism activities does not include an item on visiting the GBRWHA, nor does it describe accurately activities taking place in the Area. ABS socio economic categories do not include tourism. Finally, crucial information on activities and values not traded in the market is not systematically being collected and integrated (eg natural, cultural and social values,

subsistence activities). Those values though are central to ecologically sustainable use as stated in the goals of environmental management agencies like GBRMPA.

GIS compatibility

GBRMPA like many planning agencies uses GIS to store and display their information because of the spatial nature of planning processes. The compatibility of existing datasets with GIS would be an advantage (eg 1991 ABS census data now available on ARC/INFO).

Cost effectiveness

Management agencies usually do not have the financial resources and expertise to undertake complex analysis of existing datasets or develop nation wide surveys. Customised studies are often expensive so solutions based on information sharing and cooperative strategies have to be considered in the first instance.

Strategies to overcome the provider/user information gap

A number of steps can be taken to maximise the use of existing datasets such as:

1. Analysing existing ABS information for the GBRWHA region, as defined by management, eg populations forecast derived from census data for the coastal zone could be compiled.
2. Developing reciprocal data collection arrangements based on:

Identification of avenues for implanting questions, creating meaningful categories in existing ABS data collection instruments. For example, the CRC Reef successfully negotiated with The BTR the insertion of a question on visiting the GBRWHA and more descriptive tourist activity categories in the International Visitor Survey (IVS , Bureau of Tourism Research).

Contribution by GBRMPA/CRC Reef of Area specific information that is compatible with ABS data collections, using similar categories and sharing questions. This will expand the usefulness of individual data collection exercises.

3. Providing access to GBRMPA/CRC Reef datasets (eg environmental data) for regional databases such as the Integrated Regional Database.

Making use of existing information in situ and identifying information gaps is the option the Sociol-cultural and Economic program is taking. Cooperative arrangements for information sharing and reciprocal data collection requires the development of appropriate information protocols. GBRMPA is looking at developing an information strategy to address those issues.

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