

3 THE FLOW-ON IMPACT OF GBRMP-BASED ACTIVITIES

3.1 Introduction

The previous section of this report provided estimates of the value of a number of economic activities that utilise the GBRMP. These are estimates of the direct contribution of activities, they do not include consideration of the flow-on impact, or the effect of linkages of these activities, with other industries in the State economy. This section of the report provides an estimate of the indirect or flow-on effects of those activities, in terms of output and employment, on the economy of the State of Queensland. Input-output analysis has been used to estimate a set of multipliers for these activities from which it is possible to estimate the employment and output effects for any given change in expenditure.

A number of assumptions underlying the input-output impact estimates are emphasised at the outset.

First, the results from the input-output analysis presented here, measure the estimated impact of the normal operating and maintenance activities of GBRMP-based activities. They do not include the impact of expenditure associated with the construction or establishment of new or additional facilities.

Second, input-output analysis measures the backward linkages in the economy of the activities of an industry. That is, it measures the flow-on effects associated with the purchases of inputs into an economic activity, not the forward linkages, or value-added, of industries purchasing the final output.

Third, input-output analysis does not provide information about the efficiency of an investment to society as a whole, or about the environmental impacts of investment. It simply provides estimates of, among others, the output, employment and income effects of the economic activities of an industry on the economy of a region.

Finally, although input-output analysis presents information about the distribution of, say, output or employment effects of economic activity on industry sectors in the economy, it does not provide information about any trade-offs in the region, social or environmental, that may be associated with the economic activity. More detailed discussion about the input-output methodology, including the construction of the transaction matrix and the manipulation of the matrix to measure the impact of economic activity together with the limitations of the results, is provided in Jensen and West (1986).

Driml (1987) measured the economic impacts of 'all human activities' in the GBRMP. The impact of these activities on the economy of a number of statistical regions adjacent to the GBRMP, namely, Mackay, Cairns, Townsville and Rockhampton, was measured over a number of years. For this report, estimates of the impact of activities based on the GBRMP are confined to three main activities, namely:

- commercial fishing;
- commercial tourism; and
- recreational fishing and boating.

These GBRMP-based activities have been defined, and presented with the data estimating their value of output, in the previous section. The economic region over which the impact of these activities has been measured is the State of Queensland.

3.2 Modelling the GBRMP-based Activities in the Input-Output Transaction Matrix

An existing input-output transaction table for the State of Queensland for 1994-95, developed at the Department of Economics, The University of Queensland, was adopted for this report. An

input-output transaction table, or matrix, traces, in monetary terms, the economic transactions, or inputs and outputs, of all economic activity in an economy over a particular period of time (usually one year). Because all economic activity is accounted for in an input-output transaction table, the GBRMP-based activities were already incorporated, in some form, within the 1994–95 transaction table for the Queensland economy. Modelling the activities was an exercise in determining which sectors, either intermediate or final demand, included the economic transactions of these activities. In brief, Commercial Fishing and Commercial Tourism were included in the intermediate sectors and Recreational Fishing and Boating was included as a part of Household final demand. Commercial Fishing in the GBRMP had been included in the Forestry and Fishing sector and Commercial Tourism was a part of the Recreation sector. These activities were disaggregated from the relevant sectors and the industrial significance of each, in terms of output and employment effects, measured.

Summary tables, presenting estimated multipliers and showing the important flow-on effects, in terms of output and employment, for each GBRMP-based activity, are provided below. More detailed information is provided in appendix tables 1–6.

Table 3.1 Summary of output effects GBRMP-based activities, Queensland, 1994–95

Activity	Initial Output (\$m)	Flow-on (\$m)	Total impact (\$m)	Main Flow-on Sectors	% of Flow-on
Commercial Fishing	120.6	73.3	193.9	Trade	29.3
				Finance	16.8
				Transport/Communication	8.8
				Food Manufacturing	8.3
				Community Services	7.2
				Other sectors	29.6
				TOTAL	100.0
Commercial Tourism	436.5	407.9	844.4	Finance	26.0
				Trade	14.1
				Food Manufacturing	11.3
				Transport/Communication	8.0
				Community Services	6.5
				Other sectors	34.1
				TOTAL	100.0
Recreational Fishing and Boating	120.2	134.7	254.9	Trade	21.8
				Finance	14.1
				Commercial Tourism (GBRMP)	8.3
				Recreation	8.3
				Commercial Fishing (GBRMP)	7.9
				Other sectors	39.6
				TOTAL	100.0
COMBINED GBRMP IMPACT	677.3	615.9	1 293.2		

Source: KPMG Consulting

For illustrative purposes the output figures for the year 1994–95 as shown in table 2.18 were used to estimate the sum of the direct and indirect effects on the economy of Queensland for the year 1994–95. Tables 3.1 and 3.2 reveal the initial or direct effect of GBRMP-based activities on gross output and employment respectively, however it should be noted that these aggregates refer to *gross* output and not value added. The column on the right hand side of each table identifies which economic sectors experience the strongest flow-on effects.

Table 3.1 shows that the combined activities of the GBRMP directly contributed \$677.3m to the gross output of the Queensland economy in 1994–95. These activities also generated \$615.9m in flow-on effects to gross output. Commercial fishing is shown to create an additional \$73.3m in flow-on output in the economy. The Trade and Finance sectors source the greatest flow-on effect from commercial fishing, with 29.3% and 16.8% of the total flow-on effects respectively. The flow-on effects from Commercial Tourism are shown to create an additional \$407.9m in output in the economy, sourced primarily from the Finance (26%), Trade (14%) and Food Manufacturing (11%) sectors. The flow-on effects from Recreational Fishing and Boating are shown to create an additional \$134.7m of output, sourced mainly from the Trade and Finance sectors.

From this input-output analysis, gross output multipliers can be derived and then, on the assumption that the structure and inter-sectoral linkages in the economy do not change substantially, they can be used to estimate flow-on effects in subsequent years. The output multipliers for GBRMP activities are estimated to be 1.6 for Commercial Fishing, 1.9 for Commercial Tourism and 2.1 for Recreational Fishing and Boating (see appendix tables 1–6). This means that for every additional \$ of output from Commercial Fishing activities, an additional \$0.60 in output from flow-on effects in other industries in the Queensland economy will be created. The same calculations can be made for the other GBRMP-based activities. For example the value of additional gross output from Commercial Tourism activities in the GBRMP between 1994–95 and 1998–99 is estimated from table 2.18 to be \$18.32m. In 1994–95 dollars this would be approximately \$16.20m. Applying the multiplier of 1.9, this would equate to an additional \$30.78m of direct and flow-on output in the State economy. Structural change is a relatively slow process, which means that the estimated output multipliers should provide accurate estimates of industry impact for some years hence.

Table 3.2 Employment effects GBRMP-based activities, Queensland, 1994–95

Activity	Initial Employment (no.)	Flow-on (no.)	Total impact	Main Flow-on Sectors	% of Flow-on
Commercial Fishing	1 568	1 152	2 720	Trade	47.8
				Finance	12.8
				Transport/Communication	11.7
				Community Services	6.0
				Recreation	5.4
				Other sectors	16.3
				TOTAL	100.0
Commercial Tourism	7 421	5 467	12 888	Trade	27.0
				Finance	23.3
				Community Services	12.6
				Transport/Communication	6.4
				Other Agriculture	6.0
				Other sectors	24.7
				TOTAL	100.0
Recreational Fishing and Boating	N/A	2 008	2 008	Trade	37.5
				Finance	11.4
				Recreation	11.4
				Commercial Tourism (GBRMP)	9.4
				Other sectors	30.3
				TOTAL	100.0
COMBINED GBRMP IMPACT	8 989	8 627	17 616		

Source: KPMG Consulting

Using the same methodology it is also possible to estimate the impacts of GBRMP-based activities on employment. Table 3.2 reveals the initial or direct effect of GBRMP-based activities on employment in the economy of Queensland (1994–95) was 8989 persons. Additional, or flow-on, employment created by these activities is estimated at 8627 persons, giving a total, combined impact of 17 616 persons.

It should be emphasised that these are not necessarily full-time equivalent positions. Looking at the activities individually, the direct employment impact of Commercial Fishing in the GBRMP is estimated to be 1568 persons, and the flow-on effect is 1152 persons, giving a total impact of 2720 persons. Most of the flow-on employment is estimated to be in the Trade and Finance sectors; 47.8% and 12.8% respectively. Commercial Tourism is shown to provide employment (direct and flow-on) for 12 888 people. The flow-on employment is estimated to be in the Trade and Finance sectors; 27.0% and 23.3% respectively. Recreational Fishing and Boating by its nature does not ‘employ’ people directly. For this reason no figure appears in the first column of table 3.2. However, the flow-on effects from Recreational Fishing and Boating activities are shown to create employment for 2008 persons, mainly in the Trade (37.5%), Finance (11.4%) and Recreation (11.4%) sectors (see appendix table 4 for full details).

The employment multipliers for these activities are estimated to be 1.735 for Commercial Fishing and 1.737 for Commercial Tourism. No multipliers are calculated for Recreational Fishing and Boating because there is no initial employment in this activity. This means that for every additional person directly employed in Commercial Fishing activities, an additional 0.735 of a person will be employed elsewhere in the economy. The same calculations can be made for Commercial Tourism. The impact of additional output from GBRMP-based activities on employment in the State economy over the period to 1998–99 could be calculated by using the estimated multipliers.

It is recommended that the economic impact of GBRMP-based activities is monitored and data collection undertaken with this in mind. Estimates of the output and employment multipliers provided here will be appropriate for the medium term, or at least for as long as the economic structure of the economy, described by the technical coefficients in the input-output transaction matrix, accurately reflects the economy of the region.

Previous estimates of the output and employment impacts of economic activity in the GBRMP have been conducted on the individual statistical divisions adjacent to the Park (Driml 1987).

Recommendation

It is recommended that GBRMPA determines the region of significance, that is, the State of Queensland and/or the regional economies, and that data about the activities in the GBRMP be collected for that region of significance. If meaningful comparisons are to be made about the impact of these activities over time, then it is important to establish a consistent approach to data collection.

More specific recommendations relating to data requirements and data collections are addressed in section 4.1 of this report.