

**Summary report of the  
social and economic impacts of  
the rezoning of the  
Great Barrier Reef Marine Park**

Great Barrier Reef Marine Park Authority (GBRMPA)

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## **1 Introduction**

Zoning is a key tool in the management of the Great Barrier Reef Marine Park (GBRMP). The zoning system includes 'no take' areas (or marine sanctuaries, or Marine National Park Zones or "Green" zones) where extractive activities are not allowed, ensuring that plants and animals are protected to maintain the function and integrity of the ecosystem. It is recognised that the current zoning regime for the GBRMP (<5% designated as marine sanctuaries) is inadequate for effective protection of the range of biodiversity in the Great Barrier Reef (GBR) ecosystem. Examples of all the different habitat types must be protected in marine sanctuaries to maintain the function and integrity of the GBR ecosystem.

The Government's Ocean's Policy and election commitment require that this imbalance be corrected. Consequently, the Great Barrier Reef Marine Park Authority (GBRMPA) commenced the Representative Areas Program (RAP). To implement the RAP, the GBRMPA has proposed a new zoning plan for the GBRMP.

The Hon Dr David Kemp, MP, Minister for the Environment and Heritage, the Hon Warren Truss, Minister for Agriculture, Fisheries and Forestry, and Senator the Hon Ian Macdonald, Minister for Fisheries, Forestry and Conservation agreed that a joined-up government approach to assessing the full range of benefits and costs would facilitate government decision-making regarding the rezoning of the GBRMP. This report summarises work conducted by PDP Australia (on behalf of the GBRMPA), work conducted by the Bureau of Rural Sciences and by the Bureau of Tourism Research. These reports are also attached in full; these explain the data, methods and assumptions used to conduct the research.

## **2 Overview of Great Barrier Reef ecosystem values**

Table 1 lists more than 30 values associated with the GBRMP, including:

- commercial use values (tourism, commercial fishing, mariculture, etc),
- non-commercial use values (recreational fishing, boating, snorkelling, diving, etc), and
- ecosystem services such as the maintenance of biodiversity, visual amenity value, and shoreline protection, plus a range of essential ecological processes such as the fixation of solar energy and the storage and recycling of organic matter (PDP Australia 2003).

Non-use values include the values people attach to the knowledge that the GBRMP is being maintained in a healthy state and available for future generations.

These values are likely to be maintained or enhanced in the short, medium and long-term through the introduction of greater protection of the GBRMP as proposed in the new zoning plan. However, commercial and recreational fishing activities in some localised areas are likely to experience some negative impacts (Section 4).

**Table 1: Total Economic Value of the Great Barrier Reef (PDP Australia, 2003)**

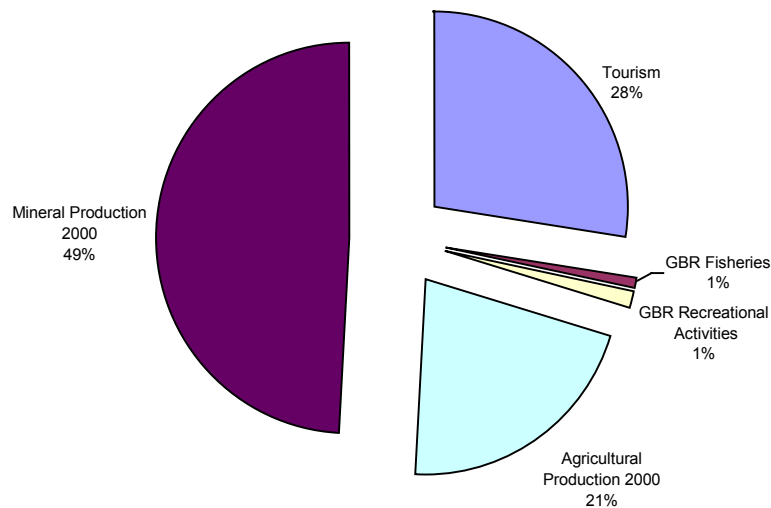
<b>Total Economic Value</b>		
	<b>Direct Use Values</b>	<b>Indirect Use Values</b>
<b>Use Values</b>	<p><b>Examples</b></p> <p><b>EXTRACTIVE USE:</b></p> <ul style="list-style-type: none"> <li>- Commercial fishing;</li> <li>- Recreational fishing;</li> <li>- Indigenous fishing and hunting;</li> <li>- Mariculture;</li> <li>- Genetic and medical resources;</li> <li>- Biochemicals; and</li> <li>- Raw materials.</li> </ul> <p><b>NON-EXTRACTIVE USE:</b></p> <ul style="list-style-type: none"> <li>- Indigenous cultural values;</li> <li>- Non-indigenous cultural values;</li> <li>- Tourism;</li> <li>- Recreation [non-extractive];</li> <li>- Aesthetic values;</li> <li>- Scientific knowledge;</li> <li>- Education;</li> <li>- Historical information &amp; places; and</li> <li>- Research.</li> </ul> <p><b>SERVICES:</b></p> <ul style="list-style-type: none"> <li>- Shipping &amp; other transport;</li> <li>- Storage &amp; assimilation of human refuse [e.g. sea dumping, nutrients]; and</li> <li>- Artistic inspiration.</li> </ul>	<p><b>Examples</b></p> <p><b>GOODS:</b></p> <ul style="list-style-type: none"> <li>- Vicarious use (e.g. enjoyment of others' use of the GBR).</li> </ul> <p><b>SERVICES:</b></p> <ul style="list-style-type: none"> <li>- Shoreline protection;</li> <li>- Regulation of local energy balances;</li> <li>- Sediment binding [from river run-off];</li> <li>- Biomass production &amp; fixation of solar energy;</li> <li>- Storage &amp; recycling of organic matter;</li> <li>- Storage &amp; recycling of nutrients;</li> <li>- Maintenance of migration &amp; nursery habitats;</li> <li>- Maintenance of biological diversity;</li> <li>- Regulation of local chemical composition of seawater &amp; microclimate; and</li> <li>- Global life support.</li> </ul>
<b>Non-use Values</b>	<p><b>Examples</b></p> <ul style="list-style-type: none"> <li>• Existence;</li> <li>• Bequest;</li> <li>• Option;</li> <li>• Quasi-option; and</li> <li>• Religious &amp;/or spiritual [indigenous &amp; non-indigenous].</li> </ul>	

Most of these values are non-market values and are therefore difficult to estimate. Ecological products and services are not used directly, but they do support direct uses. Therefore, while ecosystem services may not have apparent economic value, the loss of these services will result in monetary losses felt by businesses dependent on their existence, and broader losses to the economy.

Hundloe *et al.* (1987 in PDP Australia 2003) explored the willingness-to-pay for some non-market values. They estimated part of the existence and option value at \$98 million per annum (in current prices) and the value of guarding against loss in biodiversity caused by just one particular threat -crown-of-thorn starfish - was \$33.9 million per annum (in current prices). Thus, non-market values are significant.

Of the values expressed in the market, mining, tourism and agriculture, totalling over \$14 billion, are the most significant to communities in the GBR catchments. An additional \$14.5 billion of commodities exports move through GBR ports. This provides an indication of the economic context within which the RAP will operate. It is important to note, however, that the RAP will not affect mineral or agricultural production but will impact tourism and fisheries as described below.

**Figure 1: GVP in Key GBR Region Industries 2002**



**Source:** Productivity Commission (2003 in PDP Australia 2003)

### 2.1 Value to Australians and Queenslanders

Recent studies [AEC 2001, Moscardo 2001, AEC 2002, AEC 2003 all in PDP Australia 2003] show that over three-quarters of Australians consider that the GBR is under threat and more than 90% want more of it protected in marine sanctuaries. Over 60% of Australians think that more than 30% of the GBR should be in marine sanctuaries. About 82% think it is acceptable to lose some usage of the reef as a consequence of increased protection protected. Similar percentages apply in coastal Queensland communities as well.

## 3 Impacts on tourism

Tourism in the GBR catchment is worth well over \$4,000 million GVP<sup>1</sup> and will benefit from implementation of the RAP (BTR 2003).

There were 9.3 million visitors to the GBRMP region in the year ending June 2003. Of these, there were 4.0 million domestic overnight visitors, 4.4 million domestic day

<sup>1</sup> Gross Value of Production. The total value of output produced by an industry.

visitors and 845,000 international visitors (BTR 2003). It is estimated these visitors spent a total of \$4.1 billion while in the GBRMP region. Tourism employment was estimated at 33,100 persons in the region in 2002, based on that year's estimate for tourism earnings.

About 40% of domestic visitors and over 80% of international visitors enjoyed 'GBR-related' activities, indicating the importance of maintaining the GBR 'product' for the local economies.

### **3.1 Tourism forecast**

Over the next 20 years to 2022/23, cumulative tourism expenditure in the GBRMP region is forecast at \$62.2 billion, based on a discount rate of 5 per cent, based on an average annual growth for international travel to the region of 4-5 per cent, 0.7-0.9 per cent growth for domestic overnight visitors and 0.5 per cent in domestic day trippers (BTR 2003)

It is likely that the GBRMP region will become more reliant on the international travel sector for tourism earnings. This sector relies most heavily on use of the GBR ecosystem. The share of total expenditure in the region sourced from the international sector is expected to increase from just under 28 per cent to 46 per cent in 2022/23. However, over the 2003/04 to 2022/23 period, expenditure sourced from domestic travellers is estimated at \$39.5 billion or around 64 per cent of cumulative tourism expenditure (discounted at 5 per cent)(BTR 2003).

## **4 Impacts on fisheries**

### **4.1 Recreational fishing**

Recreational fisheries contribute about \$240 million GVP<sup>1</sup> to the local Queensland economy per annum (PDP Australia 2003). This does not include the non-economic importance and value to communities of recreation in the Marine Park. The GBRMPA considered the ability of recreational fishers to adapt when assessing options for the placement of MNPZs. Three sets of data (Suntag, boat ramp information and Rfish data) all indicate that the revised Zoning Plan will have minimal impact on recreational fishers even if anecdotal information suggests that these data are slight underestimates (PDP Australia 2003). The data suggest that less than one in ten fishing spots *in the Marine Park* may be unavailable for fishing and that, regardless, most of the fishing happens in creeks and estuaries outside the GBRMP.

### **4.2 Commercial fishing**

Commercial fisheries in the GBRMP are currently worth about \$130 million GVP per annum (BRS, 2003). It is estimated the areas that will be closed to fishing under the proposed zoning plan are currently the source of approximately 10% of this GVP, ranging between approximately \$10.3 million and \$13.7 million annually<sup>2</sup>. On a value-added<sup>3</sup> basis (VA) the value of the areas to be closed to fishing is estimated at about \$2.59 million per annum (PDP Australia, 2003).

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<sup>2</sup> \$10.3 million excludes harvest fisheries, i.e. beche de mer, trochus; \$13.7 million covers all fisheries.

<sup>3</sup> Value-added (VA) is the value of outputs produced by an industry less the value of its inputs. In essence, this surplus equates to the sum of incomes earned directly from an industry's production

The short-term impact of displaced fishing effort is likely to result in a reduction in total fishery production because commercial catches in many Queensland fishery sectors are at or above sustainable levels. However, increased fishing effort in areas that remain accessible to fishers, and exploitation of new or lightly fished grounds, is likely to bolster production. There is increasing evidence that protected areas can benefit marine fisheries by acting as refuges to spawning fish and ultimately act as sources of new recruits to a fishery (Ward *et al* 2001 in BRS 2003). These benefits may be realised in as little as three years for productive short-lived species, but will take longer for less productive longer-lived species (BRS 2003).

### **4.3 Impact assessment**

The extent to which the proposed zoning plan will impact on some fishers will vary depending on:

- The percentage of the fishery being located in the new protected zones;
- The sustainability of fisheries under existing fisheries management arrangements and industry practices;
- The availability of alternative fishing grounds;
- Search costs associated with locating suitable new fishing grounds;
- Changes in patterns of fishing effort in those areas where fishing activity may be displaced following implementation of the new zoning plan;
- Spillover and recruitment benefits from protected areas that could potentially arise in some fisheries resulting from the movement of larvae, juvenile and adult fish from protected areas into non-protected areas as a result of increases in fish number, size and fecundity within the protected areas.
- The dependence of fishers on GBR fisheries income compared with other sources of income;
- The recent management changes in the trawl and reef line fisheries and impending inshore finfish management review offsetting the effects of reduced fishing area and/or catch reduction;
- Age of fishers;
- Number of dependents relying on fishers for income;
- Diversity and robustness of the local economy.

Given these factors, fishers with lower mobility operations in some inshore coastal areas are more likely to experience negative impacts in the short-term. That is, localised fishers in the beam and banana trawl fisheries, some netters and some crabbers are more likely to experience adverse impacts.

### **4.4 Fisheries forecast**

Outside the context of RAP, commercial fisheries GVP was forecast to decline by 6% by 2010 and by 21% by 2020 period (Productivity Commission 2003 in PDP Australia 2003). With total GVP of GBR fisheries currently around \$130 million per annum, GVP for GBR fisheries is therefore forecast to fall to \$122.3 million by 2010 and \$102.8 million by 2020 in 2000-2001 values.

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process, including returns to labour and capital. Comparable VA figures are not available for other industries so meaningful comparisons are not possible.

Despite the forecast reduction in GVP, value-added is forecast to increase by 19% by 2010 and 31% by 2020 (Productivity Commission 2003 in PDP Australia 2003). This positive forecast is largely a reflection of expectations for improved fisheries management occurring as a result of significant and ongoing industry improvements introduced both by fisheries management authorities and the commercial fishing industry itself.

## 5 Regional impacts

The forecast predictions for growth in tourism are spread throughout the different statistical divisions within the GBR region, with greater growth expected in the North Queensland statistical division and less in the statistical division around Bundaberg. Forecast annual expenditures in undiscounted terms are estimated in Table 2 (BTR 2003). Over the 20-year period, cumulative tourism expenditure is estimated at \$103.3 billion (BTR 2003). Any deterioration in environmental values, actual or perceived, is likely to result in a decline in visitor growth. Given the size and relative importance of tourism to local, regional and the national economy any such decline will have major economic and social consequences (BTR 2003). The RAP will provide an effective safeguard against this occurring as the rezoning of the GBRMP is one step to minimise the risk to tourism growth in the region (BTR 2003, PDP Australia 2003).

**Table 2 GBRMP tourism expenditure estimates, by financial year**

	Bundaberg	Fitzroy	Mackay	Whitsundays	Northern	Tropical North Queensland	Total GBRMP
	\$ million	\$ million	\$ million	\$ million	\$ million	\$ million	\$ million
<b>Total</b>							
2002/03	188	439	310	478	469	2 181	4 064
2012/13	207	492	341	580	558	2 893	5 070
2022/23	227	547	370	697	669	3 831	6 340

As indicated above, the RAP will result in closing areas to fishing in the GBRMP that are currently the source of approximately \$10.3 million GVP per annum in the commercial otter trawl, net, line and crab fisheries. In the absence of any adaptation by fishers, the potential decrease in GVP is likely to be spread amongst the 20 Town Resource Clusters associated with commercial fishing in the GBRMP (BRS 2003). The average potential impact per town is where approximately 10% in commercial fishing GVP, with individual estimated impacts ranging from 6.7% to 12.9%. However, in some cases the estimated impact is small in absolute terms, or the commercial fishery has alternate sources of catch outside the GBRMP.

The BRS (2003) analysis focussed on the potential social impact on those fishing communities with high dependency on the GBRMP. Changes to resource access can be expected to have the greatest potential social impact for those 13 towns that rely solely or heavily on the GBRMP for their commercial fishing activity (*see Table 2, p.10 BRS 2003 - link to external PDF file*). Factors which will influence the level of impact on individuals and specific fisheries are their capacity to shift effort, change the nature of their fishing operations or take other mitigating action, and their



individual resilience to change. These factors were considered through a mobility index based on capacity to shift effort, and a family resiliency measure (which included socio-demographic factors such as age and family structure, income, housing type and employment, and education) to examine the ability of fishing families operating in the GBRMP to manage changes in the level of access to fisheries resources.

Communities also vary in terms of their resilience to change depending on their social and economic characteristics and this will influence the way they respond to changes in the value of fishery production. The impacts and responses may also flow onto other sectors of the local communities. A regional-based index of resilience to change (comprising variables such as housing, age, labour force, occupation, weekly incomes, education, family and Indigenous persons) was used to assess likely regional impacts.

Considerations in further analysis would be that the total GVP from fisheries constitutes less than 1% of the GBR catchment economy<sup>4</sup>(Productivity Commission 2003 in PDP Australia 2003), although the impacts on persons in the fishing industry adversely affected by changes are obviously of great significance to those individuals concerned, and also to the regions within which they are employed (PDP Australia 2003). A comprehensive understanding of social impacts would require targeted research at the community level, including surveys and community consultation to examine options. The analysis discussed in BRS (*see Table 3, p.13 BRS 2003 - link to external PDF file*) suggests that of the regions and communities identified as less resilient, potential impacts for Bowen appear higher than for other areas. Within other regions, such as Yeppoon, there may be substantial impacts on individuals or particular fisheries, due to differing dependence on rezoned areas. However, the impact on individuals and communities cannot be quantified without further analysis (BRS, 2003).

## 6 Conclusion

There is a very strong case for introducing the new Zoning Plan purely on economic grounds given (BTR 2003, PDP Australia 2003):

- The strong linkage between safeguarding and enhancing the value of economic-use activities and maintaining the Marine Park in a healthy state;
- Economic-use activities undertaken in the GBR Marine Park (i.e. tourism, fishing, and recreation) have direct GVP of billions of dollars per annum;
- Economic use activities directly employ around tens of thousands of people; and
- Economic-use activities create significant economic flow-on benefits in GVP and indirect employment.

Furthermore, the new Zoning Plan is justifiable purely on the basis of the environmental benefits (PDP Australia 2003).

Commercial fishing accounts for around 1% of the GVP of the GBR Catchment adjacent to the Great Barrier Reef Marine Park<sup>4</sup> (Productivity Commission 2003 in PDP Australia 2003). It is recognised that the proposed Zoning Plan is likely to have some negative economic and social impacts on some persons and communities

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<sup>4</sup> The GBR catchment refers to Statistical Divisions as used by the Productivity Commission (2003) that are a larger area than that of Town Resource Clusters.

associated with the commercial fishing sector in the GBR (BRS 2003). The loss of value to commercial fishing is estimated at ranging between approximately \$10.3 million and \$13.6 million per annum (BRS 2003, PDP Australia 2003). The principal economic cost of the new Zoning Plan - the value of forgone fishing activity - is estimated at between \$0.52 and \$2.59 million per annum (PDP Australia 2003). However, there may be long-term benefits to the commercial fishing industry in the GBR, and benefits to other industry sectors, particularly the tourism industry (BTR 2003).

In summary, given the high value of the environmental and economic benefits of the new Zoning Plan relative to the low aggregate economic cost, the new Zoning Plan is likely to deliver substantial net benefits for Queenslanders and the broader Australian community (PDP Australia 2003).

## **7 References**

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Bureau of Rural Sciences (2003) Implementing the Representative Areas Program in the Great Barrier Reef Marine Park. BRS assessment of potential social impacts on commercial fishing and associated communities - draft report. Bureau of Rural Sciences, Canberra.

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