

## **4. KAKADU NATIONAL PARK**

### **4.1 Description<sup>10</sup>**

#### **Location, size**

Kakadu National Park is located in the Northern Territory, 120 km east of Darwin. It covers an area of 19 804 km<sup>2</sup>.

#### **Major natural features**

The park encompasses areas of sandstone escarpment and dissected Arnhem Land plateau, low hills and the flood plains of several rivers which run north to the sea which bounds the park in the north.

The juxtaposition of these features results in a variety of habitats, representing all the major habitats in the Top End. There is a great diversity of native fauna and the wetlands of Kakadu are considered of international significance for waterfowl.

#### **History**

The Alligator Rivers Wildlife Sanctuary was declared over part of what is now Kakadu National Park in 1972. In 1979, Stage One of Kakadu National Park was declared and subsequent additions have been made: Stage Two in 1984, Stage Three in 1987 and further additions in 1989 and 1991.

In 1981, Stage One was inscribed on the World Heritage List and Stage Two was included in 1987. The entire park, including Stage Three was renominated and was included on the World Heritage List in 1992.

#### **Management arrangements**

Part of the area of Kakadu National Park is Aboriginal freehold land leased to the Director of the Australian Nature Conservation Agency (ANCA, formerly the Australian National Parks and Wildlife Service). The remainder is Commonwealth land and some of this is currently subject to land claims. Management planning is undertaken jointly by the Kakadu Board of Management (the majority of members being Aboriginal people nominated by the traditional owners of the land) and the Director of ANCA. The management intentions for the period 1991 to 1996 are presented in the 1991 Plan of Management. Day-to-day management is undertaken by ANCA.

#### **Management funding**

The majority of funding for management is provided to the ANCA by the Commonwealth Government. In 1991-92, ANCA allocated \$10.8 million to park management.

Park entry fees are levied on every visitor. From July 1992, these fees are \$10 per person or \$40 per family for a single entry, or \$30 per person annual entry. Camping fees for developed camp grounds are \$7 per site per night.

Park revenue in 1991-92 was \$1.02 million. In 1992-93, Park revenue was \$1.28 million and of this, \$1.17 million was from entry fees and \$105 900 was from camping fees.

#### **Management objectives**

The following key management objectives have been developed in the Plan of Management 1991:

- to establish a plan of management in which Aboriginal people associated with the park play a major role;
- to give special protection to Aboriginal art sites, sacred sites and other sites of significance to Aboriginal people
- to institute an innovative park management regime conforming to the highest international standards;

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<sup>10</sup> Information was compiled from Kakadu National Park Plan of Management (ANPWS 1991) and personal communication from ANCA staff.

- to protect park resources from the undesirable consequences of fire, erosion, environmental change, pollution and other activities of people;
- to rehabilitate areas damaged by feral and introduced animals and plants, and other recent human impacts;
- to cooperate with neighbours in complementary management programs which help to protect park resources;
- to develop an inventory of all relevant resources in the Park;
- to study the physical and biological processes operating in the park as an aid to management and as a contribution to scientific knowledge;
- to develop a range of facilities for public enjoyment of the Park;
- to stimulate interest in nature conservation and Aboriginal culture by the development and implementation of an imaginative communication program;
- to provide information and guidance to visitors about potential hazards in the Park and ensure their safety as far as possible.

### **Major uses**

As identified in the management objectives, the primary uses of the Park are to provide for contemporary use by local Aboriginal people, protection of sites of cultural significance and nature conservation.

The major direct uses of the Park are tourism and recreation and these are discussed in more detail in section 4.2 below. There are Aboriginal residential settlements in the Park (about a dozen living areas with a total population of 300 people) and the township of Jabiru (population 1200) is within the Park. There is a research station run by the CSIRO and other research occurs within the Park. The total expenditure on research has not been ascertained for this report.

Mining is prohibited. The Ranger uranium mine and surrounding area is excluded from the Park. No agricultural activities (except a small buffalo herd) occur. Recreational fishing is allowed but highly regulated; no commercial fishing is permitted. The eradication of feral animals, particularly buffalo, is a source of income to private contractors who are paid by the ANCA and also sell the animals.

Prior to the inclusion of the former Conservation Zone into Stage Three of Kakadu National Park, the option remained open for mining to occur in the Conservation Zone. A series of assessments of whether or not mining should proceed culminated in an Inquiry by the Resource Assessment Commission. As part of that Inquiry, a contingent valuation study of the economic value of the conservation (no mining) option was undertaken. The results of the study and comments on interpretation within the context of this report are presented in section 4.3 below.

## **4.2 Kakadu National Park tourism and recreation**

Tourism in Kakadu National Park is characterised by a majority of self drive or private travellers who stay overnight or longer within the Park. Eighty per cent of visitors are private travellers and the remaining 20 per cent arrive on commercial tours. Only five per cent of private visitors and 35 per cent of visitors on commercial tours make their visit a day trip. The majority of visitors stay at least overnight. The average length of stay is about four days for private travellers and two days for those on tours (ANPWS 1991).

Private visitors may camp independently (50 per cent bring camping gear and a further 29 per cent tow caravans) or they patronise the commercial accommodation located within the Park. This consists of four motels and lodges, one caravan park and a youth hostel. While in the Park, private visitors may take one or more of the popular short commercial tours available; boat tours for wildlife viewing or helicopter and fixed wing aircraft flights over the escarpment (ANPWS 1991a).

Visitors on commercial tours may stay in the motel/lodge accommodation or camp in safari style accommodation provided by tour operators. These tourists may also take boat and air tours offered by other operators within the Park.

The commercial tour sector consists of the accommodation establishments, the companies who run trips within the Park and regular or infrequent tours from Darwin and other parts of Australia. In 1992, there were 153 companies with permits to conduct commercial tours in the Park (ANPWS 1992).

The increase in numbers of people visiting Kakadu National Park has been dramatic in the last decade. Visitor numbers have more than trebled, see table 4.1.

Table 4.1 Visitor Numbers, Kakadu National Park

	Visitors	Visitor days
1982	45 800	150 000
1988		717 000
1990	240 000	
1991	211 000	

Source: 1991 data from ANPWS 1992, remainder from ANPWS 1991a.

### Financial values

Total expenditure within the Park in 1990 was calculated at \$34.375 million (Knapman et al. 1990). This figure was \$103.6 million for 1988–89. On the same basis, the amount for 1991–92 was \$122 million (NTTC 1992). This is the estimated direct expenditure without the cost of travel to the area.

### Calculating financial values

The relevant measure of the financial value of tourism in Kakadu National Park is expenditure by visitors. A survey of visitors to the Park conducted in 1990 provided information on direct expenditure in the Park by private visitors and tourists on commercial tours (Knapman et al. 1990). International tourists spent an average of \$51 dollars a day and domestic tourists spent \$35 on average. Total expenditure within the Park in 1990 was calculated at \$34.375 million (Knapman et al. 1990).

This amount is only a part of the expenditure on tourism and recreation in Kakadu National Park as it does not include expenditure on tours purchased outside the Park. Neither does the amount include a proportion of travel to and accommodation in the Northern Territory associated with visits to Kakadu.

Financial values would include expenditure on:

- (a) all purchases of tours, accommodation and services within the Park
- (b) the full cost of trips from Darwin to Kakadu National Park
- (c) a component of travel to and accommodation in the Northern Territory associated with visits to Kakadu National Park by private visitors
- (d) a component of travel to and accommodation in the Northern Territory associated with visits to Kakadu National Park by visitors on commercial tours.

Knapman et al. (1990) have measured (i) at \$34.375 million in 1990. These researchers have also estimated a financial value that includes (i) plus part of items (ii) to (iv), excluding travel to the Northern Territory, from knowledge of total expenditure by tourists in the Northern Territory. Total expenditure by tourists in the Northern Territory was \$414.67 million in 1988–89. Half of this was spent in the Top End, excluding Katherine. Knapman et al. have concluded that 'it is reasonable to assume that about one half of the tourism expenditure in the Top End was spent by people who visited Kakadu/CZ<sup>11</sup> (including expenditure within the Park and CZ, and elsewhere)' (Knapman et al. 1990, p 13-14).

This figure was \$103.6 million for 1988–89. On the same basis, the amount for 1991–92 was \$122 million (NTTC 1992). This is the estimated direct expenditure without the cost of travel to the area.

<sup>11</sup> CZ refers to the Conservation Zone now included within the Kakadu National Park World Heritage Area.

The following comment is made by Knapman et al. on the estimate used:

'It should be noted that this estimate is likely to be conservative. In particular, many people will argue that Kakadu and Uluru are economically important far beyond these calculations because they are widely known both nationally and internationally and draw attention to the other tourism possibilities in the NT. We do not disagree with this assessment but we are unable to assess the value of this effect' (Knapman et al. 1990, p 14).

Knapman et al. went on to construct an analysis of the regional economic impacts of Kakadu tourism on sectors of the Northern Territory economy, using the ORANI NT model (see appendix 1.). They separated out the contribution to various economic indicators of current levels of expenditure on tourism in Kakadu National Park (based on the \$103.6 million figure noted above). They also simulated the impacts of a 10 per cent increase or decrease in Kakadu tourism on various economic indicators, see table 4.2.

Table 4.2 Regional Economic Impact Analysis, Tourism in Kakadu National Park

	All Kakadu tourism	10% decrease	10% increase
Real gross NT product	+ 4.52	- 0.38	+ 0.38
Employment	+ 6.26	- 0.52	+ 0.52
Real disposable income	+ 4.03	- 0.34	+ 0.34
Real consumption	+ 4.02	- 0.33	+ 0.33
Real investment	+ 4.02	- 0.33	+ 0.33
Locally raised NT govt. revenue	+ 0.80	- 0.07	+ 0.07
NT consumer price index	+ 2.48	- 0.20	+ 0.20

Source: Knapman et al. 1990.

The results show that at current levels, Kakadu tourism makes a notable contribution to the Northern Territory economy, for example, income is 4.03 per cent higher and employment is 6.26 per cent higher than it would be without this activity (assuming no other uses employ these natural environment, labour and capital resources in the Northern Territory). The effects of a 10 per cent decrease or increase are however small.

The ORANI model results as reported by Knapman et al. do not include a 'standard' output multiplier to convert direct expenditure to a direct plus indirect effects value.

### Economic values

The economic value to tourists of access to Kakadu National Park is what they would be willing to pay, minus any fees charged. Knapman and Stanley (1991) calculated a willingness to pay equivalent to \$36.6 million in 1991 dollars. In that year, tourists paid \$1 million in fees, making the net economic value \$35.6 million for 1991.

### Calculating economic value

The economic value of direct visitor use of Kakadu National Park is measured as the consumer's surplus accruing to visitors. That is, the value that they are willing to pay above what they have to pay for

access to the attractions of the Park. An estimate of this value has been calculated by Knapman and Stanley (1991) using a Travel Cost Analysis.

Using data collected in their 1990 visitor survey, Knapman and Stanley modelled what it actually cost visitors from other parts of Australia to travel to Kakadu National Park. A demand curve for visits to Kakadu was successfully described. This was then used to model the effects on demand of a range of hypothetical entry fees from \$5 per person to \$350 per person. The consumer's surplus at zero entry fee was calculated to be \$34.9 million (in 1990 dollars). There is an entry fee to Kakadu National Park which averaged at \$3.70 per person at the time of the study. The total entry fees paid were about \$0.9 million in 1990, resulting in a consumer's surplus of \$34 million in 1990. Knapman and Stanley adopted an annual consumer's surplus of \$34.9 million (\$36.6 million in 1991), for technical reasons, and calculated the Net Present Value at an 8 per cent discount rate. This resulted in a NPV of \$436.3 million (\$458.1 million in 1991 dollars).

Table 4.3 Economic Values, Tourism in Kakadu National Park

Consumer's surplus (1990 dollars)	
Per person	\$142.29
Per household	\$384.18
Per person per day	\$37.05
Total	\$ 34.9 million
Net Present Value	\$ 436.3 million

Source: Knapman and Stanley 1991.

In 1991, visitors paid around \$1 million in fees to enter Kakadu National Park. Reducing the 1991 consumer's surplus value by this amount gives an annual economic value for tourism of \$35.6 million in 1991 dollars.

#### 4.3 Economic valuation of Kakadu National Park conservation

There is one piece of research that attempts to estimate preservation values for Kakadu National Park. Preservation values are considered to combine the components of existence, bequest and option values. These are the indirect use, non-market values arising from a protected area. As will become clear from the discussion following, there is some uncertainty about what the study actually measured. The results of the study are interpreted here as estimating an undefined part of the total preservation value of Kakadu National Park.

The results of the study can be interpreted as assigning a minimum economic value to Australians of \$647 million per annum from preservation of Kakadu National Park in its current form.

##### Calculating economic values

The study was undertaken by the Resource Assessment Commission to provide an input to its Inquiry into the Kakadu Conservation Zone. The Conservation Zone has since been incorporated into the National Park and World Heritage Area. The Inquiry specifically assessed proposals to establish a gold and platinum mine at Coronation Hill.

The study attempted to estimate the economic value to the Australian community of preserving the Conservation Zone from mining and prevent any damage from mining that may spill over into other areas of the Park. The study employed the Contingent Valuation Method (CVM). This involved surveying a sample of the Australian population and a sample of the Northern Territory population for their willingness to pay to avoid damage. As the potential effects of mining were unknown at the time

of the survey, two scenarios of 'major' and 'minor' possible damage were developed and described to respondents.

The results for the sample of the Australian population were a median willingness to pay \$123.80 per year for ten years to avoid the major impacts or \$52.80 per year for ten years to avoid the minor impact. All results are in 1991 dollars.

The Inquiry determined that the minor scenario was the more likely, based on the information presented to the Inquiry on the impacts of mining. Extrapolation of the individual median willingness to pay to avoid the minor impact to the Australian population gives a value of \$647 million per annum for ten years. The estimated Net Present Value of mining for the 14 years the mine was forecast to operate was \$82 million.

The CVM and results obtained were criticised by some economists and commentators and supported by others. The RAC examined the various criticisms and have stood by the results to the extent that they have been published in their Inquiry report. However the Inquiry Commissioners stated that they did not use the results of the survey in considering the economic impacts of mining, having accepted that 'the values revealed by the study are most probably too high' (RAC 1991, p. 149).

Criticisms of the Conservation Zone CVM study fall into two general categories. The first is that the method is flawed by difficulties in getting people to nominate a 'realistic' willingness to pay. This type of problem is the subject of continuing critical analysis by the economics profession and there is no clear or unanimous judgement on the acceptability of the method as yet.

The second type of criticism applies specifically to the Conservation Zone CVM. It has been argued that the respondents did not understand the scenarios presented and were nominating values more in line with their willingness to pay to prevent potential major damage to Kakadu National Park as a whole.

While the perception is held by some people, including the Inquiry Commissioners, that the values were 'too high' for the issue at stake - potential minor damage from mining - it is interesting to consider what these values may indicate for preservation values of Kakadu National Park as a whole.

If respondents did misunderstand the scenarios and nominated willingness to pay for preservation of Kakadu National Park, the figure of \$647 million per annum, or possibly the \$1.5 billion based on the median value of the major damage scenario, is a reasonable figure to assign to the preservation value of Kakadu National Park. If the results of the Conservation Zone CVM are not 'too high' then \$647 million is an undefined part, or minimum value, of the total preservation value of Kakadu National Park.

The interpretation of these values rests on the acceptance of the CV methodology.

TABLE 4.4 KAKADU NATIONAL PARK WORLD HERITAGE AREA

<i>USES</i>	<i>DESCRIPTION</i>	<i>GROSS FINANCIAL VALUES</i>	<i>ECONOMIC VALUES</i>
PRIMARY USES			
Aboriginal contemporary use	Population of 300 people	Nil, however these attributes provide the resource base for potentially sustainable direct uses which generate financial values	These attributes provide the resource base for economic values of potentially sustainable direct uses <b>plus</b> the economic values of non-market indirect uses  Economic values of non-market indirect uses have been estimated at a minimum of \$647 million pa.(1991)
Nature conservation	19 804 km <sup>2</sup> of relatively undisturbed natural environment.		
Conservation of cultural features	Numerous art sites, sacred sites and other features.		
COMPATIBLE DIRECT USES			
Tourism and recreation	240 000 visitors in 1990	Direct: \$122 million (1991-92)	\$35.6 million in 1991 NPV \$458.1 million (1991)
Research	CSIRO (Kapalga), ANCA, OSS, CCNT etc.	not known	not known
Residential use	Living areas, Jabiru township	not known	not known