TOURISM AND GOLD IN KAKADU

THE IMPACT OF CURRENT AND POTENTIAL NATURAL RESOURCE USE ON THE NORTHERN TERRITORY ECONOMY
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NATURAL RESOURCE USE
ON THE NORTHERN TERRITORY ECONOMY

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ACKNOWLEDGEMENTS

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Figure 1: Kakadu National Park
CHAPTER 1
INTRODUCTION

Kakadu National Park is recognised nationally and internationally as a place possessing outstanding natural and cultural values. Largely because of this, it is one of Australia's major tourist magnets. Rapidly increasing numbers of visitors from overseas, interstate and within the Northern Territory (NT) have come to the Park since the declaration of Stage 1 in 1979. From an economics perspective, it provides onsite services to these people, while simultaneously providing offsite benefits to non-visitors who gain satisfaction from knowing that the environmental and cultural resources of the Park are protected. The latter group may exhibit willingness to pay for the right to use Kakadu at a later date (so-called option value), or they may have no intention of visiting but be willing to pay just to know that Kakadu is preserved (so-called existence value). The total economic value of the Park, then, consists of actual use value derived from visiting plus option value plus existence value (Pearce et al. 1989). A cost-benefit analysis of the Park as a national environmental resource would seek to estimate these values.

Additionally, use of Kakadu by visitors generates secondary or regional economic impacts. Expenditures by tourists and tourism-associated expenditure within the private and public sectors become gains to the regional suppliers of the relevant goods and services, so that another major aspect of the economic significance of the Park is its contribution to the economic development of the Northern Territory. It is this aspect which is addressed here. Chapter 2 presents quantitative estimates of the regional economic impact of Kakadu National Park generated by the use of newly acquired expenditure data and a model of the NT economy known as ORANI-NT. The chapter goes on to examine past, present and prospective tourism and recreation use of the 1986 Stage 3 extension of the Park, focusing on the regional economic impact of alternative development plans, and utilising qualitative data gained from interviews with operators in the tourist industry as well as other interested parties. An outline of the broader debate concerning tourism and recreation use in Kakadu is found in an up-to-date literature review in Appendix 1.

Kakadu's natural resources also include non-renewable stocks of minerals. Uranium has been mined at Ranger since 1980; and there is an on-going controversy over, and a Commonwealth inquiry into, a proposal to mine gold, platinum and palladium at Coronation Hill in the so-called Conservation Zone, a 47.5 km² area of Crown land within Stage 3 but presently excluded from the Park (RAC 1990). A cost-benefit analysis of the Coronation Hill project would be the standard means for establishing its worth from a national perspective: if every social benefit and social cost associated with the project were identified and appropriately evaluated, and if there were an excess of benefits over costs, then the project would make society as a whole better off in the sense that it would be possible to increase every individual's welfare.

However, the cost-benefit analyst's task is neither easy nor, once finished, conclusive. Particularly difficult is the valuation of preservation benefits - consisting of the use, option and existence values mentioned above - which could be lost as a result of mining. Such a loss would be omitted from a purely private financial appraisal of the Coronation Hill project but must be included in a cost-benefit analysis since it reduces societal welfare. On the assumption that mining in the Conservation Zone reduces, even destroys, preservation benefits, present value calculations must deduct the real net foregone flow of these benefits from net development benefits. Further, the latter are likely to decline
over time because technical advance tends to augment supply of extractable natural resources and/or provide substitutes, whereas preservation benefits from a given natural resource are likely to increase over time because supply is not augmentable and substitutes are not available, while demand grows as population and income increase. Indeed, supply of nature declines as growing societies encroach on wilderness areas. As Porter (1982, 64) argues, 'the rate of growth of preservation benefits...and rate of decay of development benefits...may enter critically to defeat seemingly profitable development projects'. Additional complications are that if the development project is reversible, consideration must be given to a sequence of development followed by restoration (however that might be defined); and if it is exhaustible, consideration must be given to postponement.

Even if the cost-benefit analyst grapples successfully with identification and valuation problems and produces an exemplary study, it does not follow that a positive net social benefit constitutes sufficient reason to proceed with the project. In reality, some people and/or regions may be made worse off as a result of the project: society may well choose to reject projects with regressive distributional consequences. (Conversely, a project may be accepted on distributional grounds even though net social benefit is negative). Additionally, there may be social as well as environmental impacts that are considered unacceptable. In the latter context, complex questions concerning environmental ethics and the importance of biodiversity and ecosystem integrity arise (Pearce & Turner 1990).

Chapter 3 of this monograph focuses on one aspect of the distributional impact of the Coronation Hill project, namely its implications for regional economic development. Whatever the primary benefits of the project (which are examined in a cost-benefit analysis), it will have secondary effects on business sales and output, employment and income, and regional government tax revenue, just as tourism in Kakadu has. There will be an interest in determining what these impacts are as part of a general project appraisal, especially if regional economic development is a policy objective. Chapter 3 employs ORANI-NT for the purposes of analysing the potential impact of the Coronation Hill gold mine on the NT economy.

ORANI-NT was developed by the Institute of Applied Economic and Social Research (IAESR) of the University of Melbourne during 1986 and is based on the widely-used ORANI model of the Australian economy, sharing its essential features (Dixon et al 1982; Meagher & Parmenter 1990). It constructs the economy as a system of interrelated industries or sectors; incorporates orthodox microeconomic theory in order to explain the behaviour of economic entities, including their responses to random or policy shocks to the economy; and computes equilibrium solutions for different economic environments and shocks chosen by the analyst. Solutions show how, in the new equilibria, macroeconomic aggregates and market-clearing prices and quantities for all product and input markets differ from what they otherwise would have been. ORANI-NT is thus a comparative static model. It is also usually short run in the sense that investment does not augment capital stocks during the (approximately) two year adjustment to the new equilibrium.

The underlying system of equations in ORANI-NT is highly non-linear, as indeed are actual economic relations between variables. However, the variables in the model are measured in percentage change form, so that the whole system is linear and relatively easily solved and analysed in that form. This makes the model methodologically superior to most models, which involve either linear relationships or are non-linear but are very difficult to solve and analyse.

The model is immense. In its condensed (solvable) form it has 7 983 variables, including a wide range of standard macroeconomic variables and industry level variables. It has, in fact, more variables than ORANI because ORANI-NT has two governments
(Commonwealth and the NT), two external sectors (rest of Australia and the rest of the world) and some new variables. Since it has 3,249 equations, it can only solve for that number of endogenous variables and thus it has 4,734 exogenous variables. The analyst must nominate what variables are to be endogenous and exogenous (called forming a 'closure'), and in that way describes the economic environment in which a simulation is to take place. In most simulations, almost all of the exogenous variables will be given the value of zero. That is, it is assumed that these exogenous variables do not change from their existing levels. The analyst examines a scenario by setting some of the exogenous variables to non-zero values. These values are called the 'shocks'. The model then solves the system for all of the endogenous variables.

There are two data sets in the model which describe the structure of the economy. The first is an input-output table for the NT economy, compiled for the year 1980-81. The table has 114 sectors or industries (Bandara & Jafferullah 1990). The second data set consists of various coefficients, including production and expenditure elasticities. These are mainly the same as those in the ORANI model and were estimated over many years by IAESR and others. They are likely to be stable and generally portable to the NT.

ORANI-NT, like its national counterpart, is detailed, theoretically solid and explicit, and thus 'provides a systematic framework for analysing policy and other issues' (IAC 1987, 60). Unlike its national counterpart, however, ORANI-NT comes in two versions. The difference between them relates to whether government expenditures are endogenous or exogenous. In the original version of the model as described in Meagher and Parmenter (1990), government consumption and investment expenditures are assumed to vary in proportion with their private equivalents, as is the case with the ORANI model of the Australian economy. In the computing form of this version (ORANI-NT_1), which exists on the NT University VAX computer and is accessible through terminals at the North Australia Research Unit, the file containing the relevant equations is designated NT_EQ4. The second version (ORANI-NT_2) is defined by the equations file NT_2_EQ4 and breaks the indexation of government to private expenditure. Government expenditures are assumed to be constant unless shocked as part of a simulation.

Given that about 70 per cent of NT government revenue comes from the Commonwealth, an analyst may use ORANI-NT_1 on the assumptions that the Commonwealth Grants Commission acts as if grants were indexed to private NT expenditures, that they are received within a year or so of the shocks being simulated occurring, and that they are spent fairly promptly. The connection is not a straightforward matter of indexation though; and it is the present NT government's stated intention to reduce expenditure (Northern Territory News 28 Dec 1990). Any increase in locally raised revenue is likely to be used in pursuit of this aim, and therefore ought not automatically lead to an increase in NT government expenditure. For these reasons, ORANI-NT_2 has been used in the simulations that are central to the discussion in chapters two and three. However, some results from ORANI-NT_1 simulations are presented for comparative purposes.

Finally, the standard closure has been adopted throughout, which means that, among other items, real wages, the average propensity to consume, the ratio of real household spending to investment, the nominal exchange rate, import prices, tariffs, non-NT demand curves for NT products, and NT and Commonwealth Government tax rates and charges are all held constant (see Meagher & Parmenter 1990, 55-6).
CHAPTER 2
THE REGIONAL ECONOMIC IMPACT OF TOURISM

This chapter is concerned with the regional economic impact of tourism in Kakadu. It examines the significance of the present level of visitation, the implications of variations in this level, and the effects of different tourism development strategies for Stage 3 of the Park. The main conclusions are that Kakadu is a key tourist destination whose existence has caused a substantial expansion in the NT economy; that a 10 per cent variation in visitors to Kakadu (for any reason) will have a small impact on the NT economy overall but will be important to local interests (tour operators, artefact makers); that capital works development within the Park will have a considerable short-term impact on the NT economy; and that because of this last factor, among others, a capital-intensive, mass-tourism development strategy in Stage 3 would have the greatest regional economic impact. Crucially though, this last conclusion does not constitute a policy recommendation: there is debate about appropriate types of tourist development, and a complete assessment of alternatives must address the issues of option and existence values, as well as the environmental and social impacts of tourism.

2.1 Tourism and the Northern Territory Economy

Self-governing since 1978 and covering 1 346 220 km², the Northern Territory has a population of about 156 000, two-thirds of which resides in the Top End. Between 1961 and the 1986 census, the Territory population grew at five per cent annually; but the rate dropped to 1.5 per cent in 1986-87 and minus 0.6 percent in 1987-88, reflecting net emigration in the face of economic downturn. Population grew by just 0.2 per cent in the following financial year (ABS 1990a).

The economy of the Territory is essentially public sector driven. Public services and defence account for 24 per cent of Gross Domestic Product (GDP), compared with 16 per cent for Australia as a whole, and directly employ 40 percent of wage and salary earners. Three-quarters of these work for the NT government which, with around 70 per cent of total revenue coming from Federal grants, is more dependent upon Commonwealth Government funding than any state (NTG 1990, Budget Paper No.6).

Private sector economic activity is narrowly based. The minerals, oil and gas sector accounts for 17 per cent of Territory GDP, compared with four per cent for Australia as a whole, and in these terms is the Territory's most important industry. Not surprisingly in view of the capital intensity of minerals extraction, the sector employs just three per cent of the workforce; and it has limited spread effects for, as O'Faireallaigh (1987) points out, up to 90 per cent of taxation revenue accrues to the Commonwealth. Mines are owned and financed by interstate or overseas companies so that interest and profits flow out of the regional economy. Minerals are generally processed to an elementary degree and inputs are imported, including labour which has a high saving and remittance ratio (NTG 1990, Budget Paper No.6).

Manufacturing (5.8 per cent of GDP) and rural industries (2 per cent) are relatively small contributors to production by national standards, and are surpassed in importance by the tourism and recreation sector which accounts for six per cent of GDP, compared with 3.8 per cent for Australia as a whole. Defined to include tourist and recreational facilities, accommodation, hotels, clubs and restaurants, this sector employs seven per cent of the
workforce. A further 6.5 per cent is employed in other sectors servicing tourists, so that overall more than 10 000 people in a workforce of 74 000 are in tourism-related employment. These data give an indication of the relative significance of the industry at the end of a decade which saw rapid growth. The estimated number of visitors rose from 411 000 in 1981-82 to 868 000 in 1987-88, increasing by an average 11.5 per cent each year (compared with a national figure of about 3 per cent); and though 1988-89 brought a decline to 835 000 (which is likely to have continued in small measure in 1989-90 because of the pilots' strike), the prospects are for growth to resume at a modest rate. The supply of accommodation has more than kept pace with this growing demand. Room nights available at hotels and motels increased at 14.1 per cent annually between 1981-82 and 1987-88, whereas room nights sold rose at 12.3 per cent, keeping occupancy rates between 45 and 53 per cent (compared with a national room occupancy rate of 52 to 60 per cent). Nights available and sold at caravan parks increased at 40.5 and 22.7 per cent, respectively, driving occupancy rates down from 39 per cent in 1981-82 to 21 per cent in 1985-86 (though of course there was seasonal variation) (NTG 1990, Budget Paper No.6; NTTC 1989; OECD 1988).

Developing tourist facilities ahead of demand has been the deliberate and long-standing policy of a Territory administration that since self-government has harnessed its hopes of economic diversification and growth to the tourism industry. The NT Treasurer observed in 1983 that his government saw tourism as the Territory's 'biggest growth industry' and was 'determined' to ensure that perceived potential was realised (Altman 1988, 40). This determination was revealed in a tourism development strategy designed 'to accelerate the provision of tourist accommodation infrastructure beyond the immediate level of demand' (NTG 1986) and substantively implemented through financial support to the tourism industry. Today, the official commitment to tourism remains firm, and is reinforced by national survey results suggesting that the Territory is Australians' most favoured holiday destination (Northern Territory News, 30 June 1990). One official publication states that 'tourism has probably the greatest potential for continued growth of any major industry' (DID 1989), while in his 1990-91 budget speech the Chief Minister, Marshall Perron, observed that 'tourism remains our leading growth industry', and announced allocations of $20m to the NT Tourist Commission, $24.4m to the Department of Industries and Development for tourism infrastructure support, and $16.7m for major tourism infrastructure projects (NTG 1990, Budget Papers Nos.1 and 4).

The message of the foregoing paragraphs is simple. Tourism has been a growth sector, is now an industry of major importance to the Territory economy and retains substantial public policy support. The next section investigates the role of Kakadu as a contributor to tourism's past growth and present significance.

2.2 Tourism and Kakadu National Park

Tourists to the Northern Territory are largely attracted in expectation of an outback or wilderness experience in which enjoyment of the natural environment is central (NTTC 1989, 56). The rate of tourism growth is accordingly revealed in the visitation records of the three major national parks (Table 1). These are officially designated 'key destinations' for tourists, the only other one being the Mary/Wildman River wetlands adjacent to Kakadu (NTG 1990, Budget Paper No.6).

Two features of the data are notable when they are combined with data on total visitor numbers. First, between 1981-82 and 1988-89 the percentage increase in visitation to the three parks together was 236 (taking an average of 1988 and 1989 figures to arrive at the 1988-89 number) - which exceeds the increase in total visitor numbers to the Territory of 103 per cent (from 411 000 to 835 000). Second, and of particular interest in the context
of this chapter, the relative importance of Kakadu National Park as a destination has grown substantially: of the total visitors to the NT in 1981-82, just 9 per cent visited Kakadu, whereas this rose to 27 per cent by 1988-89. Additionally, it is well-established that tourists stay longer in Kakadu (about four days on average) than in Katherine Gorge/Nitmiluk (two days) and Ayers Rock/Uluru (between one and two), so that Kakadu accounts for over half of visitor days in the three major destinations (Senate Standing Committee on Natural Resources 1988, 6). Also, it is worth noting that the proportion of international visitors has increased in recent years. Taking Australian National Parks and Wildlife Service (ANPWS) data, and making the possibly conservative assumption that the percentage of foreigners taking tours into Kakadu is the same as that for private visitsation, 4 580 international tourists constituted 10 per cent of total visitors in 1982, while in 1988 68 200 made up 31 per cent of visitor numbers (Preece 1989, 2,5). In the Bicentennial year, it appears that a little over three per cent of 2 246 724 inbound tourists went to Kakadu (BTR 1990).

Table 1
Visitors to NT National Parks (000s)

<table>
<thead>
<tr>
<th>Year</th>
<th>Kakadu</th>
<th>Nitmiluk</th>
<th>Uluru</th>
</tr>
</thead>
<tbody>
<tr>
<td>1981-82</td>
<td>37.5</td>
<td>75.0</td>
<td>86.9</td>
</tr>
<tr>
<td>1982-83</td>
<td>49.9</td>
<td>90.0</td>
<td>87.9</td>
</tr>
<tr>
<td>1983-84</td>
<td>66.5</td>
<td>100.0</td>
<td>106.0</td>
</tr>
<tr>
<td>1984-85</td>
<td>80.3</td>
<td>120.0</td>
<td>110.1</td>
</tr>
<tr>
<td>1985</td>
<td>101.6</td>
<td>na</td>
<td>132.0</td>
</tr>
<tr>
<td>1986</td>
<td>131.0</td>
<td>145.0</td>
<td>203.0</td>
</tr>
<tr>
<td>1987</td>
<td>195.0</td>
<td>165.0</td>
<td>238.0</td>
</tr>
<tr>
<td>1988</td>
<td>220.0</td>
<td>225.0</td>
<td>221.0</td>
</tr>
<tr>
<td>1989</td>
<td>230.0</td>
<td>263.0</td>
<td>181.0</td>
</tr>
</tbody>
</table>

Sources: Senate Standing Committee on Natural Resources 1988, 26; Cameron McNamara 1989; NTG 1990, Budget Paper No.6, 29.

Visitors to the park place considerable importance on its natural and cultural values. Analysis of 912 responses to a 1990 Kakadu National Park Visitor Survey (Knapman 1990) provides the following Table 2 averages from answering the question 'Would you indicate the importance to you of the various recreation opportunities in the Park?' (The numbers 1, 2, 3, 4, and 5 represent not important, not very important, moderately important, very important, and extremely important, respectively). The great importance attached to wildlife viewing and visiting rock art sites is striking, and provides support for the contention that, increasingly, the primary purpose of visiting the park is 'appreciation of Kakadu fauna, flora, Aboriginal art and landscapes' (ANPWS 1986, 73).
Moreover, visitors generally seem to leave the park satisfied that their purposes have been fulfilled (though this is not to say that they have no complaints or criticisms). The 1990 survey asked people 'Overall, how would you rate your visit to the Park?', and provided a six point scale from very poor to excellent on which respondents could answer. The average for the 912 groups analysed was a little over five, which is 'very good' (Knapman 1990, 22-3).

Again the message is simple. Kakadu National Park is a source of significant natural and cultural values that are recognised nationally and internationally, and that makes the Park 'a vital component of the tourist industry of the Northern Territory' (NTG 1986, 3).

<table>
<thead>
<tr>
<th>Activity</th>
<th>Domestic Tourists</th>
<th>International Tourists</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bushwalking</td>
<td>3.63</td>
<td>3.91</td>
</tr>
<tr>
<td>Camping</td>
<td>3.89</td>
<td>3.56</td>
</tr>
<tr>
<td>Fishing</td>
<td>2.06</td>
<td>1.61</td>
</tr>
<tr>
<td>Wildlife viewing</td>
<td>4.43</td>
<td>4.66</td>
</tr>
<tr>
<td>Boating</td>
<td>2.40</td>
<td>2.74</td>
</tr>
<tr>
<td>Scenic driving/tours</td>
<td>3.87</td>
<td>3.41</td>
</tr>
<tr>
<td>Visiting rock art sites</td>
<td>4.09</td>
<td>4.23</td>
</tr>
</tbody>
</table>

Source: Knapman 1990, 22

2.3 The Economic Significance of Kakadu

As stated in the introduction to this monograph, expenditures by visitors to Kakadu and tourism-related expenditure by private and public entities have an impact on the regional economy, so that Kakadu has secondary economic benefits in addition to its primary benefits or use, option and existence values. The following subsection presents information on business activity and tourist expenditure within park boundaries, while the subsequent subsection broadens the perspective in order to estimate the regional economic impact of all Kakadu-related expenditure.

2.3.1 Economic activity within the Park

Substantial investments have been made in accommodation facilities in Kakadu, most notably by two organisations. Australian Frontier Holidays (AFH), as at mid-1990, had invested $18m in Kakadu Holiday Village, which is located on the Arnhem highway and
consists of a 3.5 star 138 room hotel plus caravan and campsites, and in Kakadu Frontier Lodge and Caravan Park in Jabiru, which has 16 budget units and 186 caravan/camping sites. (In addition, AFH runs boat tours on the South Alligator.) The Gagudju Association has upwards of $10m invested in the Four Seasons Cooinda 3.5 star, 48 room motel and related infrastructure; and $17m has gone into the 4 star, 110 room Four Seasons Kakadu Hotel. All up, total hotel/motel investment comes to around $45m. Additionally, Jabiru has emerged as a service centre for tourism, to the point where there is an embryonic Tourist Association. Notable tourism-dependent businesses based in or around the town include Kakadu Air, Lord's Tours, a travel agency and The Miners' Hut cafe and restaurant.

Commercial tour operators also have a predictable and major stake in Kakadu. At the end of June 1990, there were no less than 132 holders of current permits to run tours in the park, and a further 36 who were still to finalise renewal of previous permits. They range from branches of large multinationals to quite small local businesses (see Appendix 2 for a full list); but for most companies be they large, small or in-between, Kakadu is a resource essential to financial success. As the manager of the Darwin Region Tourism Association put it, 'The future of the industry depends on attracting more people to the Park' (MacDonald R, pers comm, 4 July 1990). Kakadu is the 'main business' for big operators like AAT Kings (Bennett D, pers comm, 5 July 1990); is central to the itineraries of operators like Australian Kakadu Tours, Terra Safaris, and Keeleys Tours; and is a place where small-scale, locally-owned safari, bushwalking and specialist companies like Odyssey Tours, Willis' Walkabouts, and Territory Photosport do virtually all their business. Data on aggregate investment attributable to all these operations in Kakadu are not available; but it is obviously substantial.

Some data are available on tourists' expenditure within the Park. One of the questions in the 1990 Kakadu National Park Visitor Survey asked 'How much have you spent and do you expect to spend while in the Park?' The total expenditures by categories and by domestic and international tourists are given in Table 3. The figures given are for 647 domestic visitor groups of 1 662 people in all, and for 187 international visitor groups totalling 383 people. The former groups stayed an average 3.8 nights, and the latter an average 3.0 nights. These data suggest that average expenditure per person per day in the park (excluding prepayment to tour operators) is $30 in the case of domestic tourists, while for international tourists it is $39. Taking these figures, assuming four and three day stays for domestic and international tourists respectively, and assuming an 80:20 domestic:international split of an estimated 250 000 visitors in 1990, annual tourist expenditure within Kakadu National park would be of the order of $30m. This figure would probably constitute about 7 per cent of total tourist expenditure in the Territory during the same time period, given that $415m was the estimated expenditure for 1988-89 (Cameron McNamara 1989); and so far as the total visitor numbers are concerned it may be conservative, since ANPWS data suggest a 13.8 per cent increase in visitation in the first half of 1990, compared with the same period in 1989. If this was sustained it would give a 1990 total of 260,000.

In addition to expenditure within the park by tourists, there is expenditure by ANPWS itself, and capital works expenditure by the Northern Territory government. Data on these items are presented in Table 4, together with the estimate of tourist expenditure given above, in order to indicate the overall level of spending by various entities within park boundaries that can be expected in 1990-91. (These figures do not include expenditure by Aborigines, other residents of the area or by tour operators.)

There is no immediate likelihood that private capital expenditure will add substantially to the estimated total given above; but in the last section of this chapter the possibility is discussed with reference to types of tourist development in Stage 3, and the regional economic impact is estimated.
Table 3
Expenditure within the Park by Visitors to Kakadu
($)

<table>
<thead>
<tr>
<th></th>
<th>Domestic</th>
<th>International</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accommodation/camping fees</td>
<td>44 010</td>
<td>11 724</td>
</tr>
<tr>
<td>Meals</td>
<td>24 831</td>
<td>8 027</td>
</tr>
<tr>
<td>Other food/beverages</td>
<td>17 529</td>
<td>2 629</td>
</tr>
<tr>
<td>Gifts</td>
<td>17 185</td>
<td>2 557</td>
</tr>
<tr>
<td>Petrol/vehicle costs</td>
<td>35 836</td>
<td>10 099</td>
</tr>
<tr>
<td>Scenic flights</td>
<td>19 598</td>
<td>2 480</td>
</tr>
<tr>
<td>Bus &amp; 4WD trips</td>
<td>6 525</td>
<td>1 555</td>
</tr>
<tr>
<td>Water cruises</td>
<td>25 343</td>
<td>4 859</td>
</tr>
<tr>
<td>Other</td>
<td>3 845</td>
<td>562</td>
</tr>
<tr>
<td>Only total given</td>
<td>5 020</td>
<td>588</td>
</tr>
<tr>
<td>Total</td>
<td>199 723</td>
<td>45 080</td>
</tr>
</tbody>
</table>

Source: Knapman 1990, 15

Table 4
Estimated Annual Expenditure within Kakadu in 1990-91
($m)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Tourist expenditure</td>
<td>30.00</td>
</tr>
<tr>
<td>ANPWS (1989-90 budget allocation)</td>
<td></td>
</tr>
<tr>
<td>- wages</td>
<td>1.50</td>
</tr>
<tr>
<td>- operations</td>
<td>3.64</td>
</tr>
<tr>
<td>- capital works</td>
<td>5.43</td>
</tr>
<tr>
<td>NT Government</td>
<td></td>
</tr>
<tr>
<td>- work in progress Kakadu highway</td>
<td>4.95</td>
</tr>
<tr>
<td>- work in progress Arnhem highway</td>
<td>0.33</td>
</tr>
<tr>
<td>- new works Kakadu highway</td>
<td>2.58*</td>
</tr>
<tr>
<td>- new works Jabiru aerodrome</td>
<td>0.20</td>
</tr>
<tr>
<td>Total</td>
<td>48.63</td>
</tr>
</tbody>
</table>

* This figure is 50 per cent of the 1990-91 allocation.

Sources: Knapman 1990; ANPWS; NTG 1990, Budget Paper No.5
It should be emphasised that the foregoing discussion has been concerned only with tourism-related expenditure within the Kakadu National Park area. There is, of course, much spending outside Park boundaries that arises because of a visit to the Park: almost all of the Kakadu tour business is on a prepaid basis; tour operators purchase petrol and other provisions before entering the Park; tourists to Kakadu spend money elsewhere in the NT; and the fame of Kakadu induces visitors to the NT in addition to those who actually visit Kakadu. The next section discusses the total consequent impact of Kakadu tourism on the NT economy.

2.3.2 ORANI-NT simulations

Any statement about the economic significance of tourism in Kakadu to the NT economy can only be made on the basis of specific assumptions. Such assumptions are often not stated, or are made without the analyst being aware of them. In the case of using a model such as ORANI-NT, which requires the researcher to input a mass of information, the assumptions must be explicit in the researcher's mind and in the analysis of the results. The following discussion accordingly provides a statement of the assumptions which were used in the simulations of ORANI-NT and describes how these simulations were conducted.

(1) It was assumed that expenditures by tourists, ANPWS, NT government and others which resulted from the existence of Kakadu would not have taken place in the NT otherwise. That is, these expenditures were assumed to be 'marginal', or 'caused by' Kakadu. If this was not assumed, then the problem of analysing the economic impact of tourism to the Park would be much more complicated because the researcher would have to know both where the money would otherwise be spent and the relationship between the multipliers for Kakadu expenditure and the expenditure in those other areas.

(2) An increase in tourism expenditure by NT residents is treated simply as an increase in autonomous consumption expenditures in the relevant industries. An increase in expenditures by non-NT residents, however, needs some discussion. The usual way of dealing with tourism expenditure of foreign source is to treat it as an export. This could be done with ORANI-NT, by shocking the exogenous components of exports for the relevant industries; but data problems arise when attempting to calculate the shocks. In particular, one needs to know the following:

(i) the proportion of exports for each of the relevant industries which are non-NT tourist expenditures (for example, the Road Transport industry moves live cattle, processed foodstuffs, non-NT tourists and other things);

(ii) the proportion of tourist expenditures for each industry which are spent by NT, interstate and international tourists;

(iii) the changes in the exported proportion of industry outputs that have taken place since the 1980-81 input-output data base was developed.

To avoid making judgments about these matters based on little or inadequate data another approach was used. In a real goods and services macroeconomic model, an increase in exports of $xm of any particular good or service has the same effect on real GDP and the structure of industry as an increase in autonomous consumption of $xm for that good or service. The impacts of these two approaches on the balance of
trade is very different, of course, with the first causing a balance of trade surplus and the second causing a balance of trade deficit. This distinction is important to the nation-state because of its implications for financial markets and the money supply. But in the case of a region within an economy, such as the NT, the money supply and interest rates are determined by what happens to the economy overall, and the regional balance of trade is of no operational significance. Consequently, treating tourist expenditures of non-NT origin as exports is the same as treating them as a financial capital inflow followed by an increase in autonomous local expenditures; and since the data demands of the latter approach are less than the former, this was the approach adopted in the following simulations.

(3) A simulation of ORANI-NT involves a shock being administered to certain variables, such as the demand for a particular industry’s output. However, tourism in Kakadu is not an industry in the sense that there is a group of producers selling a defined product. Rather, tourism creates demand for a range of goods and services, such as food, transport, accommodation, and entertainment. Therefore shocks in the following simulations were made to the demands for the products of seven ORANI-NT industries which produce products for both tourists (of NT and non-NT origin) and non-tourists. These industries are listed in Table 5.

<table>
<thead>
<tr>
<th>ORANI-NT Industry Number</th>
<th>Industry Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>89</td>
<td>Residential Construction</td>
</tr>
<tr>
<td>90</td>
<td>Other Construction</td>
</tr>
<tr>
<td>92</td>
<td>Retail Trade</td>
</tr>
<tr>
<td>95</td>
<td>Road Transport</td>
</tr>
<tr>
<td>106</td>
<td>Public Administration</td>
</tr>
<tr>
<td>111</td>
<td>Entertainment and Leisure</td>
</tr>
<tr>
<td>112</td>
<td>Restaurants, Hotels</td>
</tr>
</tbody>
</table>

(4) When running the simulations, the shocks required were the percentage changes in total expenditure on each of the seven industry outputs which could be attributed to tourism in Kakadu. This involved first calculating tourism expenditure in each industry, and then estimating the proportion of this ‘caused’ by Kakadu.

The first step was problematic because no current output data were available for industries 89, 90, 92, 95, 106, 111 and 112, so that an indirect approach had to be used. Harries (1989) has calculated the proportion of people employed in tourism for a range of industry categories which are close to, but more aggregated than, ORANI-

11
NT categories. These employment figures were used to estimate the percentage of expenditure on each industry's output which was due to tourists in the NT as a whole - a procedure which is acceptable so long as tourists buy from particular industries goods and services which are as labour intensive as those bought by non-tourists.

With respect to the second step, the NT government Budget Paper No.6 for 1990-91 records that of the 835 000 tourists who visited the NT in 1988-89, some 230 000 or 27.54 per cent visited Kakadu National Park. Further, the NT Travel Monitor for 1988-89, compiled by Cameron McNamara (1989), shows that about half of the estimated tourist expenditure for the NT in 1988-89 was spent in the Top End, excluding Katherine: it is reasonable to assume that about one half of this amount in turn was spent by people who visited Kakadu (including expenditures within the Park and elsewhere). Therefore it was assumed in the simulations that 25 per cent of tourism expenditures in the NT in each industry was due to Kakadu. (It should be noted that this estimate is likely to be conservative since Kakadu is widely known both nationally and internationally, and consequently draws attention to the other tourism possibilities in the NT).

(5) The second column in Table 6 shows the percentage of direct tourism employment for the main industries as calculated by Harries (1989). The third column shows the percentages of employment, and hence of expenditure, which were attributed to Kakadu on the basis of the assumptions stated in (4).

It should be noted that Harries found that 95.2 per cent of people employed in manufacturing were attributable to tourism. However, almost all of these were Aborigines working in the artefact industry. This industry is not modelled in ORANI-NT so we have not included it here. However, this important fact must be recalled when assessing the results later. Although not all industries listed by Harries are listed above, the tourism employees in the industries in Table 6 constitute 97 per cent of those identified by Harries, apart from employees in manufacturing.

<table>
<thead>
<tr>
<th>Industry</th>
<th>% Tourism Employment</th>
<th>% For Kakadu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>2.80</td>
<td>0.70</td>
</tr>
<tr>
<td>Wholesale, Retail</td>
<td>5.60</td>
<td>1.40</td>
</tr>
<tr>
<td>Transport, Storage, Communication</td>
<td>27.80</td>
<td>6.95</td>
</tr>
<tr>
<td>Public Administration</td>
<td>4.20</td>
<td>1.05</td>
</tr>
<tr>
<td>Recreation, Pers. Services &amp; Other Services</td>
<td>90.00</td>
<td>22.50</td>
</tr>
</tbody>
</table>
(6) Table 7 shows the estimated percentages of employment in various ORANI-NT industries attributable to Kakadu, and the shocks which were used in three simulations designated A, B and C.

<table>
<thead>
<tr>
<th>Industries</th>
<th>Employment %</th>
<th>Shocks A</th>
<th>Shocks B</th>
<th>Shocks C</th>
</tr>
</thead>
<tbody>
<tr>
<td>89 Residential Const.</td>
<td>0.70</td>
<td>+0.70</td>
<td>-0.07</td>
<td>+0.07</td>
</tr>
<tr>
<td>90 Other Const.</td>
<td>0.70</td>
<td>+0.70</td>
<td>-0.07</td>
<td>+0.07</td>
</tr>
<tr>
<td>92 Retail Trade</td>
<td>1.40</td>
<td>+1.42</td>
<td>-0.14</td>
<td>+0.14</td>
</tr>
<tr>
<td>95 Road Transport</td>
<td>6.95</td>
<td>+7.47</td>
<td>-0.695</td>
<td>+0.695</td>
</tr>
<tr>
<td>106 Public Admin.</td>
<td>1.05</td>
<td>+1.06</td>
<td>-0.105</td>
<td>+0.105</td>
</tr>
<tr>
<td>111 Entertainment &amp; Leis.</td>
<td>22.50</td>
<td>+29.03</td>
<td>-2.25</td>
<td>+2.25</td>
</tr>
<tr>
<td>112 Restaurants, Hotels</td>
<td>22.50</td>
<td>+29.03</td>
<td>-2.25</td>
<td>+2.25</td>
</tr>
</tbody>
</table>

A number of points need to be made about this table. Firstly, the same percentage of employment, as a result of Kakadu, has been assumed for the two construction industries (Nos 89 and 90). This is merely a default assumption. Tourist accommodation is included in industry No.89 but road construction and upgrading for tourist traffic is included in No.90. In any event, the total tourism related employment in all construction is only 145 persons (Harries 1989, Table 1), so that any error caused by this allocation will be small. Secondly, it has been assumed that the same percentage of employees can be attributed to industries 111 and 112 as were attributed to the composite industry (Recreation etc.) by Harries. This is not a dangerous assumption because, although the industries are of different size, they have similar production functions, and for that reason they are often grouped together.

Simulation A was designed to answer the question 'how much is tourism in Kakadu currently worth to the NT economy?'. This was done by supposing that expenditures in the various industries were increased by the difference between what they would be without Kakadu tourism and what they are now. Notice that the shocks used (Shocks A) are not equal to the percentages of employment or expenditures for these industries as shown in the employment column. The reason for this can best be illustrated with industry No.111 or 112: since the proportion of expenditure in these industries as a result of tourism in Kakadu is 22.5 per cent, every $100 of expenditure would be reduced by $22.5 without Kakadu, to $77.5. Thus the existence of Kakadu causes expenditure to increase by the proportion of $22.5/$77.5, or 29.03 per cent. If one simply shocked the expenditures by the negative of the percentages of employment attributed to Kakadu, one would be answering the question 'what would happen if tourism in Kakadu disappeared'. This is also a perfectly good way to approach the question of the economic significance of tourism in Kakadu, and although the answers with each approach in percentage change form would be similar (but not the same), the answers in absolute values would be the same.
(7) There is considerable speculation about the effects on Kakadu tourism of the possible mining of Coronation Hill. Some believe that there would be no impact, others that it would actually increase tourism and yet others that tourism would decrease. No judgment as to which is the most likely outcome is made here but the regional economic significance of these possible outcomes was examined in simulations B and C.

Simulation B covered the case of a 10 per cent decrease in tourists visiting Kakadu. As already explained, the employment column in Table 7 shows the percentage of expenditure in various industries that can be attributed to Kakadu. If Kakadu tourism dropped to zero then expenditure from this source would drop to zero. This would be equivalent to a 100 per cent decline in these expenditures, and industry expenditures would fall by the percentages shown in the employment column. These would also be the shocks for such a simulation. However, in Simulation B only a 10 per cent decline was assumed, so the shocks were one tenth of the numbers in the employment column.

In Simulation C the case of a 10 per cent increase in tourists to Kakadu was examined. Since Simulation B looked at a 10 per cent decline from existing levels, Simulation C required the same shocks, only of opposite sign. Because ORANI-type models are linear in their percentage change form, it was not necessary to run Simulation C. Its results were the same, but opposite in sign, as those obtained in Simulation B.

(8) ORANI-NT in its condensed form has equations for market clearing outputs for industries of the following structure (Meagher & Parmenter 1990, 120):

\[ z = (\ldots) + b8 \]

where \( z \) is the vector of market clearing outputs, the terms in the brackets bring the markets to equilibrium, and \( b8 \) is a vector of shift variables which can be used to simulate increases or decreases in demand. Notice that shocking a market by setting \( b8 \) equal to 10 (per cent) will not normally result in \( z \) changing by 10 (per cent), because the shock causes changes throughout the economy and these in turn affect the market concerned. In the simulations conducted here, the following variables were shocked by the various percentages shown in Table 7:

\[ b8: 89,90,92,95,106,111,112. \]

(9) Another experiment, Simulation D, was undertaken for the purpose of commenting on the impact on the NT economy of any large capital works which might be considered for Kakadu. In this case, it was assumed that new capital works equal to 10 per cent of the total for the NT were undertaken in the area. Since ORANI-NT results are proportional in terms of the shocks, the result of a five per cent increase can be obtained by halving those for a 10 per cent increase. Thus the precise percentage assumed is not crucial to obtaining useful results. The impact of capital works in either tourism or mining in the Conservation Zone can also be derived from this simulation. Notice that hotel construction, workers accommodation etc. are included as activities in industry No.89 while roadworks, removing overburden etc. are included as activities in industry No.90. In the following presentation of the results of the simulations, the impacts of expansion in these industries are shown separately.
Table 8 shows results for the most relevant macroeconomic variables, the numbers being the percentage changes in the variables between their preshock and postshock equilibrium values. It can be seen that Kakadu is very significant for the NT economy in the sense that its existence has caused a substantial expansion in the economy (see Simulation A). Real gross NT product is 2.5 per cent higher than it otherwise would have been. Employment is up 3.64 per cent, a figure which includes direct employment in Kakadu, employment elsewhere in the servicing of Kakadu tourists, and secondary employment caused by the expansion in the NT economy generally. And locally-raised NT government revenue is 0.49 per cent higher because of Kakadu.

<table>
<thead>
<tr>
<th>Some Macro Variables</th>
<th>Simulations A</th>
<th>Simulations B</th>
<th>Simulations C</th>
<th>D:89</th>
<th>D:90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Real gross NT product</td>
<td>+2.50</td>
<td>-0.21</td>
<td>+0.21</td>
<td>+1.15</td>
<td>+1.18</td>
</tr>
<tr>
<td>Employment</td>
<td>+3.64</td>
<td>-0.30</td>
<td>+0.30</td>
<td>+0.84</td>
<td>+1.42</td>
</tr>
<tr>
<td>Real disposable income</td>
<td>+2.23</td>
<td>-0.19</td>
<td>+0.19</td>
<td>+1.06</td>
<td>+1.05</td>
</tr>
<tr>
<td>Real consumption</td>
<td>+2.23</td>
<td>-0.19</td>
<td>+0.19</td>
<td>+1.06</td>
<td>+1.05</td>
</tr>
<tr>
<td>Real investment</td>
<td>+2.23</td>
<td>-0.19</td>
<td>+0.19</td>
<td>+1.06</td>
<td>+1.05</td>
</tr>
<tr>
<td>Locally raised NTG rev</td>
<td>+0.49</td>
<td>-0.04</td>
<td>+0.04</td>
<td>+0.17</td>
<td>+0.19</td>
</tr>
<tr>
<td>NT CPI</td>
<td>+1.62</td>
<td>-0.13</td>
<td>+0.13</td>
<td>+0.47</td>
<td>+0.51</td>
</tr>
</tbody>
</table>

A ten per cent decrease or increase in the level of tourists has a relatively small impact on the NT economy however (see Simulations B and C). Real output, employment, and the other listed macroeconomic aggregates vary by less than a half of one percentage point. This suggests that the argument about the effect of mining on visitor numbers is largely irrelevant in terms of economic impact on the NT economy overall, at least so long as the debate is about numbers of less than or equal to 10 per cent.

Importantly though, the type of development considered for Kakadu has considerable regional significance. Capital works in the area of the order of 10 per cent of total NT capital works would cause a notable expansion of the NT economy in the short-term, as simulation D results show: a 10 per cent increase in expenditure on the output of industry no.89 increases real gross NT product by 1.15 per cent, while the same expenditure increase directed at industry no.90 generates a 1.18 per cent real output expansion. The respective overall employment expansions are 0.84 and 1.42 per cent.

Had ORANI-NT_1 been used to run the same simulations, the foregoing discussion would have referred to larger numbers because, as explained in chapter one, government expenditure is endogenous in this version of the model. For example, simulation A results for real gross NT product and employment are 4.52 and 6.26 per cent, respectively, if ORANI-NT_1 is used. However, for reasons also explained in chapter one, ORANI-NT_2 is thought to be the better model for the analytical purposes of this monograph.
Of course ORANI-NT in either version generates results for over 3 000 variables, including the percentage change in the level of production for each of the 114 industries (variable 'z'). Data of this type permit an examination of the impact of Kakadu tourism on the structure of industry in the NT, and Table 9 accordingly shows some selected microeconomic results for simulation A. Activity levels in the vast majority of industries increase because of the direct linkage effects of the shock and because of the rise in aggregate income; but some industries, notably ORANI numbers 15, 19 and 66, are crowded out because they are unable to pass on the increased costs which result from the overall economic expansion. It is the extent of the latter which is of primary interest, however, and which is addressed in the following section's discussion of tourism development options for Stage 3 of Kakadu.

### Table 9
Industry Output Changes: Simulation A

<table>
<thead>
<tr>
<th>ORANI No.</th>
<th>Industry</th>
<th>% Change in Output</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gainers:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Other farming-export</td>
<td>4.82</td>
</tr>
<tr>
<td>38</td>
<td>Other textile products</td>
<td>5.79</td>
</tr>
<tr>
<td>45</td>
<td>Furniture &amp; mattresses</td>
<td>3.03</td>
</tr>
<tr>
<td>49</td>
<td>Publishing &amp; printing</td>
<td>2.47</td>
</tr>
<tr>
<td>50</td>
<td>Paper stationary etc.</td>
<td>3.75</td>
</tr>
<tr>
<td>60</td>
<td>Clay products &amp; refractories</td>
<td>3.20</td>
</tr>
<tr>
<td>62</td>
<td>Ready mixed concrete</td>
<td>2.15</td>
</tr>
<tr>
<td>63</td>
<td>Concrete products</td>
<td>2.14</td>
</tr>
<tr>
<td>67</td>
<td>Structural metal products</td>
<td>2.01</td>
</tr>
<tr>
<td>69</td>
<td>Other metal products</td>
<td>3.88</td>
</tr>
<tr>
<td>70</td>
<td>Motor vehicles &amp; parts &amp; transp. equip. n.e.c.</td>
<td>3.01</td>
</tr>
<tr>
<td>74</td>
<td>Photographic, professional &amp; scientific equip.</td>
<td>3.49</td>
</tr>
<tr>
<td>75</td>
<td>Electronic equipment</td>
<td>3.51</td>
</tr>
<tr>
<td>76</td>
<td>Refrigerators, h/home appl. &amp; water heaters</td>
<td>5.70</td>
</tr>
<tr>
<td>82</td>
<td>Rubber products</td>
<td>4.77</td>
</tr>
<tr>
<td>84</td>
<td>Signs &amp; advertising</td>
<td>6.37</td>
</tr>
<tr>
<td>87</td>
<td>Gas</td>
<td>4.36</td>
</tr>
<tr>
<td>88</td>
<td>Water, sewerage, drainage</td>
<td>3.16</td>
</tr>
<tr>
<td>90</td>
<td>Other construction</td>
<td>2.70</td>
</tr>
<tr>
<td>92</td>
<td>Retail trade</td>
<td>4.17</td>
</tr>
<tr>
<td>93</td>
<td>Mechanical repairs</td>
<td>3.91</td>
</tr>
<tr>
<td>94</td>
<td>Other repairs</td>
<td>2.73</td>
</tr>
<tr>
<td>95</td>
<td>Road transport</td>
<td>8.92</td>
</tr>
<tr>
<td>99</td>
<td>Communication</td>
<td>4.04</td>
</tr>
<tr>
<td>100</td>
<td>Banking</td>
<td>2.64</td>
</tr>
<tr>
<td>101</td>
<td>Non-bank finance</td>
<td>5.33</td>
</tr>
<tr>
<td>102</td>
<td>Investment &amp; services to investment &amp; finance</td>
<td>4.22</td>
</tr>
<tr>
<td>104</td>
<td>Other business services</td>
<td>5.20</td>
</tr>
<tr>
<td>110</td>
<td>Welfare services</td>
<td>3.17</td>
</tr>
<tr>
<td>111</td>
<td>Entertainment &amp; recreation services</td>
<td>31.69</td>
</tr>
<tr>
<td>112</td>
<td>Restaurants, hotels &amp; clubs</td>
<td>30.03</td>
</tr>
</tbody>
</table>

| **Losers:**                      |                                               |                    |
| 15        | Nonferrous metal ores                        | -0.37              |
| 19        | Services to mining                           | -0.99              |
| 66        | Basic nonferrous metals & products           | -1.06              |
2.4. Tourism in Stage Three: Present and Potential Uses

The former Gimbat and Goodparla pastoral leases now incorporated into Stage 3 of Kakadu National Park have long been recognised as an area of considerable ecological significance and tourism potential, possessing some characteristics which are not present in the rest of the Park. Apart from Gunlom (UDP/Waterfall Creek Falls), however, no tourist foci have yet been developed in Stage 3 to rival the attractions of Ubirr, Nourlangie and Yellow Waters. Much of the Upper South Alligator River valley and its immediate surrounds have been effectively closed to visitors for most of the past three-and-a-half decades. Mining and pastoral uses have altered the landscape and ecology and detracted to some extent from the value of the region’s natural endowment. At the same time, tourism ‘underdevelopment’ resulting from the presence of such land uses and the rugged nature of the terrain itself have given the Gimbat area a remoteness attractive to visitors. It is a part of Kakadu thought by some as most suitable for low density tourism and recreation, concentrating on a wilderness experience for walkers and others who wish to get away from the more developed parts of the Park.

2.4.1 The asset base

There is general agreement among observers from a variety of backgrounds that the incorporation of Stage 3 into Kakadu National Park broadened the natural and cultural asset base on the Park in a major way. Sixty per cent of the area ‘comprises land systems which are not in or are poorly represented’ in the Park, and which in turn support a distinctive fauna and flora (ANPWS 1990). The convergence, between Gunlom and Coronation Hill, of the Arnhem Land plateau with the Marrawal plateau is especially important for its number of rare or notable species (such as the Hooded Parrot, the Gouldian Finch, the Red Goshawk, Calaby’s Mouse, and the Kakadu Dunnart), and for its high number of species. The rocky landscape is relatively open, and the Arnhem Land escarpment is much closer to the South Alligator River valley road than it is to the main highways in Stages 1 and 2, providing commensurately superior scenic driving and walking opportunities. Koolpin Creek and Gorge constitute a major, though ecologically fragile, natural attraction. Additionally and importantly, ‘the valley of Coronation Hill [Upper South Alligator River valley] feeds the World Heritage wetlands that are universally regarded as truly irreplaceable’ (Bushnell 1988, 78).

Stage 3 is also of great cultural importance. According to Brockwell and Cane (1987), the area ‘contains some of the most significant rock art within Australia, if not the world... sites are numerous, rich, diverse and very old’. Thylacine paintings there are ‘the best preserved examples so far located in Kakadu’. Many paintings are in the vicinity of Coronation Hill (Eyre 1988). Not surprisingly, there are also archaeological sites of scientific interest - and of cultural importance to the Jawoyn people who claim ownership of the land.

In the words of an interviewee with experience of mining and tourism in Kakadu, Stage 3 is a ‘magic area’ (Reid G, pers comm, 12 July 1990). It is an assessment with which many would agree (without necessarily agreeing over what would constitute appropriate use). Chaloupka wrote in 1981 that ‘The area of the Gimbat Station is of exceptional scenic, cultural and recreational value’ (Chaloupka 1981, 20). The then Chief Minister of the Northern Territory noted in 1984 that Gimbat-Goodparla ‘have a high potential for tourism and recreation’ (Weekend Australian, 26-27 May 1984). It could be added that the relative absence of mosquitoes and saltwater crocodiles is another noteworthy feature of Stage 3 that is likely to enhance public enjoyment of environmental resources. Indeed, the chance to swim at Gunlom has been a major attraction of Stage 3 for some time.
2.4.2 Tourism activities and usage

In the days of the pastoral leaseholds, Gunlom (or UDP Falls as it was known) and Koolpin Gorge were used for recreational purposes by Territorians and others, though access to the Gorge was restricted by the lessee and by the rough nature of the track. Between 1982 and 1987, an average of 20.4 per cent of visitors to Kakadu visited Gunlom, with absolute numbers increasing from 10,300 in the first year of the period to 31,700 in the last. During that same period, an average 11.4 per cent of private overnight visitors to Kakadu camped at Gunlom for a night or two. In 1987, some 17,400 people did this (calculations from ANPWS data in Preece 1989).

Comprehensive, continuous data on visitation since declaration of Stage 3 are not yet available. But visitation to Kakadu in general has increased since that time; Gunlom remains the only escarpment waterfall accessible by two wheel drive vehicles during the dry season; a fourth Park campground with an ablutions block has been established there; and a picnic area with free gas barbecues near the rock pool is now available. For these reasons growth in usage is to be expected: 14,200 people paid campground fees at Gunlom in the period June 1989 to June 1990; and informed opinion at Park Headquarters is that day usage during that year had accelerated to be in the order of three to four times overnight usage, suggesting total visitor numbers were approaching 50,000. This would be consistent with the past percentage of Kakadu visitors going to Gunlom, and is regarded as conservative by Park management.

Koolpin Gorge has also been the scene of increased visitation since incorporation into Kakadu opened it up for day use and controlled overnight camping (involving an in-principle limit of 30 people per night). A four wheel drive vehicle is still needed to get to the site; but it should be remembered that in 1982-88 an average 36 per cent of private visitors to Kakadu came in such vehicles, so that rough tracks do not constitute the obstacle that some presume (Preece 1989, 7). The sheer weight of numbers and the transport revolution tend to press on environmental resources in Stage 3 as they do elsewhere.

Tourism and recreational use of the Conservation Zone itself has been limited, not least because the major attractions of Stage 3 are upwards of 10 km away. However, the valley and escarpment in the immediate vicinity of the Hill are scenically attractive, and offer wilderness bushwalking and wildlife viewing opportunities that have been grasped by Territorians and tourists alike. Organisations such as the Darwin Bushwalkers' Club and the NT Field Naturalists' Club utilise the area; as does Willis' Walkabouts, which takes bushwalkers, mostly from interstate, through the Fisher Creek, Coronation Creek and Dinner Creek area. Ninety per cent of Odyssey Safaris' business is in Stage 3 in the Koolpin area, and both the access road and Koolpin run through the Zone. More generally, adventure tour operators like Dial-A-Safari and Terra Safaris rely heavily on access to the relatively uncongested Stage 3 area in order to provide a wilderness experience (subjectively defined) for their clients.

Thus it is not the Conservation Zone as such that is likely to be a tourist focus. It is rather that the Zone's strategic location impinges on the natural or wilderness value of nearby attractions and to that extent on tourism potential. This raises the contentious issue of the type of tourism development appropriate to Stage 3.

2.4.3 Tourism potential: industry views and assessments

It is fair to say that there is general agreement that the tourism asset base of Stage 3 is substantial and, within the overall Park context, distinctive. What is under debate is the kind of tourism development that should be permitted. This involves different judgments
on the relative importance of the Park's role in preserving natural and cultural resources, on the one hand, and permitting public enjoyment of the same resources, on the other; and it also involves different assessments of the nature of the development versus preservation trade-off. At least three broad viewpoints can be discerned from a review of interviews with people having commercial interests in Kakadu (see Appendix 3).

One view is that preservation ought to be the primary goal and that only environmentally benign tourism should be permitted, so that natural and cultural assets are available to future generations in an essentially unchanged form. Proponents of this view advocate minimum development with Stage 3 designated a wilderness area. This would mean no sealing of roads, and thus reversal of the decision to seal the Kakadu highway; no construction of accommodation and other facilities; and a commitment to allowing only lightweight camping and minimal impact bushwalking which would be sensitive to the fact that the 'wilderness' has been inhabited by Aboriginal people, and that in consequence some sites would be out of bounds or only accessible with approval and assistance from Aboriginal guides. These are the preferences of small, locally-owned operations like Odyssey Safaris, Territory Photosport and Willis' Walkabouts that seek places which, in the words of an Odyssey director, are not 'overrun by coaches' and do not resemble a 'termite mound with the top kicked off' (Crummy M, pers comm, 13 August 1990). The preferences are shared and publicly expressed by the Environment Centre, NT, amongst others.

The opposite view is advanced by hoteliers and large tour and coach companies who wish to see Stage 3 developed for much more intensive tourism use. This development-oriented perspective is generally in favour of multiple land use in the Conservation Zone area, improved vehicular access and construction of accommodation facilities within or perhaps just outside Stage 3. Indeed, mining is favoured precisely because it is expected to accelerate infrastructure development, though there is concern that any resource extraction is done without causing irreparable environmental damage. The general manager of Australian Frontier Holidays, for example, sees Stage 3 as an area which requires the construction of an 'all weather' road to 'release' its full potential (Reid G, pers comm, 12 July 1990). Such roads are regarded as crucial by tour companies trying to encourage year-round Park usage. As a parallel development several respondents raised the importance of improving the Jabiru airstrip to permit jet traffic and the upgrading of the Fisher strip just outside the Conservation Zone. Although such improvements in access would facilitate the movement of greater numbers of tourists to and within the Park, it is obvious that they can also be judged as incompatible with low density visitor use in the Upper South Alligator valley.

The desirability of providing overnight accommodation in the Conservation Zone and Stage 3 was foreshadowed by ANPWS in their indicative plans of 1983 (ANPWS 1983) and is still under consideration in the revisions to the plan of management currently under preparation. Submissions to the revised plan of management have supported this idea, as well as the possibility of a hotel or lodge of some kind at Sleisbeck. There is no indication, however, that Aboriginal opinions have been taken into account in this last suggestion, given the wide publicity about the presence of a large sacred site in the upper reaches of the South Alligator. In summary it seems that there is a school of thought which would like to see multiple use of the Conservation Zone and environs as a means of diversifying visitor drawcards in Stage 3. To limit the use of this part of the Park to low density forms of tourism and recreation is thus considered to be a deliberate under-use of the assets available.

There is also what might be termed an 'intermediate position' among the commercial users of the Park and some other bodies which supports limited tourist development as a compromise between strict preservation and intensive development. This viewpoint does not necessarily embrace mining as a land use, but sees merit in the partial sealing of some
access roads in the Upper South Alligator River valley and provision of 'appropriate' accommodation for bushwalkers, bird watchers and the like. The NT Dept of Industrial Development, for example, would like to see a wilderness lodge in Stage 3 which is 'small, discrete, in harmony with nature' and perhaps constructed on privately subleased land near the Conservation Zone (O'Sullivan R, pers comm, 9 August 1990). Specific possibilities mentioned were a safari lodge at Koolpin, four wheel drive opportunities in the Sleisbeck area and eventually a motel at El Sherana.

It should be remembered that commercial use of Kakadu currently comprises a mix of a few large and numerous small tour operators. By their nature such operations will seek to maximise those activities which they do best and where they reap the highest returns. Development and maintenance of Park infrastructure will always be necessary, but there comes a point where improvements are such that the comparative advantage of small operations specialising in limited access trips will be lost to the big companies. Industry viewpoints are thus a mix of close knowledge of the Park and its attractions as well as vested self interest.

2.4.4 Regional economic impact of alternative development plans

When faced with assessing the alternative tourism development scenarios discussed in section 2.4.3 solely in terms of their regional economic impact, it is a foregone conclusion that a capital-intensive development strategy will have the greatest effects. This follows for two reasons. First, greater numbers of tourists will come if roads are sealed and accommodation and other tourist facilities are available; and on average they will spend more per head on services, accommodation, food and beverages than visitors under the other development scenarios. Therefore the absolute level of tourist expenditure will be larger and the regional multiplier effect will be greater. As the ORANI-NT results showed, the overall impact on the NT economy will be small, though tour operators and other businesses will benefit, as will Aboriginal artefact makers.

The second, and more important, reason why the regional economic impact will be greatest in the intensive development case is that this will involve large capital works; and as Simulation D's results in 2.3.2 show, such activities cause a significant expansion of the NT economy. In the original indicative plans advanced by the Federal Government in 1983, a hotel, road, airfield and water supply development was proposed at El Sherana, and a road and campground were suggested for Coronation Hill. Planned investment in these areas totalled $17.7m, with an additional $21.55m for other areas of Stage 3 (ANPWS 1983). Fifty million dollars, for argument's sake, would represent about 15 per cent of public capital works planned for the Territory in 1990-91. Supposing new construction work equal to just one per cent of total NT private and public capital expenditure occurred in Kakadu, which is to say that ORANI industry No.90 experiences a one per cent shock, real gross NT product is likely to increase by 0.12 per cent, and employment by 0.14 per cent (these figures being one-tenth of the relevant figures in Table 8).

It should be stressed that the foregoing comments should not be interpreted as a recommendation that the intensive tourist development strategy is to be preferred over the others. As noted in chapter one, the total economic value of Kakadu (and the Stage 3 and Conservation Zone subsets) consists of not just actual use value, but also option and existence values; and a cost-benefit analysis would need to take these into account. Regional economic impacts are strictly to be treated as income transfers unless the region concerned has substantial and ongoing unemployment of labour. Moreover, the intensive development alternative may have large environmental impacts and involve burdens on government finances that the minimum development option avoids. It has been the case in national parks in other parts of the world that in order to protect natural resources from
exploitation by miners or loggers, tourism has been accepted as an alternative commercial use on the incorrect assumption that it is environmentally benign.

Finally, in response to the view that wilderness designation of an area in Kakadu would exclude too many people, including the aged and immobile, and that its negligible economic impact would be matched by use by an elite, consideration must be given to the counter-argument that the majority already have access in many places to the recreation park experience, but that the wilderness frontier is ever retreating.
CHAPTER 3
THE POTENTIAL REGIONAL ECONOMIC IMPACT OF MINING

This chapter analyses the impact of the possible mining of Coronation Hill on the NT economy and in so doing provides data that could be used in a comprehensive project appraisal. A brief account of the project proposal is followed by a presentation of results for three ORANI-NT simulations and then by a discussion of the conceivable implications of mining for NT government finances and for Aboriginal economic interests. The main conclusions are that the increase in real gross NT product is likely to be less than the project's proponents contend; that the employment effects might be larger than the proponents suggest; that a small increase in total NT government revenue would be generated; and that although Aboriginal entitlements under NT land rights legislation to payments from any mining have not been determined, such payments represent a potentially significant source of income to a population which spends and invests a relatively high proportion of income locally.

3.1 The Mining Proposal

The area around Coronation Hill and the Upper South Alligator River has been subject to mining activity over many years. Extraction of uranium oxide in the 1950s and early 1960s has resulted in seven open cuts, over 2,600 drill holes, 5,000m of underground workings, over 300 km of roads, and many passages from the surface to underground workings (Dames & Moore 1988, 1-2). Exploration for further uranium deposits continued in the 1970s without success; but in 1984 the Coronation Hill Joint Venture (CHJV) began searching for gold, which had originally been discovered at the hill in 1956, and mined, by United Uranium NL. Quite promptly gold, platinum and palladium were discovered independent of the extracted uranium deposit on the eastern side of the hill, and although in 1985 large areas of the Upper South Alligator River valley (totalling 264 km² and including Coronation Hill) were declared sacred sites, permission was given by the Aboriginal Sacred Sites Protection Authority for exploration to continue in 1986. On 16 December 1986 the Commonwealth Government stated that the Coronation Hill project would be allowed to proceed if it met the environmental, Aboriginal, heritage and related standards set by the Government. However, in October 1989 a decision on the CHJV proposal was deferred pending completion of a comprehensive inquiry by the Resource Assessment Commission (RAC 1990, 1).

The precise nature of the mining project proposal has varied over time. In particular, differences exist in the proposal as between the CHJVs' draft and final environmental impact statements (Dames & Moore 1988; Dames & Moore 1989), their submission to the RAC inquiry (CHJV 1990), and the submission to the inquiry by the Australian Bureau of Agricultural and Resource Economics (ABARE 1990). The ABARE description is the most recent and was developed with the aid of the CHJV. For these reasons, its data were used in the simulations conducted for this study, supplemented where appropriate by CHJV data not provided by ABARE.

The following is a list of characteristics and benefits of the mine as claimed by the CHJV (Dames & Moore 1988 and CHJV 1990):
The Coronation Hill deposit contains approximately 1.2 million ounces of gold. Initial annual production levels would be 1,500 kg of gold, 29 kg of platinum and 262 kg of palladium.

The life of the mine is approximately 9 years with the possibility that it could be extended to at least 20 years. In the initial nine years, mining would at first be by open pit, followed by underground work.

Construction and establishment costs would be approximately $45m in 1990 values (or $30m in 1988 values). Approximately 150 persons would be employed at this stage. Underground mining would cost another $20m in development. About 70 per cent of construction costs would be spent in Australia, and about 80 per cent of that would be spent in the NT. The CHJVs have already spent $13m on exploration and planning. The ore would be processed on site.

Depending on export prices and production levels, annual export earnings would be $27-65m (in 1988 values). An export value of $65m would generate another $46m of activity elsewhere in the economy (Dames & Moore 1988, 25). In CHJV (1990), it is estimated that the mine would generate gold exports of $500m over the forecast minimum mine life. This is about $55.5m per annum. Platinum and palladium are unlikely to be exported. CHJVs do not give estimates of the likely value of production for these minerals (though ABARE does).

The permanent workforce would be 150 persons; some 50 to 60 Aborigines could be trained. The workforce would be housed 3.5 km to the north-west of Coronation Hill.

Flow-on effects would create another 200 jobs elsewhere in the NT, giving a total of 350 jobs.

Tax and royalty benefits would accrue to the Commonwealth and NT Governments.

The structure of CHJV is:
BHP Gold Mines Limited (BHP Gold) (project manager) 45%
Plutonic Resources Ltd 45%
Norgold Ltd (wholly owned subsidiary of North Broken Hill Peko Ltd) 10%

The ABARE (1990) study was mainly concerned with calculating the net present value (NPV) of the mine to Australia overall (excluding a range of environmental effects) and to the CHJVs. It concluded that the NPV for Australia was $82m and the NPV for the CHJV was $28m, both in 1991 values. The difference between these is explained by the fact that the CHJVs will be required to pay taxes and royalties, and that a higher (nominal) rate of discount was used for the CHJVs (16.42 per cent) than for Australia overall (13 per cent).

As part of the NPV study, and of considerable usefulness for the purposes of examining regional economic impacts, ABARE produced cash flows for the mine over a projected life of 13 years, values being given in nominal terms on the assumption of a five per cent inflation rate (ABARE 1990, 40, 49). Expressed in constant 1991 prices, the revenues from a Coronation Hill mine vary from year to year, with the lowest revenue of $22.4m occurring in 1993 (the second year of operation), and the highest revenue of $60.6m occurring in 1997. Revenue then trends downwards until the last year of 2003 when it is
$29.5m. The nominal construction costs for the mine (excluding working capital) are $36.5m in 1992, zero in 1993, $30m in 1994, $25m in 1995 and zero thereafter. Deflating these figures for a five per cent inflation rate, construction costs are at a maximum in constant 1991 prices in 1992, when they are $34.7m.

3.2 ORANI-NT Simulations

In order to obtain the NT-wide effects of the construction of the Coronation Hill mine and of its anticipated production of gold, platinum and palladium, three simulations were run. Simulations A and B examined the impacts of the above-mentioned low ($22.4m) and high ($60.6m) revenue figures respectively, and simulation C examined the impact of the high value of construction ($34.7m).

Simulations A and B involved shocking the international export volumes and interstate export volumes for the Non-Ferrous Metal Ores industry, which in ORANI-NT notation meant shocking variables x4.1 and x4.2 for industry No.15. Volumes could be used to represent values on the basis of the following argument:

If $P$ is price and $X$ is volume, then the differential, $d$, is

$$d(PX) = X.dP + P.dX$$

and

$$d(PX)/PX = X.dP/PX + P.dX/PX$$

For a simulation in which the price is not shocked and therefore $dP = 0$,

$$d(PX)/PX = dX/X.$$  

That is, in the case when the price is not shocked along with the volumes, the percentage change in the value of output is the same as the percentage change in the volume of output.

Simulation C involved shocking the output of the Other Construction industry, which in ORANI-NT notation meant shocking the variable b8 for industry No.90 (as was done in the simulations in chapter two).

For the purpose of calculating the shocks, 1987-88 values were used because this was the most recent year for which reliable data on non-ferrous metal ores output were available. The Darwin Consumer Price Index was used to deflate the 1991 values given above, with the result that the high value of revenue was $51.245m, the low value of revenue was $18.942m, and the maximum value of construction was $29.380m. The denominator in the calculation of shocks for mine outputs is the 1987-88 value of exports from the NT of the Non-Ferrous Metal Ores industry. Calculating this necessitated determining the total output of the industry in that year and using an estimate of the proportion of the output exported. On the basis of data in the 1987-88 NT input-output table (McDonald 1990) and advice from the NT Department of Mines and Energy, the former figure was determined to be $1 004.004m. (Contrary to the ASIC classification rules, uranium is in the Other Minerals sector of the input-output table when it should be in Non-Ferrous Metal Ores). Data in McDonald (1990) revealed that 83.38 per cent of production was exported, so that the 1987-88 level of exports for the industry was $837.14m. The 1987-88 output of the Other Construction industry was $277.902m (McDonald 1990).
The three simulations therefore involved administering the following shocks:

**Simulation A:** This examined the impact of the estimated low level of mining of $18.942m. The percentage change in exports of Non-Ferrous Metal Ores was 2.26 per cent (18.942/837.14), and was applied to the ORANI-NT variables x4.1:15 and x4.2:15.

**Simulation B:** This was the same as Simulation A excepting that the estimated high level of exports of $51.245m was used. This resulted in the shock being 6.12 per cent (51.245/837.14).

**Simulation C:** This simulation examined the impact of construction costs equal to $29.380m in 1987-88 values. The variable b8:90 was shocked by 10.57 per cent (29.380/277.902).

Abbreviated statements of the results of the simulations are presented in Tables 10 to 12.

Table 10 shows the macroeconomic results. ORANI-NT variables are in percentage change form but, to aid their interpretation, some of the results have also been presented in absolute values. In particular, the changes in real NT GDP at factor cost are also provided in millions of dollars at 1987-88 prices and at June 1991 prices. These were obtained by applying the relevant percentages to the Australian Bureau of Statistics estimate of the 1987-88 NT GDP of $2 920m (ABS 1990b, 18), to give the changes in 1987-88 values, and then these were indexed up to give values as at June 1991. Actual ABS CPI values for Darwin were used to take the values from December 1987 to June 1990, and then five per cent inflation was assumed to convert the numbers to June 1991 values.

The implications of the various shocks for employment are also provided in terms of the number of people employed. These figures were obtained by applying the relevant percentage change in employment to 74 000, which is representative of the number of people employed in the NT in recent years. Finally, GDP multipliers have also been provided. These were derived by dividing the resultant increase in real NT GDP in 1987-88 values by the initial shock in expenditure.

**Simulation A** examines the case of the low output estimate of $18.942m. As can be seen from the table, real GDP will grow by about $13.72m in 1987-88 values, which is less than the value of initial expenditure. This is also reflected in the value of the multiplier, which is less than one. The reason for this is, of course, that much of the materials and services used in mining are imported directly from outside the NT. Further, the NT economy is very open, so that a large proportion of all extra goods and services which are demanded as a result of overall expansion are imported.

It can also be seen that the combined value of exports to the rest of Australia (ROA) and the rest of the world (ROW) will grow (because of increased exports of Non-Ferrous Metal Ores); and that imports will also grow because of increased imports of goods and services to be used directly for the mine, because of the expansion of the NT economy overall and because of domestic inflation. The net result of these combined changes is that the NT balance of trade against the ROA and ROW combined is improved slightly.

The growth in direct and indirect employment, combined, will be about 222 jobs. This is somewhat less than the CHJVs' estimate of 350 jobs mentioned in section 3.1. (ORANI-NT_1 generates a number of 612.)
Table 10
Simulation Results: Some Macroeconomic Variables
% Change

<table>
<thead>
<tr>
<th>Variables</th>
<th>A</th>
<th>Simulations</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NT Domestic:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Real NT GDP - %</td>
<td>0.47</td>
<td>1.27</td>
<td>1.28</td>
</tr>
<tr>
<td>- increase in 1987-88 values</td>
<td>$13.72m</td>
<td>$37.08m</td>
<td>$37.38m</td>
</tr>
<tr>
<td>- increase in June 1991 value</td>
<td>$16.22m</td>
<td>$43.85m</td>
<td>$44.20m</td>
</tr>
<tr>
<td>Real disposable income</td>
<td>0.44</td>
<td>1.18</td>
<td>1.14</td>
</tr>
<tr>
<td>Real investment</td>
<td>0.44</td>
<td>1.18</td>
<td>1.14</td>
</tr>
<tr>
<td>Real consumption</td>
<td>0.44</td>
<td>1.18</td>
<td>1.14</td>
</tr>
<tr>
<td>CPI</td>
<td>0.19</td>
<td>0.51</td>
<td>0.55</td>
</tr>
<tr>
<td>Employment - %</td>
<td>0.30</td>
<td>0.83</td>
<td>1.52</td>
</tr>
<tr>
<td>- employment number</td>
<td>222.00</td>
<td>614.00</td>
<td>1,125.00</td>
</tr>
</tbody>
</table>

| **NT Trade:**                   |       |             |       |
| Export revenue                   | 0.57  | 1.55        | -0.24 |
| Import bill                      | 0.30  | 0.82        | 1.59  |
| Balance of trade                 | 0.0004| 0.0010      | -0.0160 |
| *Calculated GDP Multipliers:*    | 0.724 | 0.724       | 1.272 |

*Simulation* B examines the case of the high output estimate of $51.245m. All of the remarks made in relation to simulation A above can also be made here, expecting that the numbers are different. It should be noted that most of the results of the simulations A and B stand in a given proportion to each other. The proportion is approximately 2.71. That is, the numbers in column B are 2.71 times the corresponding values in column A. The reason for this is that the shock in Simulation B is 2.71 times the shock in simulation A, and ORANI-NT results are linear in percentage changes. The multipliers are different. The reason is that these measure the relationships between absolute values.

Notice that even the higher estimate of the growth in GDP obtained in this simulation (of $37.08m) is substantially less than the CHJVs' estimate of $111m (see section 3.1 above). On the other hand, ORANI-NT_2 predicts that employment would grow by 614, which is substantially more than that predicted by the CHJVs. (The figure for ORANI-NT_1 is 1 658.)
Simulation C examines the impact of the construction phase of the mine on the NT economy. As can be seen, the expenditure of a relatively small amount on construction results in a substantial impact. The reason is, of course, that construction has much stronger backward linkages in the NT economy than does the production and export of minerals. The multiplier of 1.272 attests to this.

Unlike the output shocks, construction does not involve the production of exports. These, in fact, are reduced because of expenditure switching and because of increased inflation. Imports are increased, both directly in the form of construction materials for the mine, and indirectly because of expansion of the NT economy. The NT balance of trade thus declines.

Employment is expected to grow by 1 125 jobs. This is very large, especially considering that the CHJV's expect to employ only 150 persons during construction. (The figure is even larger if ORANI-NT_1 is used: employment grows by 1 983.)

Tables 11 and 12 present microeconomic results that permit an examination of the impact of the mine's potential output and construction on the structure of industry. For simulations B and C, only those industries whose percentage change in production level (the 'z' value) is greater than one half have been included. In ORANI-NT simulations, such changes in the levels of industry outputs typically arise because of a number of specific factors. First, direct consequences of a shock occur because of forward or backward linkages. Second, changes in aggregate income lead to variation in consumers' demand for goods and services. Third, changes in the overall price level affect industries differentially, export industries being especially sensitive to overall price changes if they flow through to wages (which they do in the closure used for our simulations). Fourth, changes in the effective exchange rate - which is the combined effect of the domestic and foreign price levels, and the nominal exchange rate - affect economic structure. (In the simulations presented here, the nominal exchange rate was held constant, so that provided foreign prices are constant, a percentage rise in the price level has the same effect as the same percentage appreciation of the nominal exchange rate). Finally, an industry can be crowded out, that is, it may be forced to contract because of increasing costs which have been caused by the expansion of another industry or industries but which cannot be passed on. The particular case where an export industry expands, causing revaluation, inflation and increases in particular costs, thus disadvantaging other industries, is called the Gregory Effect. This is a common response in ORANI-NT simulations.

Table 11 shows that the industries which most benefit by the mine's production are those with strong backward and forward linkages. In descending order, they are Services to Mining, Rail and Other Transport, Mechanical Repairs, and Other Repairs. Then comes a range of industries who benefit largely because of the expansion of the NT economy overall. They include Investment and Services, Restaurants and Hotels, and Electricity. Other Basic Metals, and its dependent, Other Machinery and Plant, are crowded out (though one may have doubts about the strength of this effect because much of the materials and labour required for the mine will be imported).

Table 12 shows, again, that industries with strong linkages with the shocked industry benefit the most. These include Ready Mixed Concrete, Concrete Products, Structural Metal Goods, Other Minerals, Non-Metallic Ore Goods, and Other Metal Products. Then there is a large number of industries which benefit because of the expansion of the NT economy overall. Again, the Other Basic Metals industry is crowded out to some extent.
Table 11
Mining Output Simulations: Industry Outputs

<table>
<thead>
<tr>
<th>ORANI No.</th>
<th>Industry</th>
<th>% Change in Output</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>sim A</td>
</tr>
<tr>
<td><strong>Gainers</strong>:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Non-ferrous metal ores</td>
<td>1.48</td>
</tr>
<tr>
<td>18</td>
<td>Other minerals</td>
<td>0.22</td>
</tr>
<tr>
<td>19</td>
<td>Services to mining</td>
<td>1.40</td>
</tr>
<tr>
<td>28</td>
<td>Soft drinks and cordials</td>
<td>0.20</td>
</tr>
<tr>
<td>29</td>
<td>Beer and malt</td>
<td>0.28</td>
</tr>
<tr>
<td>38</td>
<td>Other textile products</td>
<td>0.35</td>
</tr>
<tr>
<td>45</td>
<td>Furniture and mattresses</td>
<td>0.36</td>
</tr>
<tr>
<td>60</td>
<td>Clay products, refacts</td>
<td>0.31</td>
</tr>
<tr>
<td>61</td>
<td>Cement</td>
<td>0.20</td>
</tr>
<tr>
<td>62</td>
<td>Ready mixed concrete</td>
<td>0.25</td>
</tr>
<tr>
<td>63</td>
<td>Concrete products</td>
<td>0.25</td>
</tr>
<tr>
<td>75</td>
<td>Electronic equipment</td>
<td>0.35</td>
</tr>
<tr>
<td>86</td>
<td>Electricity</td>
<td>0.40</td>
</tr>
<tr>
<td>87</td>
<td>Gas</td>
<td>0.30</td>
</tr>
<tr>
<td>90</td>
<td>Other construction</td>
<td>0.34</td>
</tr>
<tr>
<td>92</td>
<td>Retail trade</td>
<td>0.32</td>
</tr>
<tr>
<td>93</td>
<td>Mechanical repairs</td>
<td>0.52</td>
</tr>
<tr>
<td>94</td>
<td>Other repairs</td>
<td>0.45</td>
</tr>
<tr>
<td>96</td>
<td>Rail and other transport</td>
<td>0.55</td>
</tr>
<tr>
<td>97</td>
<td>Water transport</td>
<td>0.21</td>
</tr>
<tr>
<td>98</td>
<td>Air transport</td>
<td>0.32</td>
</tr>
<tr>
<td>99</td>
<td>Communication</td>
<td>0.35</td>
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<tr>
<td>100</td>
<td>Banking</td>
<td>0.29</td>
</tr>
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<td>101</td>
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<td>Investment and services</td>
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<td>103</td>
<td>Insurance and services</td>
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<td>104</td>
<td>Other business services</td>
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<td>Welfare and religious</td>
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<td>Personal services</td>
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<td><strong>Losers</strong>:</td>
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<td></td>
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<tr>
<td>66</td>
<td>Other basic metals</td>
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</tr>
<tr>
<td>80</td>
<td>Other machinery &amp; plant</td>
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</tr>
<tr>
<td>ORANI No.</td>
<td>Industry</td>
<td>% Change in Output</td>
</tr>
<tr>
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<td>-----------------------------------------</td>
<td>--------------------</td>
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<tr>
<td>Gainers:</td>
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<td>18</td>
<td>Other minerals</td>
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<tr>
<td>22</td>
<td>Fruit and vegetables</td>
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</tr>
<tr>
<td>28</td>
<td>Soft drinks and cordials</td>
<td>0.64</td>
</tr>
<tr>
<td>29</td>
<td>Beer and malt</td>
<td>0.63</td>
</tr>
<tr>
<td>38</td>
<td>Other textile products</td>
<td>1.22</td>
</tr>
<tr>
<td>44</td>
<td>Joinery and wood n.e.c.</td>
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</tr>
<tr>
<td>45</td>
<td>Furniture and mattresses</td>
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</tr>
<tr>
<td>50</td>
<td>Commercial printing</td>
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</tr>
<tr>
<td>60</td>
<td>Clay products, refracts</td>
<td>1.91</td>
</tr>
<tr>
<td>61</td>
<td>Cement</td>
<td>5.56</td>
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<tr>
<td>62</td>
<td>Ready mixed concrete</td>
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<tr>
<td>63</td>
<td>Concrete products</td>
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<td>64</td>
<td>Non-metallic ore goods</td>
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<tr>
<td>65</td>
<td>Basic iron and steel</td>
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<tr>
<td>67</td>
<td>Structural metal goods</td>
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<td>68</td>
<td>Sheet metal products</td>
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<td>69</td>
<td>Other metal products</td>
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<tr>
<td>70</td>
<td>Motor vehicles and parts</td>
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<tr>
<td>74</td>
<td>Scientific equipment</td>
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<tr>
<td>75</td>
<td>Electronic equipment</td>
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</tr>
<tr>
<td>76</td>
<td>Household appliances</td>
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</tr>
<tr>
<td>77</td>
<td>Other electrical goods</td>
<td>1.69</td>
</tr>
<tr>
<td>80</td>
<td>Other machinery and plant</td>
<td>1.12</td>
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<tr>
<td>81</td>
<td>Leather goods</td>
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</tr>
<tr>
<td>82</td>
<td>Rubber products</td>
<td>1.09</td>
</tr>
<tr>
<td>83</td>
<td>Plastic products</td>
<td>3.04</td>
</tr>
<tr>
<td>84</td>
<td>Signs, writing gear</td>
<td>1.02</td>
</tr>
<tr>
<td>86</td>
<td>Electricity</td>
<td>1.00</td>
</tr>
<tr>
<td>87</td>
<td>Gas</td>
<td>1.47</td>
</tr>
<tr>
<td>88</td>
<td>Water, sewers and drains</td>
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</tr>
<tr>
<td>90</td>
<td>Other construction</td>
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</tr>
<tr>
<td>91</td>
<td>Wholesale trade</td>
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<td>92</td>
<td>Retail trade</td>
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</tr>
<tr>
<td>93</td>
<td>Mechanical repairs</td>
<td>1.54</td>
</tr>
<tr>
<td>94</td>
<td>Other repairs</td>
<td>1.44</td>
</tr>
<tr>
<td>95</td>
<td>Road transport</td>
<td>1.70</td>
</tr>
<tr>
<td>96</td>
<td>Rail and other transport</td>
<td>0.68</td>
</tr>
<tr>
<td>97</td>
<td>Water transport</td>
<td>0.70</td>
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<td>98</td>
<td>Air transport</td>
<td>0.91</td>
</tr>
<tr>
<td>99</td>
<td>Communication</td>
<td>1.09</td>
</tr>
<tr>
<td>100</td>
<td>Banking</td>
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<td>103</td>
<td>Insurance and services</td>
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<td>Entertainment, leisure</td>
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<td>112</td>
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</tr>
<tr>
<td>113</td>
<td>Personal services</td>
<td>0.87</td>
</tr>
<tr>
<td>Losers:</td>
<td>Other basic metals</td>
<td>-0.52</td>
</tr>
</tbody>
</table>
3.3 Implications for NT Government Finance and Aboriginal Interests

ORANI-NT models the NT government in some detail and the implications of the simulations for it are presented in Table 13. An outline of the way in which the components of NT government revenue is modelled is provided here as an aid to the interpretation of these results:

1. The percentage change in aggregate NT government revenue (v) is the weighted sum of the percentage changes in locally raised revenue and transfers from the Commonwealth Government. These transfers are exogenous.

2. The percentage change in locally raised revenue (v1) is the weighted sum of the changes in nine components of locally raised revenue (v11 to v19).

3. Stamp duty (v11) is assumed to be proportional to the gross value of outputs of industries.

4. Taxes on gambling (v12) are assumed to be proportional to the basic value of the outputs of the industries in which gambling occurs.

5. Liquor (v13) and tobacco taxes (v14) are assumed to be proportional to the basic value of total usage of alcohol and tobacco.

6. Payroll taxes (v15) are assumed to be proportional to each industry’s pre-tax wage bill.

7. Water and sewerage charges (v16) are equated to the revenue of the water and sewerage industry.

8. Mining royalties (v17) on each mineral are assumed to be proportional to the basic value of their outputs.

9. Health fees and charges (v18) are assumed to be proportional to the basic value of household consumption of health services.

10. Revenue from miscellaneous local sources (v19) is assumed to be proportional to nominal NT GDP.

11. Direct tax revenue (v1*) measures the direct tax revenue from the above revenue sources.

12. Commonwealth other direct tax revenue (v2*) is simply indexed to the NT CPI.

With some minor exceptions, these are reasonable assumptions to make. The NT government has continued to remain very dependent on the Commonwealth government. No doubt the relative importance of the sources of locally raised finance will have changed somewhat, but we are not able to say how this would affect the projections. One important change, of course, has been to mining royalties. The NT now has a profits-based mining tax and this is likely to have increased the relative importance of mining revenue for the NT government.

These qualifications must be borne in mind when interpreting the data in Table 13. It can be seen that mine production could increase locally raised NT government revenue by as much as 2.45 per cent (simulation B). Although this means only a small increase in total NT government revenue of 0.37 per cent, it is nevertheless important for a regional
government with a very small local tax base. Mining royalties are likely to increase substantially, and the stimulation to employment and income overall is likely to increase payroll taxes and other NT government taxes and charges.

Table 13
ORANI-NT Projections of Government Revenue (% Change)

<table>
<thead>
<tr>
<th>NT government:</th>
<th>Sim A</th>
<th>Sim B</th>
<th>Sim C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggregate revenue, v</td>
<td>0.13</td>
<td>0.37</td>
<td>0.21</td>
</tr>
<tr>
<td>Locally raised revenue, v1</td>
<td>0.90</td>
<td>2.45</td>
<td>1.43</td>
</tr>
<tr>
<td>Stamp duty, v11</td>
<td>0.46</td>
<td>1.24</td>
<td>1.90</td>
</tr>
<tr>
<td>Taxes on gambling, v12</td>
<td>0.33</td>
<td>0.90</td>
<td>0.97</td>
</tr>
<tr>
<td>Liquor taxes, v13</td>
<td>0.54</td>
<td>1.47</td>
<td>1.39</td>
</tr>
<tr>
<td>Tobacco taxes, v14</td>
<td>0.34</td>
<td>0.93</td>
<td>0.64</td>
</tr>
<tr>
<td>Payroll taxes, v15</td>
<td>1.77</td>
<td>4.81</td>
<td>0.66</td>
</tr>
<tr>
<td>Water and sewerage rev, v16</td>
<td>0.17</td>
<td>0.47</td>
<td>0.77</td>
</tr>
<tr>
<td>Mining royalties, v17</td>
<td>2.53</td>
<td>6.85</td>
<td>0.21</td>
</tr>
<tr>
<td>Health fees and charges, v18</td>
<td>0.84</td>
<td>2.28</td>
<td>2.27</td>
</tr>
<tr>
<td>Miscell. local revenue v19</td>
<td>0.66</td>
<td>1.78</td>
<td>1.82</td>
</tr>
</tbody>
</table>

Direct tax revenue, v1 *             | 0.66  | 1.78  | 1.82  |

Commonwealth government:
Comm other direct tax rev, v2 *      | 0.19  | 0.51  | 0.55  |

The construction phase of mine development will cause increases in NT government revenue, fairly evenly, from most sources. The obvious exception is mining royalties. These increase only slightly because construction leads to small decreases of less than one per cent in the outputs of some mining industries, probably because of inflation and some crowding out.

Mining royalties, as Peterson observes in his preface to Altman (1983, viii), 'are the single most important lever Aboriginal people in the Territory possess to determine their future political and socio-economic status'. Under the NT land rights legislation and prior agreements, Aborigines have gained royalties and various other payments from mining, many groups currently receiving royalties of four per cent and more. This is the only likely source of substantial incomes, apart from government transfers, for most Aboriginal communities which, moreover, spend and invest within the NT. Their incomes thus have relatively high local multipliers. And insasmuch as substantial royalty income is received and spent on housing, education and health, government resources allocated to such purposes can be redirected to more needy Aboriginal groups.
Of course the ORANI-NT model used in assessing the regional economic impact of the Coronation Hill mine does not consider the factors mentioned in the preceding paragraph; and the entitlements of Aborigines to payments from the mine, were it to go ahead, have not yet been determined. This only serves to underline the point made at the outset of this monograph, namely that a comprehensive project appraisal must go beyond even a complete cost-benefit analysis and an examination of regional economic benefits to encompass environmental, social and distributional impacts.
REFERENCES


APPENDIX 1
THE ECONOMIC AND FINANCIAL SIGNIFICANCE OF CURRENT AND
POTENTIAL RECREATION AND TOURISM IN KAKADU NATIONAL PARK
AND THE CONSERVATION ZONE: A LITERATURE REVIEW

1. Introduction

Although there are many papers and research findings on tourism in Kakadu National Park, there is little work directly concerned with the economic and financial sides of the industry. This appendix provides an overview of the tourism literature on Kakadu with a special focus on economic considerations in Kakadu and the Conservation Zone (CZ). The key findings are organised into four sections dealing with the evolution of tourism in the Park area since the 1950s, tourism economics in the Park, tourism and Aboriginal economic interests, and tourism and the natural environment. Each section includes separate consideration of Stage 3 and the CZ where there is some evidence of relevant research.

The most important sources of information are the evidence submitted to the Senate Inquiry into the potential of the Kakadu National Park region, 1985-87; public submissions concerning the Draft Environmental Impact Statement for the Coronation Hill Project, 1989; the plans of management for the Park prepared by the Australian National Parks and Wildlife Service (ANPWS), together with submissions sought on their revision; and extensive research into the impact of tourism on Aboriginal interests in the Park.

Submissions to various parliamentary, park management and environmental impact inquiries over the years reflect the opinions and aspirations of well defined interest groups in the future development of Kakadu National Park. Tourism's importance as a key land use places it at the centre of this debate and, at times, this serves to obscure objective assessment of its positive and negative features. Opinions have also changed over time as seen in the present Commonwealth government's acceptance of Jabiru as a mining and tourism centre and the extensive involvement of the Kakadu Aboriginal community in the tourist industry. Neither development was encouraged at the time of the Ranger Inquiry in the mid-1970s because mass tourism was considered incompatible with Aboriginal interests.

Today the scope of the same debate has enlarged to include the following identifiable and interlinked issues.

(a) An underlying questioning of the relative weights to be given to conservation or development (or both of these objectives) in a World Heritage national park. It is not just a question of mining versus tourism but the extent to which a unique and fragile area should be expected to accommodate development of any kind;

(b) The role and status of tourism and recreation in a multi-use World Heritage national park. Positions range from fundamental questioning of the role of tourism in maintaining park values, to acceptance of expansion of the industry under appropriate management plans;

(c) The interrelationship of tourism, recreation and mining as competing land uses. In many respects the arguments for and against these uses in the CZ and their impacts on each other reflect similar concerns raised fifteen years ago at the Ranger Inquiry;
(d) The extent to which the interests of Aboriginal landowners and other Park residents are served by the presence of the tourist industry. The circumstances of the CZ follow many similar concerns explored in the establishment of Stage One of the Park.

There are of course many other equally important questions about the future of Kakadu but most of those about tourism are subsumed by the four identified here. It is clear, for example, that consideration of tourism economics is governed by different positions taken about issue (b) above. To some, tourism is a park use and not a park purpose (Australian Conservation Foundation 1986); but for others it is a major objective of a national park to provide adequate facilities for enjoyment by the public, just as it is to conserve and protect the natural environment (National Parks and Wildlife Conservation Act 1975, Sub-section 11(8)).

2. Evolution of Tourism in the Park

The earliest small scale safari and hunting tourism in the region occurred in the 1950s and 1960s before the Park was proclaimed. Press reports describe a Darwin tour operator being confident of attracting 'at least 200 American hunters to Nourlangie [in 1962]...', and of shooting trophies which '... included a crocodile, pigs, kangaroos, wallabies and a buffalo ...' (Northern Territory News, 10 April 1962). After the sealing of the Arnhem Highway and bridging of the South Alligator river in the early 1970s, there is evidence of a great increase in visitor traffic and some damage to the natural environment and Aboriginal sites (Ryan 1975; Lea and Zehner 1986).

2.1 The growth in visitor numbers

Early estimates of visits to what is now the national park are sketchy but indicate that it was a popular recreation area for Top End residents. Evidence submitted to the Ranger Uranium Environmental Inquiry in 1975 (Ryan 1975; McIntosh 1975) suggests that uncontrolled tourist visits to the region were already of the order of 50,000 visitor days per annum '... there would have been over 1,000 tourists in the area that weekend. [with] The completion of the bitumen road these numbers would have probably doubled' (A. McIntosh, transcript of evidence, Darwin, 8 October 1975, 1553).

There is further evidence from the Ranger Inquiry transcripts that camp tour operators had been showing interest in developing facilities in the Kakadu region several years before the national park was proclaimed but nothing had been achieved apart from building the small motel at Cooinda. It was thought likely that the construction of the new regional town of Jabiru (based on uranium mining) would provide the stimulus for such private sector investment in tourism in the future (Ranger Uranium Environmental Inquiry, transcript of evidence, 21 May 1976, 9214). An appreciation of the great tourism potential of the region was understood years before the Ranger Inquiry was held and it was anticipated by government that there would be energetic promotion and considerable consequent development of the necessary infrastructure by the private sector. The feasibility study for the new regional centre (the early plans were for a town much larger than Jabiru) concluded that the annual number of visitors would increase to 708,000 by the early 1990s (Fox et al 1977, 209). It may thus be concluded there is evidence dating back to the early opening up of the area that tourism and recreation were always likely to be a primary use of land in the Kakadu region.

ANPWS data indicate that visitor numbers had actually increased to 220,000 by 1988, with 171,600 of these being private visitors (Preece 1989, 2). Much of this growth was achieved with little advertising throughout most of the 1980s because a lack of
accommodation in and around the Park was seen as a major constraint to tourism in the peak season. Visitor numbers could grow to 500,000 a year by the year 2000 (or double the current annual total), suggesting that present Park facilities will be strained and inadequate unless new facilities are provided. Official forecasts suggest that the Park will experience the following sort of increases in visitor numbers by the year 2000: NT visitors up by 10 per cent, interstate visitors up by 102 per cent and overseas visitors up by 164 per cent. Such growth rates will lead to a doubling of 1989 numbers by 1996 (Northern Territory Government 1990).

The average proportion of private to tour visitors of 5.5 to 1 (1982-1988) masks the fact that those using the tours have been increasing at twice the rate of private tourists since 1987 (Preece 1989). This increase in guided tours reflects the growing commercialisation of tourism in Kakadu and is in part responsible for an increase in demand for overnight accommodation from 5 per cent of total visitors in 1982 to 19 per cent in 1988. The September quarter is the peak period for interstate visitors and demand for accommodation will outstrip supply within the next five years (Northern Territory Government 1990). Such pressure will soon lead to a push for more facilities.

Evidence presented by the Northern Territory Tourist Commission to the 1986 Senate Inquiry states that visits to Kakadu are growing faster than to the other two key tourist foci at Uluru/Olgas and Nitmiluk/Katherine Gorge. Length of stay is also longer at Kakadu, averaging 4-5 days when compared to 1.5-2 days at the other attractions.

2.2 The incorporation of Stage Three

Access to new areas of the Park in Stage 3 is a logical and necessary development if the decision is made to allow visitor increases of the magnitude which these demand levels suggest are likely in the 1990s. The arguments for and against expansion of this kind are covered by Alman (1988) and Gillespie (1988), as are profiles of the type of tourists visiting the Park and their behaviour patterns. An important point which seems to have escaped most of the researchers who have noted the advantages of dispersing or decentralising tourism activities to Stage 3, is that this will not of itself lessen the extent of visitation to major Stage 1 attractions: 'Those who travel up the Stuart Highway, and reach UDP Falls on the Pine Creek Road, are hardly likely to turn around and return to Sydney without sampling the widely advertised fare of Stage 1' (Lawrence 1985, 112).

2.3 The Conservation Zone

There is very little hard data on tourism use of the CZ itself because the Upper South Alligator River Valley is in the newly proclaimed Stage 3 of the Park and has not yet become recognised as an important part of visitor itineraries. Considerable mining exploration activity has been conducted there since uranium mining ceased in the mid-1960s and much of the Zone itself has not been accessible to the public as a result of this, rough roads and restriction of access by pastoral lease holders. However, the main attraction near the CZ at Waterfall Creek Falls (Gunlom Falls) attracted 12.7 per cent of private overnight visitors to the Park and 21.7 per cent of private visitors, amounting to more than 30,000 people in 1987 (Preece 1989).

Unquantified observations suggest that certain kinds of recreation/tourism existed in Stage 3 before it was proclaimed, such as bushwalking and the hunting of feral animals. This was a response to the imposition of restrictions enforced by ANPWS in other parts of the Park (McLaughlin 1986). No specific assessment of visitor numbers to the CZ area or their behavioural characteristics appears to have been undertaken.
3. Economic Considerations Raised in the Literature

Although there is little direct research into the economic impact of Kakadu tourism on regional, Territory and national economies (the subject of chapter 2), there is general agreement that it is the key element sustaining the industry in the Top End (Northern Territory Tourist Commission 1988; Winter 1986). Tourism is second only to mining in the Northern Territory in terms of income generation by the private sector and is the fastest growing industry (Northern Territory Government 1986). A number of writers have pointed to the need for economic studies of tourism in the Park and CZ (Gillespie 1988; The Wilderness Society 1989) and only broad estimates have been made of the economic importance of the industry in the Park and possible negative impacts on it of mining activity. The economic literature on Kakadu tourism is very thin indeed and relies mainly on informed guesswork.

3.1 Investment in Kakadu tourism

Expenditure by ANPWS in the Park for the five years from 1982 to 1987 is reported by Gillespie (1988) to have amounted to over $25 million, made up of $4.57m on salaries, $6.81m on operational expenses and $14.6m capital spending. This represents only a proportion of government and private sector spending on infrastructure and services in the Park region which could be considered as of direct benefit to the tourist industry. Some idea of the level and public/private sector mix of hoped-for Park investment from 1983 to 1989 can be derived from the ANPWS (1983) indicative development plans. These suggest totals of $74.87m by government and $196.9m by the private sector. The Northern Territory government (1986, 1235) has complained these targets have not been met in reality, leading to a shortfall in essential visitor facilities.

An aspect of these investment plans which does not appear to have been considered in the literature is the public/private sector mix. It is difficult to understand how the private sector, other than local Aboriginal interests, would wish to be involved in the provision of tourism facilities without secure title to such investments. Even in Jabiru, uncertainties about the limited leasehold nature of land title has proved an obstacle to most types of private investor, as have been the obligations placed on new businesses to pay the town developers for a share in the use of basic infrastructure (Lea and Zehner 1986). The ANPWS (1983) plans indicate considerable investment for Stage 3 and the CZ (see below), much of which was expected from private sources. The point here is that likelihood of private tourism investment (other than Aboriginal) in Stage 3 is problematical.

3.2 Income from Kakadu tourism

Only two references place a direct monetary value on Kakadu tourism. One fails to explain how a figure of $15m p.a. was reached for '...the contribution which this park can make to long term economics in terms of development of tourism' (Ovington, 1986, 2249); and the other estimates that 'Kakadu is now a $100 million a year entity' (Eyre 1988, 34). Neither advances beyond rough guesswork.

The Wilderness Society (1989) suggests there are two major effects of mining (and other human land use disturbance) on recreational potential: a direct effect of discouraging recreational visits in the area because of intrusive mining activity, and an indirect effect of discouraging visits from those who may be put off by the knowledge that the natural heritage has been spoiled. Both effects are examined to give a preliminary quantification
of the economic impact of reduced tourism/recreation income arising out of the presence of mining in the CZ. According to the Society, assuming 'only a 10 per cent reduction in visitor numbers' would result in impacts costing as much as $6.75m per year in lost tourist trade. This is based on a visitor rate of 250,000 annually, with overseas visitor spending at an average of $500 per person and each domestic visitor spending $200 on domestic carriers and $200 while in the Kakadu region (The Wilderness Society and Australian Conservation Foundation 1989).

Such assessments require guesses about the cause-and-effect of mining discouraging tourism/recreation and the extent to which this affects the latter in the Park as a whole, as well as about tourist expenditure data which were not available. It is fair to assume, however, that obtrusive mining activity will have some effect on some classes of visitor to Stage 3 of the Park and could be seen to 'devalue' the natural worth of the Park as a whole in their eyes. The extent to which this effect is economically significant in Kakadu has yet to be adequately assessed and the use of a figure like 10 per cent for the reduction in visitor numbers to the Park could be exaggerated.

3.3 The Conservation Zone

Apart from the attempt at quantifying negative effects of mining in the CZ on tourism, there is little in the literature to help in assessing the economic worth of tourism/recreation in the CZ itself. Several references attest to the tourism potential of the Gimbat area of Stage 3 (Storey 1979; McLaughlin 1986), and the ANPWS (1983) provides detailed evidence of new tourism developments in the CZ which were planned in the early 1980s. The tourism value of the CZ is scarcely mentioned apart from reference by the Australian Conservation Foundation (1986) to visits to old mine workings. It is recognised, however, that the CZ forms part of the Upper South Alligator River system for tourism purposes and should be seen in this context. The Northern Land Council (1989, 24) claims 'The assertion in the Draft EIS [Coronation Hill Draft Environmental Statement] that "the Coronation Hill project will be a mining land use project, with its land use effects confined within the boundaries of the Project Area" is absurd in the context of tourism in Kakadu'.

Storey (1979) gives an assessment of tourism/visitor values in Stage 3 and includes mention of the CZ area. The old mines are considered to have tourist value in terms of their history and for possible fossicking (especially in the Wenlaw land system, 7 km south of El Sherana). The white eroded gullies near Sleisbeck would be interesting to tourists and are geologically important because they reflect ancient climates. Other places of scenic beauty are: the headwaters of Barramundie Creek, Koolpin Creek and Stag Creek which has many examples of rock art. The area west of the South Alligator River opposite El Sherana is particularly attractive:

*The whole comprises an area of great contrasts and great natural charm, set in uplands of bare sandstone which give uninterrupted views of the basin and volcanic plug and end in impressive cliffs, with cascades and waterfalls. Some undulating lightly wooded country at the foot gives on to the banks of the South Alligator river. Archaeological remains have been reported from this whole area, which is to be expected in view of its attributes. It would greatly appeal to most self-sufficient campers (Storey 1979, 10).*

Coronation Hill is notable for its rock art treasures: 'Aboriginal art is not as prolific in Stage 3 as elsewhere in the park, but there are still many sacred sites and dreamings, with hundreds of paintings, especially in the vicinity of Coronation Hill and in rock ravines on the edges of the sandstone plateau country' (Eyre 1988, 33).
Against this optimistic assessment is a warning about the suitability of the craggy, sandstone country for some tourism uses: 'The very factors which contribute most to the magnificent scenery are those which detract from its tourist value, for they make it extremely hazardous. We cannot over-emphasise the ease with which one can lose the way or the serious consequences of doing so, in this and similar country' (Storey 1979, 11-12). It is also noted that Stage 3 can cater for two chief kinds of park visitor - gregarious and otherwise. The gregarious category are the only ones catered for in most national parks and they are content to see attractions with a minimum of effort. The minority who wish to see the attractions of the park in their natural context, rather than on exhibition, and who will put up with some hardship to do so, have many opportunities for self-sufficient walking in the area for a week or longer.

The bushwalking potential of the Upper South Alligator River valley is considered to depend to a considerable degree on the presence or otherwise of mining activity in the CZ: 'If you have a mine sitting in the middle of or adjacent to, and having visual or audible impact on, a walk which is classified as a wilderness walk, it detracts from the value of that walk' (McLaughlin 1986, 1300). This statement appears to use the term wilderness in relation to the area's remoteness rather than its unspoilt quality because there is widespread evidence of old mine workings from the 1950s and 1960s up and down the South Alligator valley (Coronation Hill Update 1988-89). Extensive areas of the nearby sandstone country can be classified as wilderness and it is the extent to which this might be compromised by new mining activity which is in question.

As previously indicated, ANPWS released indicative plans in 1983 for the opening up of Stage 3 and the CZ area to tourism and recreation, with major visitor facilities and new infrastructure developments to be located at El Sherana, Coronation Hill and along the South Alligator River valley. El Sherana is shown as the site of a new Ranger Station, caravan and camping ground and safari motel estimated (in 1983 dollars) to cost some $17 380 000. Coronation Hill is listed for a camping ground and road improvements costing $380 000 with a focus on walking trails and rock art galleries. Together with other Ranger Stations, road and water supply improvements, the total planned expenditure in Stage 3 was more than $21m. This indicates that the Upper South Alligator River valley including the CZ was considered to be the most feasible location for a major southern focus for Kakadu National Park well before the area was formally incorporated into the Park proper.

Chapter 2 presents recent data on expenditure by tourists in Kakadu and by ANPWS, and discusses proposals about possible new tourism developments in the areas in and around the CZ.

4. Tourism and Aboriginal Economic Interests

The involvement by Kakadu Aboriginal people in tourism is among the best researched aspects of the industry in the Park. It has been the subject of detailed investigation by the Northern Land Council (Palmer 1985; Brady 1985 and Lawrence 1985) as well as individual researchers (Stanley 1982; Kesteven 1984; Weaver 1984; O’Faircheallaigh 1986; and Altman 1988). This work covers the progressive involvement of Aboriginal Park traditional owners (The Gagudju and Djabulukgu Associations) in tourism investments and enterprises; the use of mining royalty equivalents in tourism; attitudes towards tourism; impacts on the Aboriginal community of tourism; and the subject of Aboriginal Park Rangers.

There is understandably little direct tourism research about the involvement by Jawoyn people in Stage 3 and the CZ. The area has been depopulated of its Aboriginal residents
and became inaccessible to them because of the existence of pastoral and mining leases. As this part of the Park is now the subject of a land claim by the Jawoyn, there is a possibility of Aboriginal repopulation in the future. The research work of most relevance for Aborigines and tourism is the investigation of archaeological sites in Stage 3, many of which may be expected to be a tourist drawcard (Jones et al 1987). The sacred significance of parts of the area to the Jawoyn people, particularly around Coronation Hill and Sleisbeck (Cooper 1988; Cooper 1989), is also a factor which could affect visits by outsiders in the future.

4.1 Aborigines and Kakadu tourism

The importance of Aborigines to Kakadu tourism can be judged by the fact that 40 per cent of overseas visitors to the Northern Territory have responded in surveys that they are interested in Aboriginal culture (Brady 1985). Recognition of Aboriginal ownership of Uluru (Ayers Rock), Nitmiluk (Katherine Gorge) and Kakadu National Parks have provided the preconditions for much more Aboriginal economic involvement in tourism. It is the experience of the Gagudju people in Kakadu, however, which has demonstrated what may be possible if adequate investment funds are forthcoming to make this involvement a practical reality.

In the Kakadu case substantial royalty equivalents from the Ranger Uranium mining operation to the Gagudju Association and smaller upfront payments by Pancontinental to the Djabulukgu Association have enabled successful investments in hotel and allied ventures in and around the Park. The details of these tourism investments are found in Altman (1988) and include the Jabiru (part share) and Cooinda hotels, the Kakadu Holiday Village (part share), Yellow Waters wildlife tours, the Border Store and the Daluk Daluk arts and crafts enterprise. Not all are particularly profitable yet but they are collectively successful enough to demonstrate that tourism will eventually be the mainstay of the local Aboriginal economy if and when mining ceases.

Yellow Water tours attracted 75 000 visitors in 1986-87 and the year before brought in an income of almost half a million dollars. The Daluk Daluk women's arts and crafts enterprise run by the Gagudju Association in Jabiru makes items for the tourist trade and markets its produce exclusively through the Border Store and Park hotels. Among the most recent developments was the successful starting of a locally owned Aboriginal tour enterprise which began trading operations in 1987. Altman (1988) reports that Bamurru Djadjam, or Wild Goose Tours, has been judged to be extremely successful in its establishment phase by the NT Tourism Commission. The breakeven point of 330 passengers paying $100 each was exceeded in its first year. The annual total for 1987 was 540 passengers, paying between $60 and $90 each. As an industry, tourism is judged as having a beneficial if limited economic impact on Aboriginal people in Kakadu (Altman 1988).

Not all aspects of the experience are positive as seen in the relatively small amount of employment for Aborigines generated by the millions invested by them in Park tourism. Of the 58 Park residents employed in 1986, just over half had jobs in tourism with the majority working for ANPWS. Very few (only 10 per cent) were employed by Gagudju in tourism-related activities (Altman 1988). This suggests that claims about tourism jobs for Aborigines generated as a result of expansion of the industry in Stage 3 should be treated with caution.

There is also some evidence that growth in tourism in the Park is impacting adversely on access by local people to Aboriginal subsistence resources of various kinds (Palmer 1985; Altman 1988). Strong support has been detected in the Kakadu Aboriginal community for greater development of Stages 2 and 3 for tourism purposes because of a
wish to see visitors thinned-out and dispersed over a greater area (Lawrence 1985). But, as has already been pointed out, such dispersal needs to be examined carefully for its likely consequences when it is remembered that most visitors to Stage 3 will also be drawn to popular attractions in Stage 1. The major attraction of Stage 3 tourism development from a Kakadu Aboriginal perspective is that such new facilities will be located well away from existing centres of Aboriginal settlement.

4.2 Aborigines and tourism in the Conservation Zone

One scenario suggested by the experience of the Gagudju and Djabulugku Associations raises the possibility of future tourism investment in Stage 3 by Jawoyn people who have a land claim over the area. The royalty equivalents which might be received by this Aboriginal community could provide the catalyst for investments in hotel accommodation which might be located in the southern part of the Park. It is clear, however, that such tourism investment would, if located in the CZ itself, have to face the possibility of coexistence with mining. Development plans might therefore require an alternative site to the El Sherana location suggested for a safari hotel in the 1983 ANPWS indicative proposals. This eventuality would result in a great deal of new development (both mining and tourism) in the Upper South Alligator River valley and is clearly at odds with the conservation groups, the NT Aboriginal Sacred Sites Protection Authority and the Heritage Commission who wish to see as little development in this area as possible.

There is no literature which indicates the direct Aboriginal employment in tourism likely to arise as a result of the provision of new visitor facilities in the CZ area. What data there are on employment indicate some interest by Aboriginal people in mine-related work at Coronation Hill, with 96 persons applying for jobs with the Joint Venture since October 1986 and 10 Aborigines being employed on average since that time (Coronation Hill Update, 6, 1989). The Northern Land Council notes that the Jawoyn will have up to 12 people employed at Nitmiluk National Park and that there are likely to be up to 70 permanent positions created in Jawoyn tourism projects in the region in the future (Northern Land Council 1989).

Although there is plenty of evidence of significant archaeological sites in and around the CZ (Jones et al. 1987; Eyre, 1988), no detailed assessment appears to have been undertaken about the tourism significance of them nor all the financial and other inputs necessary to make them accessible to the public. Some of the necessary information will be contained in the revised plan of management; but other factors, such as the presence of Bula Sickness Country in and around the CZ (Cooper 1988; 1989), suggest that tourism and mining could both be viewed by Aboriginal custodians as unwelcome in large parts of the Upper South Alligator River valley. Indeed, the likely alternative to mining in much of the valley is nature conservation if the presence of a sacred site of this kind is recognised and observed.

5. Tourism and the Natural Environment

A broad definition of the environment includes both natural and human dimensions of Park heritage, both of which are affected in varying degrees by tourism, mining and other land uses. Measuring the relative extent to which these activities may damage the environment and lead to a reduction in Park values as a natural conservation area is an objective of environmental impact assessment (EIS). Both the Ranger Uranium EIS of 1974 (Ranger Uranium Mines 1975) and the Coronation Hill EIS (Coronation Hill Joint Venture 1988; 1989) are criticised for failing to adequately assess the worth of
alternatives to mining as a Park land use (Australian Conservation Foundation 1976; The Wilderness Society 1989).

In part this is a legitimate criticism of the EIS process itself which does not demand such comparisons, but it also underlines the fact that very little impact research has been conducted into the effects of further tourism development in Kakadu. ANPWS plans of management cover Park zonings and other strategies aimed at minimising tourist damage but the Service does not possess resources to examine tourist carrying capacity or even the long term effects of camp ground septic tanks and the like. Opinions about the desirability of locating hotel, camping and infrastructure projects in the Upper South Alligator River valley are divided among tour operators in the tourism industry itself.

The relative effect of introducing mining, more tourism, or both of these land uses into the CZ and Valley comprises an impact balance sheet with positive monetary values (some of them not readily measured) on the one side and some negative disturbance to the environment on the other. The negative effects can be expected to detract in a measurable way from positive tourism and conservation values. This picture is made even more complicated because it seems that tourism development itself can result in some decline in overall Park preservation worth. No researchers have yet addressed this complex challenge in Kakadu.

Nothing in the published literature begins to assess the range of positive and negative impacts involved in the more developed parts of the Park (Stage One), where factual data are available, or the newly incorporated Stage Three and CZ where only the mining prospects, archaeological assets and some potential camping areas and bush walks have been identified in any detail.

In the opinion of at least one observer 'Stage 3 will never achieve the popularity of the rest of Kakadu' but pressure is thought likely to grow to increase access by tourists in the future (Eyre 1988, 33). As a leading Northern Territory anthropologist has said: 'It is imperative that this area is managed in such a manner that the scientific, cultural and spiritual values of this region are safeguarded' (Chaloupka 1981, 23).

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APPENDIX 2
KAKADU NATIONAL PARK: COMMERCIAL TOUR OPERATORS

NOTE: The following list was provided by Australian National Parks & Wildlife Service. It includes businesses holding permits to operate commercial tours in Kakadu. Of the total 168 133 were current at 29 June 1990, 21 were to be finalised, and 15 were awaiting renewal.

AAT Kings Tours Pty Ltd
Abercrombie and Kent (Aust) Pty Ltd
Advance Tours & Bellarine Buslines
Affordable Top End & Kakadu Tours/U-Rent
All Terrain Tours
Allmac Tours
Allstates Travel
Amesz Tours
Apple City Tours
Around Darwin and Kakadu Tours
Arrival Tours
Atlas Adventures
Australian Explorer Tours
Australian Kakadu Tours
Australian Outback Expeditions Pty Ltd
Australian Pacific Tours
Back O'Beyond Tours
Backpackers International
Banksia Tours
Bert Bolton's Outback Track Tours Pty Ltd
Billy Can Tours
Brendan's Tours NT
Brits Rentals
Bucks Safaris
Buffalo Tours Pty Ltd
Bundaberg Coach Tours
Bus Australia
Buslink Pty Ltd
Calabro Coach Holidays
Campbells Coaches Pty Ltd
Canberra Charter Coaches
Capricorn Coast Tours
Cardwell Coach Travel
Casey Australia Tours
Chapman's Coach Tours
Chris' Coaches Pty Ltd
Clarks Bus Service
Classic Holidays
Clipper Tours
Coachlines of Australia
Coachtrans Australia Pty Ltd
Coachways Tours of Australia
Coate's Wildlife Tours
Coffs Harbour Coaches
Colé's Coaches
Connections for 18-35s
Contiki Holidays (Aust) Pty Ltd
Cross Country Tours
Crossways Travel
Custom Coaches WA
Deluxe Coachlines Pty Ltd
Desert Discovery
Dial-A-Safari
Down Under Tours/Maryborough
Hervey Bay Coaches
Doyles Bus Lines
Driver Bus Lines
Evergreen Tours
Exploranges
Expo Travel Services
Falcon Tours
Far North Safari
Fearne and Son
Forest Coach Lines Pty Ltd
Forster Coach Tours
Four Wheel Drive Discovery Tours
Glenhenry Coach Lines Pty Ltd
Goode's Coaches
Graham's Coach and Charter Services Pty Ltd
Greyhound (Southern) Pty Ltd
GET Educational Tours Pty Ltd
Hannafords Coaches Pty Ltd
Harris Coach Tours
Harveys World Travel
Hauser Exkursionen International
Hawkins Coach Lines
Holidaymakers Pty Ltd
Hoppies Tours
Howards Bus & Charter Service
Hunter Safaris (Northern Territory)
Imagery Photo Tours
International Park Tours - Australia
Jay Jay's Coach Tours
Jayes Travel Service Pty Ltd
Just Travelling
Kakadu Arnhemland Tours
Kakadu Dreamtime Safaris
Kangaroo Flat Bus Lines Pty Ltd
Katherine Adventure Tours
Keating Coach Tours Pty Ltd
Keetleys Tours
Kingston's Coach Tours Pty Ltd
Kirklands Coaches
Koala Tours
Kurt Kakadu Tours
L C Dysons Bus Service
Lananda Tours
Landmark Tours
Langdon's Bus Lines
Lanla Pty Ltd
Lazy Days Tours & Travel Pty Ltd
Lindsay's Coach and Bus Service
Loaders Coaches
Mackay City Buses
McCafferty's
Melbright Coaches Pty Ltd
Mundarra Safaris
Munmarlary Nominees Pty Ltd
Mylons Motorways Pty Ltd
Nangar Wilderness Expeditions
Newmans Australia
North Australian Biological Consultants
North West Safaris
Northern Adventure Safaris & Jacana Tours
Northern Australian Frontier Adventure Safaris
Northern Four Wheel Drive Safaris
Northern Territory Holiday Planners
Nowra Coaches Pty Ltd
Odyssey Safaris
Outback NT Touring Co. Pty Ltd - Parklink
Overland Australia Pty Ltd
O'Mara Bros
O'Shannessy's Sorrento Travel Pty Ltd
Pathfinder Tours
Pelly-Can-Tours
Peninsula Bus Lines
Polley's Coaches
Quince's Scenicruisers Pty Ltd
Rotel Tours
Sampsons Tours Pty Ltd
Sandrifter Safaris
Scobie's Walkabout Pty Ltd
Seaforth Bus Service
Sid Fogg & Sons Pty Ltd
Smart Limousine Services
Sonshine Tours
Stuarts Coaches Pty Ltd
Sun Australia Safaris
Sundowner Safaris
Sundowner Scenic Tours
Sunliner Tours
Sunshine Coast Coaches
Swagman Tours
Symes Bus Service
Terra Safari Tours
Territory Park Tours
Territory Photosport
Territory Tour Makers
The Australian Outback Travel Company
Thomas Coach Tours Pty Ltd
Thomson's Yarrawonga
Toddy's Tours
Tom's Territory Tours
Top End Heritage Tours
Trans Otway Pty Ltd
Travel North Pty Ltd
Travelabout
Tripple RRR Travel
Valley Coach Lines
Ventura Coaches
Wales Coaches
Waratah Adventure Safaris
Westbus Pty Ltd
Wild Goose Tours
Wild Track Camping Safaris
Willis' Walkabouts
World Expeditions
Wrenn Tours
Youngs Coaches
APPENDIX 3
PEOPLE INTERVIEWED JULY-AUGUST 1990

Dan Baschiera
Territory Photosport

Ross Beardsell
General Manager, The Darwin Travelodge

Ian Belsham
Manager, Deluxe Coachlines

David Bennett
Manager, Darwin, AAT King's Tours

Mark Crummy
Director, Odyssey Safaris

Don Douglas
Campground Manager, Gunlom, Kakadu

Val Evans
Financial Controller, Gagudju Association

Andrew Griffiths
Willis' Walkabouts

Firth Haigh
Manager, Kakadu Frontier Lodge & Caravan Park

Sue Jackson
Coordinator, Environment Centre NT

Grant Keetley
Managing Director, Keetleys Tours and
President, Darwin Region Tourism Association

Michael King
General Manager, Four Seasons Kakadu

Robin MacDonald
General Manager, Darwin Region Tourism Association

Richard O'Sullivan
Development Manager - Tourism, Department of Industries
and Development

Terry Patroni
Manager, Australian Outback Expeditions

Phil Pinion
Town Clerk, Jabiru Town Council

Tony Press
General Manager, Northern Operations,
Australian National Parks and Wildlife Service (ANPWS)

Geoff Reid
General Manager, Australian Frontier Holidays

Magda Sexton
Project Officer (Research), Northern Territory Tourist
Commission

John Smith
Acting Tour Liaison Officer, ANPWS, Kakadu

Keith Taylor
Senior Project Officer, Parks & Tourism Section,
Northern Land Council

Darrell Tutty
Director - Marketing, Australian Kakadu Tours

Glen Wastell
General Manager, Four Seasons Cooinda

Peter Wellings
Manager, Kakadu National Park

Andrew Wellings
Ranger, Kakadu National Park

Tom Winter
Managing Director, Terra Safari Tours

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