THE VALUE OF PROTECTED AREAS TO QUEENSLAND

Final Report

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Prepared for:

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Summary

SECTION 2-AN ECONOMIC INTERPRETATION OF THE VALUE OF PROTECTED AREAS TO QUEENSLAND

The Total Economic Value (TEV) provides a conceptual framework for understanding the range of values arising from the environment. The goods and services from the environment provide benefits to society. Losses would be incurred if they ceased existing. Some losses would be directly noticed in the monetary economy. Many of the goods and services arising from natural environments do not have apparent monetary values. The whole of the value of natural environments is likely to be more than the sum of the parts that are able to be separately identified and valued in monetary terms.

SECTION 3-TOURISM AND RECREATION IN QUEENSLAND PROTECTED AREAS

Tourism and recreation is the most significant direct use of protected areas in Queensland, in terms of human presence in the areas, and may also be the most significant direct use in terms of economic value.

It is possible to place monetary values on tourism and recreation in protected areas. As these values are only part of the *TEV of* protected areas, it can be understood that the *TEY is* an amount greater than that indicated by tourism and recreation.

There are a number of different economic indicators which use dollar values to describe characteristics of the economic value and impact of tourism and recreation in protected areas. It is important to distinguish just what is being described via these dollar values. Two broad groups of indicators are provided here. One group of economic indicators is relevant for describing the, impact of expenditure associated with tourism and recreation, that generates *economic activity,* and employment in the economy. The other group of indicators provides the economic value measure of *economic benefits.*

SECTION 4-ECONOMIC INDICATORS OF TOURISM AND RECREATION USE OF PROTECTED AREAS IN QUEENSLAND

Indicators of economic activity

Expenditure on visits to protected areas, and accommodation associated with visits to protected areas, was estimated using several options for some of the relevant variables, giving a range of results. The mid range results are:

- $602-$8.58 million in total direct expenditure
- $1,023-$1,458 million for total output effects.

The commercial tour sector in protected areas consists of at least 176 active operators. The majority of these operators depend on protected areas for over 75% of their business. These operators employ 2,249 people. Gross visitor expenditure on tours is around $138 million per annum a figure included in the above expenditure on visits estimate.

There are a number of resorts in Queensland which are located adjacent to protected areas and which base their business on the attractions of these natural areas. A selection of forty-two resorts was made to represent those accommodation establishments perhaps most associated with protected areas. The gross takings for these resorts was estimated at $126 million per annum. A proportion of these takings would have been included in the above estimates of expenditure on accommodation, but a proportion would be in addition, representing additional nights spent in the accommodation. Other accommodation establishments throughout Queensland also benefit from visitors attracted by protected areas.

The Department of Environment spends around $17 million annually in provision of visitor management in Queensland protected areas. A further $16 million is spent on natural and cultural resource management and management capability. This expenditure supports economic activity and employment, including in rural and regional areas of Queensland.

Economic benefits

An estimate of willingness to pay to visit protected areas (consumers' surplus) was made using the benefit transfer technique. An order of magnitude estimate of $121-$196 million is indicated.

1 Introduction

The primary purpose of this report is to provide a range of economic indicators that describe the economic values and activity associated with tourism and recreation in national parks and other protected areas in Queensland. This task is approached using the economic measures of expenditure on visits and 'willingness to pay' for access. The methodology and results of this analysis are presented in Sections 3 and 4 of this report.

In addition, the economic value of protected areas for tourism and recreation is placed within the context of a economic interpretation of the full range of values of protected areas. This is the subject of Section 2.

The terms of reference for this report set.these.objectives. They are as follows:

Project Objective 1

Prepare a statement on the full range of economic and non-economic benefits associated with the existence, management and use of the protected area estate with a focus on an economic interpretation of the value of protected areas to Queensland.

This objective is addressed in Section 2.

Project Objective 2

Objectively estimate the economic value of tourism and recreation use associated with national parks and other protected areas in Queensland using indicators, such as expenditure associated with management expenditure (including direct and indirect effects), and visits to protected areas by free and independent travellers and commercial passengers.

This objective is addressed in Sections 3 and 4.

2 An economic interpretation of the value of protected areas to Queensland

The objective of this section is to:

Prepare a statement on the full range of economic and non-economic benefits associated with the existence, management and use of the protected area estate with a focus on an economic interpretation of the value of protected areas to Queensland.

In this section of the report, an economic interpretation of the value of natural environments and protected areas is introduced. This interpretation comes from the branches of economics known as 'environmental economics' and 'ecological economics'. It is recognised that many of the goods and services we utilise from natural environments do not have obvious monetary values, yet contribute positively to our standard of living, and indeed to our ability to live on the planet. Society would experience a loss, or incur costs of replacement, if natural environments were no longer available. Environmental and ecological economics attempts to recognise the full range of values arising from natural environments as having 'economic' values, even if they are not usually or easily measured in dollar terms.

lie environmental and ecological economics interpretation of the values of natural environments in general is presented. This is followed by a discussion of how this interpretation applies to the protected area estate in Queensland. Finally economic values of tourism and recreation in protected areas, which is the major focus of this report is placed into the context of all economic values of protected areas.

2.1 ECONOMIC VALUES OF NATURAL ENVIRONMENTS

2.1.1 Links between the natural environment and the economy

Natural environments provide a range of goods and services that are used and enjoyed by humans. The utilisation of these goods and services contributes to 'the economy', which is the entire system of production and exchange which allows humans to meet the necessities of life and enjoy things that enhance the quality of life.

The natural environment has been described as contributing to the economy in four ways, as illustrated in Figure 2.1:

- As a source of natural resources
- As a source of natural amenities
- Providing waste assimilation
- As a life support system (Common 1995).

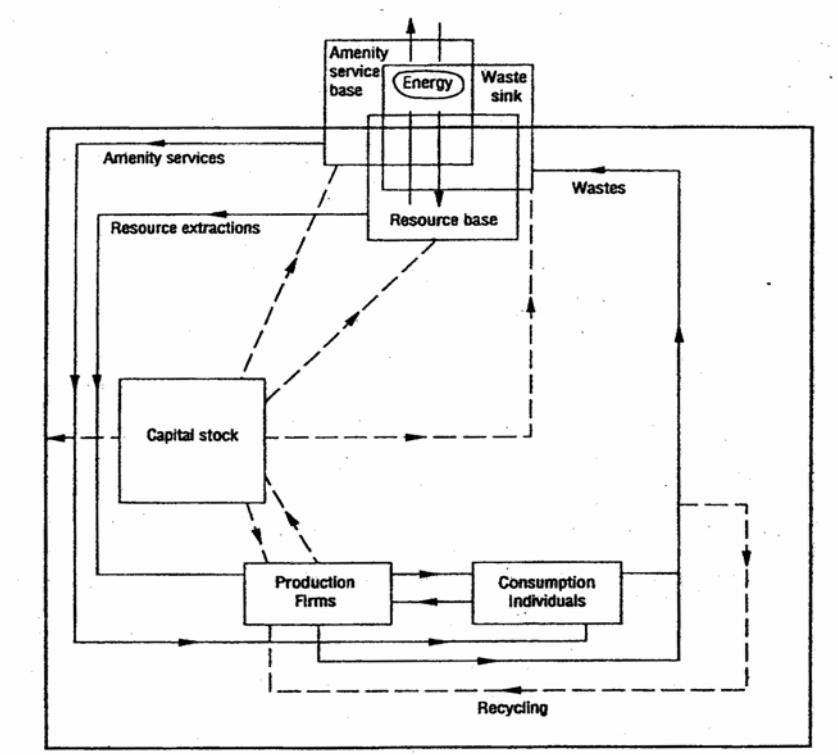

Figure 2.1
Economic activity in the natural environment
Source: Common 1995.

Natural resources (resource base in Figure 2.1) utilised from natural environments directly by the economic system include: harvested plants and animals, water, and minerals; and resources used indirectly, such as soil used to grow crops.

Natural amenities (amenity service base) include landscapes and areas used for recreation. Amenity resources may be enjoyed directly by visitors and those who live nearby, and indirectly through media including photographs, film, sound recordings, books, and personal accounts by visitors.

The waste assimilative capacity (waste sink) of water, air and ecosystems allows humans to dispose of the waste products of their consumption. So long as disposal remains within the assimilative capacity of the environment there is no expenditure required by industry or government to convert wastes into benign substances.

The basic life support systems for human and other life on earth arise from the natural environment. Humans depend upon natural environment systems for the air, water and food that is required for survival.

In this context the 'goods and services' that are used by humans within the economic system can be understood to include: goods, such as harvested fish, timber, and medicinal drugs; and services, such as waste assimilation, beautiful landscapes and clean air.

2.1.2 Total economic value

Total Economic Value (TEV) is primarily a conceptual tool for describing the full range of values placed by humans on goods and services from natural environments. This concept of TEV is often used, in environmental and ecological economics. The TEV of the environment has been described as being composed of several number of types of goods and services, as illustrated in Figure 2.2.

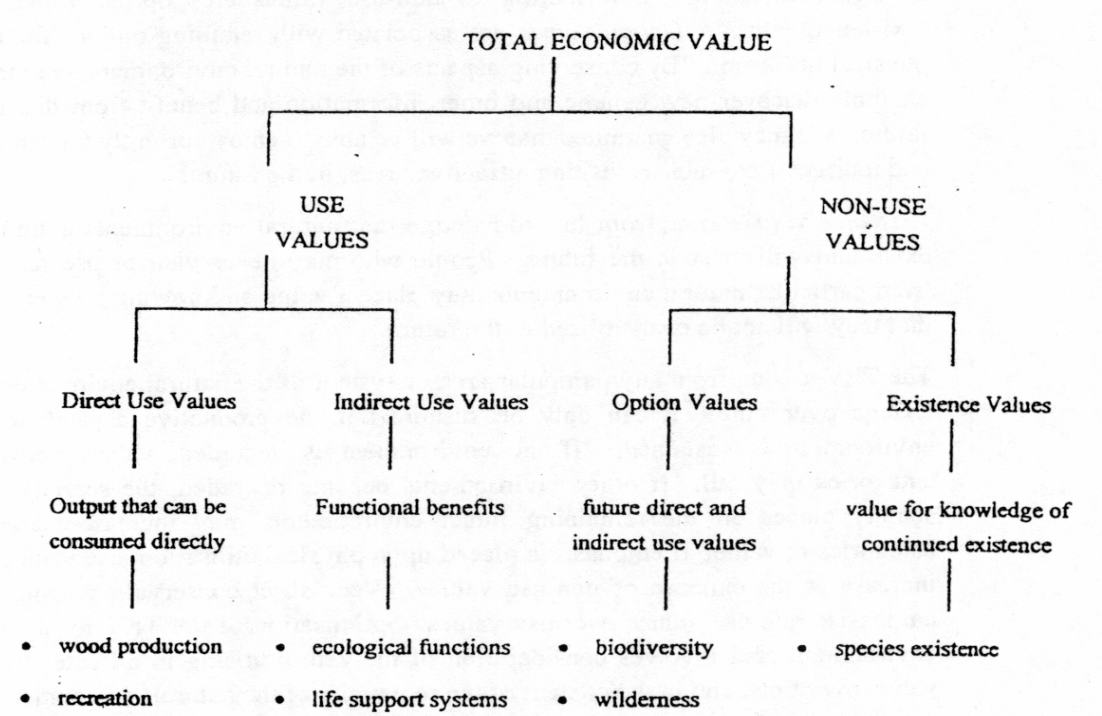

Figure 2.2
Total economic value of natural environments
Source: Munasinghae 1993.

The TEV provides a framework for understanding the full range of values of natural environments.The convention for economists is to only attempt to value changes in TEV, not the absolute total value of natural environments. Changes may-be-in the form of loss of some areas of natural environmental, degradation of environments, or improvements due to rehabilitation etc. A recent paper by Constanza et.al. (1997) estimating in dollars the total annual contribution of the world's ecosystem services is the subject of considerable debate.

Most economic analyses of natural environments attempt to estimate dollar values for changes in only some elements of the TEV (for example tourism and recreation in national parks).

The TEV comprises 'use values' and 'non-use values'. *Use values* are those values that arise from physical utilisation of features of the natural environment. Included in this category are 'direct use values' and 'indirect use values'. *Direct use values* include those that arise from directly utilising the natural resources from the environment, including by harvesting. Directly visiting natural environments to enjoy their amenity also gives rise to direct use values.

Indirect use values include the values placed on ecological functions provided by natural environments, including for production of goods and services as in agriculture and water catchment functions. The values arising from life support systems of the earth as they provide essential for life such as clean air and water, are included in this category.

Non-use values are benefits from natural environments that arise without requiring physical utilisation. Contributing to non-use values are 'option values' and 4existence values'. *Option* values are associated with retaining options for future physical utilisation. By conserving aspects of the natural environment, we may for example discover new genetic and other information and benefit from this in the future. We may also guarantee that we will be able to enjoy currently known direct and indirect uses, such as visiting attractive areas, in the future.

Existence values arise from the knowledge that natural environments continue to exist, and will exist in the future. People who may never visit or use resources from particular natural environments may place a value on knowing they exist and that they will not be over-utilised in the future.

The TEV arising from any particular area or system of the natural environment can change over time. It can only be sustained if the productive capacity of the environment is sustained. If the environment is degraded, values across all categories may fall. If other environments become degraded, the scarcity value society places on the remaining intact environments may increase across all categories of value. If emphasis is placed upon physical utilisation, use values may increase at the expense of non-use values. Very strict conservation approaches emphasise non-use values over use values. Optimisation of the TEV for a natural environment area involves consideration of the values arising in all categories of value, over time, and in the context of the remainder of the natural environment.

Generally, as resources become more scarce, they increase in value-across all elements of TEV.

2.1.3 Market and non-market values

Many of the values arising from natural environments are not normally measured in terms of the conventional monetary economic indicators used to describe 'the economy'. Goods and services traded in markets acquire a monetary, or dollar, value and are known as having *market* values. Only a portion of the values arising from natural environments are traded in markets.

Significantly many goods and services from natural environments do not enter conventional markets and do not thereby acquire monetary values. These goods and services are known as having *'non-market* values'.

Direct use values such as harvesting of fish or timber acquire monetary values because they are traded in markets. However, some direct use values are not traded in markets, and consequently do not have observable market values. For example recreation and tourism use of natural environment is often not valued in monetary terms, because there is no market for entrance to protected areas or other ways of enjoying protected areas. If admission is free, or only attracts a nominal charge, the value people place on having the privilege of access will not be readily apparent.

Many indirect use values and non-use values arising from natural environments are not normally measured in monetary terms. Very often the indirect use connections, between natural environments and closely associated goods and services that do have a monetary value, are not recognised in the monetary valuation of the dependent product. For example, reduction of the waste assimilative capacity of environments is not recognised as a cost in the market price of manufactured goods, unless specific pollution taxes are levied, that is, until that particular environmental function is brought within the realm of the market.

Option and existence do not generally have observable monetary values because they are typically not traded in markets.

Markets allocate goods and services efficiently provided there is no market failure. *Market failure* occurs where the conditions for perfect competition are not met. The conditions for efficient allocation by markets are:

- 'the absence of external effects
- the absence of public goods/bads
- all households and firms have complete information
- all households and firms act as price takers' (Common 1988, p.79).

Market failure occurs in relation to goods and services of natural environments due .to imperfect information on ecosystem and other processes, the prevalence of external effects (where actions by one may have impacts on others--such as pollution of air and water), and the public good nature of many of the services of natural environments (see below). If all resource allocation were left to the market, goods and services with non-market values could be treated as free of charge, and any susceptible to overuse may be used to exhaustion.

There are several ways in which society can intervene to try to correct for market failure. One way is to price environmental goods and services. Techniques for doing so include placing government taxes and charges on use of resources and waste disposal. Markets may be created by allocating property rights, such as via tradeable pollution rights. In other cases, monetary values are generated through research and used in developing policy or land use or practices. A non-market approach is to invoke the precautionary principle and limit uses of environmental resources to those that can be demonstrated to be sustainable. In reality a mix of approaches is used in managing our use of natural environment resources, of which only some will require placing a monetary valuation on non-market environmental goods and services.

There are several techniques developed to place monetary estimates on non-market values. Some are relatively straightforward conceptually and well accepted, but others, especially those related to non-use values, are more controversial. In all cases, the required information may be difficult to generate, resulting in practical difficulties in valuation.

2.1.4 Private and public goods

Natural environments provide both private goods and public goods at the same time, as '*joint products'*.

Private goods have the characteristics of its being possible to exclude people from consuming them and if consumed by one person, they are not available for others. Private goods can have well defined *private property rights, so* that the act of exchange of the goods for monetary recompense can be legally enforced.

Pure public goods on the other hand are non-excludable and non-rival in consumption. It is not feasible to define private property rights for pure public goods. Individuals have little incentive to invest in providing public goods, firstly because the benefits they obtain cannot be quarantined from the actions of others, and secondly because of an expectation that others will 'free ride' on their general availability. In the absence of government intervention, public goods, including those of the environment, may be under-supplied, or existing supplies may be over-utilised. It is usually up to governments to maintain investment in managing natural environments, to continue supplying public goods.

In reality there is a continuum between public and private goods. For example, clean air, normally a public good, can be eventually depleted if used as a waste disposal medium, so 'consumption' becomes rival.

Many of the goods and services arising from natural environments have public good characteristics. Those arising from the atmosphere, and some of those arising from natural environments on crown lands, are not amenable to the assignment of property rights. Thus, markets can not be relied upon to accord a monetary value for the use of these in economic activity.

2.1.5 Summary

The Total Economic Value or TEV, provides a conceptual framework for understanding 'the range of values arising from the environment. The goods and services from the environment provide benefits, and losses would be incurred if they ceased existing. Some losses would be directly perceived in the monetary economy. Economic techniques exist to generate monetary values for all the categories of use and non-use values identified. Techniques for non-market valuation are however, justifiably, open to challenge. The whole of the value of natural environments is likely to be more than the sum of the parts that are able to be separately identified and valued.

2.2 ECONOMIC VALUES OF THE PROTECTED AREA ESTATE IN QUEENSLAND

The economic values of those natural environments included in Queensland's protected areas are discussed here, using the concepts introduced above.

2.2.1 The Queensland protected area estate

The protected area estate in Queensland can be defined as land declared as one of the eleven classes of protected area described in the *Nature Conservation Act 1992.* In total this estate covers about 6.92 million ha, or more than 4% of the land area of Queensland.

The eleven classes of protected area include crown lands and some areas on private lands. A listing of the classes and the management principles for each class, defined by the *Nature Conservation Act 1992, is* included in Table 2. 1.
The best known of the protected area classes is national parks, and the majority of the land in the protected area estate is under national park tenure. The management principles for national parks are to:

- provide, to the greatest possible extent, for the permanent preservation of the area's natural condition and the protection of the area's cultural resources and values;

- present the areas' cultural and natural resources and their values;

- ensure that the only use of the area is nature-based and ecologically sustainable.

For all the classes of protected area, management principles focus on conserving natural environment and cultural resources and values. Direct uses permitted on some classes of protected areas include tourism and recreation, grazing, fishing, and traditional hunting. In all cases, these uses are to be managed to be consistent with the conservation principles of the areas. A small group of classes involve protected areas over natural and cultural resources on private lands that may otherwise be substantially altered. In these cases, the protected areas will be sources of economic values, that have been reduced or lost over the surrounding cleared areas (for example, biodiversity values).

Table 2.1 Eleven classes of protected areas and management principles under the *Nature Conservation Act 1992*

Class of protected area	Management principles	Number	Area (ha)
National Park (Scientific)	• Protect the area's exceptional scientific values and, in particular: – to ensure that the processes of nature continue unaffected in the area – to protect the area's biological diversity to the greatest possible extent. • Allow controlled scientific study and monitoring of the area's natural resources.	7	52,175
National Park	• Provide, to the greatest possible extent, for the permanent preservation of the area's natural condition and the protection of the area's cultural resources and values. • Present the area's cultural and natural resources and their values. • Ensure that the only use of the area is nature-based and ecologically sustainable.	212	6,518,143
National Park (Aboriginal land)	• (To be managed as a national park), as far as practicable, in a way that is consistent with any Aboriginal tradition applicable to the area, including any tradition relating to activities in the area.	-	
National Park (Torres Strait Islander land)	• (To be managed as a national park), as far as practicable, in a way that is consistent with any Island custom applicable to the area, including any Island custom relating to activities in the area.	-	
Conservation Park	• Conserve and present the area's cultural and natural resources and their values • Provide for the permanent conservation of the area's natural condition to the greatest possible extent • Ensure that any commercial use of the area's natural resources, including fishing and grazing, is ecologically sustainable.	158	29,027
Resources Reserves	• Recognise and, if appropriate, protect the area's cultural and natural resources • Provide for the controlled use of the area's cultural and natural resources • Ensure that the area is maintained predominantly in its natural condition.	36	322,462
Nature Refuges	• Conserve the area's significant natural resources • Provide for the controlled use of the area's natural resources • Provide for the interests of land-holders to be taken into account.	21	5,469

Table 2.1 (continued)

Class of protected area	Management principles	Number	Area (ha)
Coordinated Conservation Areas	• Conserve the area's natural and cultural values by coordinated management involving the area's various land-holders • Take account of the area's values, including its recreational, educational and commercial values • Provide for the interests of the various land-holders to be maintained.	1	1,170
Wilderness Areas	• Protect or restore the wilderness values, and the cultural and natural resources, of the area to the greatest possible extent • Maintain the area to preserve its capacity to evolve in the absence of significant human interference • Provide opportunities for solitude and appropriate self-reliant recreational and spiritual activities.	-	
World Heritage Management Areas	• Meet international obligations in relation to the area • Protect the area's internationally outstanding cultural and natural resources and its biological diversity • Transmit the area's world heritage values to future generations.	-	
International Agreement Areas	• Maintain the area's importance to the conservation of nature that is the subject of significant international concern • Conserve the area's native wildlife habitat as far as practicable • Provide for the interests of land-holders to be taken into account.	-	
Total		**435**	**6,928,446**

Note: Figures in the table as at 1 June 1998.

Source: Nature Conservation Act 1992. This is a summary only, for details see NCA 1992

2.2.2 Elements of total economic value of Queensland protected areas

The protected area estate in Queensland represents natural environments and cultural resources that society has decided to protect now and in the future. All the lands within the protected area estate conceptually have a Total Economic Value arising from the values we place on the goods and services that we enjoy from these areas.

Potential values associated with Queensland protected areas are listed below, along with a discussion of their status as public or private goods.

Direct use values from Queensland's protected areas include, but are not limited to:

- visits for tourism and recreation
- visits for cultural purposes
- fishing
- grazing
- water extraction.

Direct uses are associated with some goods that are already traded as private goods, for example harvested animals. As use pressure grows for goods such as water and tourism, mechanisms are being put into place to limit use to ecologically sustainable levels. The mechanisms may define property rights, allowing these goods to be traded as private goods, an example being tradeable water rights. Where limits are placed on access to protected areas for commercial tourism for example, access permits may become more valuable. If permits are made tradeable, the right to access becomes a private good able to be 'traded'.

Indirect use value from Queensland's protected areas include:

- attractive and interesting landscapes
- water catchment protection
- ecosystem services to provide clean air, water, temperature regulation, materials cycling, waste assimilation, habitat viability, etc.

The majority of these are public goods. It is significant that many of the essential life support services of natural environment are public goods.

Option values arising from Queensland's protected areas include:

- genetic information retained due to biodiversity conservation
- options to visit for tourism and recreation in the future
- future delivery of ecosystem services, etc.

Option values exist for future private and public goods.

Existence values consist of

- knowledge by Queenslanders, Australians, and citizens in other countries that natural environments are protected and will be protected in the future. (A number of the protected areas are World Heritage Areas, designating that they are of international significance for conservation. It is possible that people beyond Australian shores will hold existence values for protected areas in Queensland.)

Existence values are generally for the public goods aspects of natural environments.

All these values together contribute to the quality of life in Queensland. It is important to understand that we do not know how much natural environment we need to retain in order that ecosystem services and life support systems will continue to function in support of present and future generations. If we were to lose natural environment functions that prove to be critical, the values they provide would become evident in the form of increasing costs of attempting to support our standard of living. Some of the functions of the natural environments may never be able to be duplicated; however, much money is spent in attempting to reverse degradation.

The ways in which the protected areas of Queensland are managed will influence the mix of contributions of use and non-use values to the TEV, and the magnitude of the TEV. If areas become degraded so that both use and non-use values fall, the TEV will fall.

Tourism and recreation is a direct use of Queensland protected areas. Allowing tourism and recreation in protected areas provides benefits to those able to visit. Unless tourism and recreation is managed to be ecologically sustainable, other direct, indirect and non-use values may be reduced by the impacts of the activity.

Economic indicators of tourism and recreation in protected areas are discussed in the following section, with information on monetary measures presented in Section 4. These monetary measures should be understood as being only part of in the TEV of protected areas, as discussed in this section.

3 Tourism and recreation in Queensland protected areas

The objective of this and the following Section is to:

Objectively estimate the economic value of *tourism and recreation use associated with national parks and other protected areas in Queensland using indicators such as expenditure associated with management expenditure (including direct and indirect effects), and visits to protected areas by free and independent travellers and commercial passengers.*

Tourism and recreation is the most significant direct use of protected areas in Queensland, in terms of human presence in the areas, and may also be. the most significant direct use in terms of terms of economic value

It is possible to place monetary values on tourism and recreation in protected areas. As these values are only part of the TEV of protected areas, it can be understood that the TEV is an amount greater than that indicated by tourism and recreation.

There are a number of different economic indicators which use dollar values to describe characteristics of the economic value and impact of tourism and recreation in protected areas. It is important to distinguish just what is being described via these doll& values. Two broad groups of indicators are provided here. One group of economic indicators is relevant for describing the impact of expenditure associated with tourism and recreation, that generates activity and employment in the economy. The other group of indicators provides the economic value measure of net economic benefits.

3.1 NET ECONOMIC BENEFITS

The economic value of tourism and recreation in protected areas is properly measured as net economic benefits, that is any benefits that accrue to visitors and to businesses that service tourism and recreation, minus any costs to society of supporting this direct use.

The benefit to visitors is in the form of any consumers' surplus experienced. This is the value, above the cost of travelling to a natural area, that visitors are 'willing to pay' for the benefits they enjoy from access.

Consumers' surplus is often understood as the willingness to pay by visitors for access to protected areas. If visits are free of charge, visitors enjoy all the consumers' surplus as non-market benefits. These benefits only become obvious if an economic

[1] The economic value of the contribution of protected areas in Queensland in supporting direct water use for agricultural, industrial and human consumption has not been calculated. This may be a significant value.

valuation technique is used to estimate a monetary value for consumers' surplus. The methodology of Travel Cost Analysis is often employed to place a monetary value on consumers' surplus. For this study, consumers surplus. is estimated for all visits to protected areas, using results generated from the.few sites for which studies have previously been conducted. Results from studies are used to estimate values for all protected areas, via the benefit transfer technique (described in Appendix A).

The benefit to businesses is any producers' surplus arising, which is any above normal profit remaining after all costs of production and a 'normal', competitive market, return to capital invested are subtracted from gross earnings. Any 'resources rent' being earned by operators, contributes to producers' surplus. For this study, producers' surplus is not estimated, as time and budget limitations did not permit research to estimate the surplus.

The economic costs of tourism and recreation in protected areas include management costs borne by government (and diverted from other uses) to enhance direct use and prevent loss of other public good benefits. If management budgets are adequate, and appropriate precautionary limits are paced on tourism and recreation uses, the activities should be ecologically sustainable. Without adequate management, environmental damage may occur. Any environmental damage costs which reduce public and private good benefits are also real costs of tourism and recreation. It is rare for these to be estimated in dollar terms in economic studies of tourism and recreation in natural environments. No relevant estimates were available for use in this study.

3.2 INDICATORS OF ECONOMIC ACTIVITY

The second set of economic measures presented in this study are indicators of economic activity including expenditure, regional output effects, and employment.

People visit protected areas as independent visitors who make their own way to the site, or as tourists on commercial tours. Independent visitors spend money on transport, usually by private car, recreational equipment, camping fees, film, food, and other items in supporting their visit. Visitors on commercial tours spend money on the cost of the tour and other items purchased while on tour. Tourists who travel some distance to visit protected areas also spend money on the costs of accommodation and other services.

This expenditure is a source of economic activity. Expenditure by tourists to Queensland is 'an addition to the State's economy. Expenditure by Queenslanders may represent a redistribution from alternative discretionary expenditure. In all cases, regional and rural areas in which protected areas are situated benefit from the expenditure of Queensland residents and tourists to Queensland. Direct expenditure on tourism and recreation in protected areas will have 'multiplier effects' as extra rounds of economic activity and employment are generated by the initial expenditure. As with all economic activity, there will be 'leakages' of a proportion of the expenditure and multiplier effects out of the State, due to expenditure on items that are imported

In the following section, an estimation is made of expenditure by independent and commercial tourists who visit protected areas. To complement this, a description of the number of commercial tour operators visiting protected areas and the number of people they employ is reported. An estimate is also made of the gross turnover and employment supported in a selection of resorts that are directly dependent on the attractions of protected areas. These measures can not all be added, as there is some double counting involved. Nevertheless they are important indicators of the significance of tourism and recreation in protected areas to sectors of the economy.

3.3 INDICATORS INCLUDED IN THIS REPORT

Various economic indicators and their relevance to understanding tourism and recreation in protected areas were introduced above. In this report, a State-wide analysis of economic indicators is undertaken. This analysis relies mainly on information currently available from published, and some unpublished, sources. Due to time and budget limitations, very little new data was collected for this study. As such, the results must be considered to be indicative estimates of economic activity and of values of tourism and recreation in protected areas.

In an ideal situation, the relevant economic, indicators which would be reported for tourism and recreation in Queensland national parks and protected areas are:

- direct expenditure associated with visits made to parks;
- direct expenditure associated with visits by tourists who stay in commercial accommodation;
- indirect regional and state-wide impacts of direct expenditure (multiplier effects);
- the number of operations and employment associated with the commercial tour sector;
- the consumer's surplus (willingness to pay for access by visitors);
- producers' surplus of the commercial tour sector,
- expenditure by the QNPWS or! visitor management;
- dollar estimates of any environmental damage costs;
- net economic benefits (taking into account any quantifiable costs of environmental damage incurred in accruing the benefits).

Any ideal analysis would include estimates of regional and State-wide economic activity, and an assessment of net economic benefits (taking into account any costs of environmental damage). This study will fall somewhat short of the ideal for reasons of limitations to the time and budget for the study, and insufficient existing data. Useful information is, however, provided on important economic indicators for tourism and recreation in protected areas in Queensland.

Indicators included in previous reports of the Wet Tropics WHA (Driml 1996) and south-east Queensland Regional Forest Assessment region, (Kinhill Economics 1998, in press), and those included in this present report are shown in Table 3.1.

Table 3.1 Indicators of economic value

	Ideal	Wet Tropics WHA	South-east Queensland forests	Queensland protected areas
Direct expenditure associated with visits made to parks	✓	✓	✓	✓
Direct expenditure by tourists who stay in commercial accommodation	✓	✓	✓	✓
indirect regional impacts of direct expenditure (multiplier effects)	✓	✓	—	estimate
The number of operations and employment associated with the commercial tour sector	✓	part	✓	✓
The consumer's surplus (willingness to pay for access by visitors)	✓	✓	estimate	estimate
Producers' surplus of the commercial tour sector	✓	—	—	—
Expenditure by the QNPWS in visitor management	✓	✓	✓	✓
Dollar estimates of any environmental damage costs	✓	—	—	—
Net economic benefits	✓	part	part	part

4 Economic indicators for tourism and recreation use of protected areas in Queensland

This section is presented in two main parts. The first part addresses values of economic activity attributable to protected areas. The second part presents methodology and results regarding net economic benefits of tourism and recreation in protected areas. Section 4.1 describes the methodology used in collecting and analysing data on economic activity. Section 4.2 presents the results. Section 4.3 presents the methodologies used in addressing net economic benefits, and results are in Section 4.4. Section 4.5 consists of a summary of findings.

4.1 INDICATORS OF ECONOMIC ACTIVITY-METHODOLOGIES FOR THIS STUDY

This current study uses data newly compiled by the Department of the Environment (Doe) on visitor numbers to all protected areas designated under the Nature Conservation Act 1992, and to recreation reserves in Queensland. The approaches taken in previous studies of the Wet Tropics WHA (Driml 1996) and south-cast Queensland Regional Forest Assessment region (Kinhill Economics 1998, in press), have been taken into consideration and a methodology developed for this study which draws upon the previous studies.

4.1.1 Protected areas included

Of the total of 435 protected areas in Queensland, visitor use data are available for 417. The 417 protected areas included are all those on the mainland of Queensland and offshore islands. Marine Park areas are not included in this study. It should be noted that there is substantial visitor use of Marine Park areas by local residents and tourists, which generates economic value additional to that reported in this study.

A selection of tourist resorts that are closely associated with adjacent protected areas is also included in the study.

The 417 separate protected areas represented in this study are classified according to Department of Environment Region and District, as shown in Table 4.1 below.

4.1.2 Person visit days

The nationally recognised standard measures of visitor use--person visit days--was used in this study. A person visit day is a whole or part day spent by a visitor in a park. For example, a camper staying for two days equals 2 person visit days.

Estimates of person visit days were supplied by DoE These were based on records of camping permits and commercial tour operator data returns. Estimates of

independent day visits were based on surveys carried out in some national parks and expert estimates made by managers of other national parks.

A total of 12,417,500 person visit days were estimated for the entire estate for 1997. Independent day visitors accounted for 78% of person visit days (see Table 4.2). Independent. camping visits accounted for a further 6% of person visit days. Independent visitors are local residents or tourists to the region who provide their own access into the protected area. The majority of trips are made by private car. Some tourists hire cars to make independent visits.

The remaining 16% of person visit days are made on commercial tours into protected areas. Fifteen percent of these are day trips, and only 1% of all person visit days are made on commercial camping trips. In total around 1,906,000 person visit days are supplied by the commercial tour sector. This may he an understatement of the importance of the commercial sector, as in some cases visitors are taken to the outskirts of protected areas by commercial tour or transport providers and 'dropped-off' to visit the protected area. Such visits are currently recorded as independent visits.

The number of person visit days by district and type is shown in Table 4. 1.

Table 4.1 Number of protected areas and person visit days

Region and district	Number of protected areas	Number of person visit days
FAR NORTHERN REGION		
Cairns Coastal	12	263,623
Cape York	20	25,601
Far North Coast	13	734
Tablelands	10	56,395
Wet Tropics	37	3,961,703
NORTHERN REGION		
Burdekin	20	569,046
Cumberland	21	437,516
Hinchinbrook	7	139,364
North West	2	25,305
Whitsundays	14	69,930
CENTRAL COAST REGION		
Capricorn	50	32,787
Curtis Capricorn	8	45,205
Great Sandy	6	1,430,118
Wide Bay Burnett	42	164,637
SOUTH-EASTERN REGION		
Central Moreton	24	431,374
Moreton Bay	17	499,170
North coast	35	1,660,111
South Coast	24	2,230,220

Table 4.1 (continued)

Region and district	Number of protected areas	Number of person visit days
SOUTH-WESTERN REGION		
Charleville	7	3,123
Longreach	12	15,674
Roma	16	62,792
Toowoomba	20	293,085
Total	**417**	**12,417,513**

Source: Department of Environment.

Table 4.2 Person visit days by type of access

	Camping		Day visits		Total
	Independent	Commercial	Independent	Commercial	
Person visit days	804,165	86,304	9,707,342	1,819,702	12,417,513
Percentage of all person visit days	6%	1%	78%	15%	100%

Source: Department of Environment.

4.1.3 Expenditure on access to protected areas

Expenditure on access-approach to analysis

Expenditure on access represents the outlay of money directly required to visit protected areas. Expenditure per person visit day on access to protected areas in Queensland is not uniform, as the costs of commercial tours and independent visits vary with the types of tours and mode and distance of travel. Independent visitors to mainland protected areas mostly travel by vehicle. Independent visitors to island national parks may travel by their own boat, by a commercial boat that provides drop-offs, for the larger sand islands, by barge and vehicle. Independent person visit days for camping involve more expenditure than day trips, as the cost of use of camping equipment must be included.

Commercial tour costs for day trips and camping cover the cost of access to protected areas.

Estimates of expenditure on access

Commercial camping and day tours

For each district, commercial tour prices were obtained from the telephone survey of operators. An average price per person visit day was calculated separately for day trips and camping trips. The methodology for the telephone survey is discussed below. The values used for each district are shown in Table 4.3. The values achieved reflect the difference in costs between vehicle and boat based trips and the greater

costs of overnight visits. A separate entry for Barron Gorge is included to account for trips on Skyrail and the Kuranda Scenic Railway. An average cost of $50 is used. Return trips on either train or Skyrail are $40 and $42 respectively, while a return trip using both modes is $64.

Independent camping and day trips

Expenditure estimates for independent visits are based on a few studies which have been completed for visits to protected areas in Queensland. No new research was able to be undertaken for this study.

Fifteen of the 0oE Districts are on the Queensland mainland. The majority of independent visitors travel to mainland national parks by private vehicle. The cost of a day trip is assumed to be the same, whether from home or from other accommodation used the previous night. The average cost of a day trip estimated for the south-east Queensland Regional Forest Agreement region was recently calculated based on surveys in the region. The figure of $15.50 estimated is similar to results of previous surveys of day trip expenditure (Kinhill Economics 1998, in press). This amount of $15.50 per person visit day is adopted as a standard for this study. An exception is made for the Wet Tropics WHA where an average day trip expenditure of $25 ($27 in 1997 dollars) was found from a visitor survey (Driml 1996). Visitors to the Wet Tropics WHA were found on average to travel to more than one site per day, and the person visit day costs reflect this. While the costs recorded for south-east Queensland are similar to other study results for the region, the higher costs found for the Wet Tropics WHA, suggest that the *$15.50 value is a conservative one.

Independent camping visits to mainland National parks cost more than day trips as they. include the cost of camping equipment and fees- An amount of $30 per person visit day was obtained from the survey of expenditure undertaken for the south-east Queensland RFA study (Kinhill Economics, in press). Beal (1995) reported an average expenditure on camping in Canarvon National Park of $155.65 per camper. Based on an average stay of 3 to 4 nights, this gives and average of $44.47 per night ($46.00 in 1997 dollars). Beal's estimate is used for all areas outside south-east Queensland, as it is based on a larger sample size of respondents, and may be more relevant for areas more remote than south-east Queensland.

Five Districts consist of island national parks, accessed by boat. Independent day visits to island national parks made in private boats have been allocated an expenditure value based on studies of recreational boating in Queensland. Blamey and Hundloe (1990) found an average cost of $80 per trip for recreational fishing and boating in the Great Barrier Reef Region. At an average of around three persons per boat, the average per person visit day cost is around $26.60 ($30.00 in 1997 dollars).

Independent camping visits to island national parks may be made using private boats or 'drop-offs' from commercial vessels. Island drop-off costs range between $120 to $200 per person, for transport only. Trip lengths of five nights are common. Per visit day transport costs would be around $30

We have found no published estimate of total island camping costs. Costs are likely to be higher than day trip costs as food and camping equipment are included. The differential between day trip vehicle costs and the most conservative vehicle camping cost is $14.50. This amount of $14.50 per person visit day has been added to day trip

boat costs to approximate camping expenditure. Camping expenditure for Island national parks is therefore estimated at $44.50 per person visit day.

The DOE provided information that the vast majority of independent visits to the Great Sandy and Moreton Bay Districts are in fact visits to Fraser and Moreton Islands by private vehicles, using barge access. The costs of visiting involve the barge cost and national parks access fees in addition to the day visit and camping costs. For Fraser Island, barge fee is $70 and the access fees is $30 per vehicle. For Moreton Island the barge fees is $95 and the access fee is $30 per vehicle. It is assumed that average vehicle occupancy is three people and average trip length is five days. The extra costs per person day are therefore $6.60 and $8.30 for Fraser and Moreton Islands respectively. These amounts have been added to the standard camping and day trip costs for the Great Sandy and Moreton Bay districts.

Table 4.3 shows the expenditure amounts per person visit day used in the analysis.

Table 4.3 Average expenditure on access per person visit day, estimates by access type and District

		Camping		Day	
Protected area type		Independent	Commercial	Independent	Commercial
FAR NORTHERN REGION					
Cairns Coastal	islands	44.50	223.00	30.00	86.00
Cape York	mainland	46.00	162.00	15.50	98.00
Far North Coast	islands	44.50	223.00	30.00	86.00
Tablelands	mainland	46.00	162.00	15.50	98.00
Wet Tropics	mainland	46.00	162.00	27.00	98.00
Barron Gorge	mainland	—	—	—	50.00
NORTHERN REGION					
Burdekin	mainland	46.00	191.00	15.50	87.00
Cumberland	mainland	46.00	191.00	15.50	87.00
Hinchinbrook	islands	44.50	223.00	30.00	86.00
North West	mainland	46.00	191.00	15.50	87.00
Whitsundays	islands	44.50	223.00	30.00	86.00
CENTRAL COAST REGION					
Capricorn	mainland	46.00	104.00	15.50	84.00
Curtis Capricorn	islands	44.50	223.00	30.00	86.00
Great Sandy	islands	52.60	104.00	22.10	84.00
Wide Bay Burnett	mainland	46.00	104.00	15.50	84.00
SOUTH-EASTERN REGION					
Central Moreton	mainland	30.00	104.00	15.50	84.00
Moreton Bay	islands	38.30	104.00	23.80	84.00
North coast	mainland	30.00	104.00	15.50	84.00
South Coast	mainland	30.00	104.00	15.50	84.00
SOUTH-WESTERN REGION					
Charleville	mainland	46.00	215.00	15.50	75.00
Longreach	mainland	46.00	215.00	15.50	75.00
Roma	mainland	46.00	215.00	15.50	75.00
Toowoomba	mainland	46.00	215.00	15.50	75.00

Source: Kinhill Economics.

4.1.4 Expenditure on accommodation

Expenditure on accommodation--approach to analysis

Expenditure directly associated with visiting protected areas also justifiably includes expenditure by tourists to the region, on accommodation and other associated items that are incurred in order to make day or longer trips into protected areas. In order to make a day trip to a protected area, tourists generally must stay near the protected area at least the night before the trip or the night after. In cases where trips are a full day, tourists may stay two nights in a region, directly in order to make the day trip. While the concept of attributing some associated expenditure directly to the attractions of the protected area visited is easily accepted, the appropriate amount of expenditure to be attributed is subject to debate. The appropriate amount ranges from one night's accommodation cost, to two night's accommodation costs plus food, entertainment, shopping. etc., expenditure. A range of results including one, one and a half, and two nights accommodation expenditure, are presented in this report.

Expenditure on accommodation is only relevant for 'tourists'. Tourists are defined as people who stay somewhere other than their own home on the night before, and/or after their visit to a protected area (this includes people staying with friends or relatives, away from their own home). - Estimating expenditure on accommodation includes steps to estimate the number of tourists, the proportion who stay in commercial accommodation or with friends and relatives, and appropriate costs per night.

Estimates of expenditure on accommodation

Percentage of tourists

Expenditure on accommodation was only included for day visitors who are tourists. It was assumed that nights spent in the region in association with a camping visit to the protected area were in fact spent in the protected area, and the higher cost of camping person visit days takes this into account. Excluding camping from this analysis might lead to an underestimate of expenditure if tourists who camp in a protected area also spend other nights in the region in association with their visit.

It is assumed for this study that all visitors on commercial day trips are tourists to the region.

The next step, in analysis was therefore to estimate how many independent day visitors (the group making 78% of all person visit days) were tourists. The pattern of visitor use of protected areas was discussed with DoE staff. It was noted that the pattern of use seemed to vary by whether the protected areas were on the mainland or islands, close to large population centres or remote, and whether they were near tourist centres. Published information for the Wet Tropics WHA showed that in that region, 50% of visits were by tourists (Manidis Roberts et al 1994).

The patterns of visitor use were divided into several types. Broad estimates of the percentage of tourists were made for each pattern type. While all percentages used are estimates, in some cases, a range of estimates was indicated. A conservative approach was taken in generating a set of percentages reflecting the likely minimum proportion of visitors who are tourists. This is shown in the first data column in

Table 4.4. A less conservative range of estimates was also generated, shown in the second data column in the table. The rationales behind the estimates are presented below. This is an area requiring more research.

For island protected areas in the Great Barrier Reef region, it was assumed that the majority of independent day visits were made by local residents in their own boats. Tourists to the region visit by commercial vessel.

The sand islands of Fraser and Moreton are visited by vehicles via barge. The pattern of visits is for people to make trips of several days to the islands and camp or stay in accommodation on the island but outside the protected areas, but make day trips into the protected areas. Thus, the majority of visits are by tourists to the islands.

The protected areas near large populations, especially Brisbane, tend to be visited by local residents on day trips from home, as well as by tourists. A survey of some protected areas near Brisbane, in November 1997, found only 10% of visitors were tourists (Kinhill Economics 1998, in press). This is considered conservative, as peak tourist seasons were not included. This estimate of 10% tourists is used in the conservative estimate for Central Moreton, and increased to 30% for the less conservative estimate.

The balance of visitors between tourists and local residents near the provincial cities of Queensland was assumed to be around 30% tourists and 70% locals, for the conservative estimate. The proportion of tourists is increased to 50% for the less conservative estimate.

A year long study of the Wet Tropics WHA found that 50% of visits were made by tourists.

The Wet Tropics WHA pattern may be repeated for tourist areas such as the South (Gold) Coast and North (Sunshine) Coast, but because the protected areas are also within a day trip distance from Brisbane, a lower proportion of tourists may be indicated. For the conservative estimate, it is estimated that 30% of visitors to protected areas in the South and North Coast Districts are tourists, increased to 50% for the less conservative estimate.

The remote protected areas are assumed to be visited by tourists in the majority.

Table 4.4 Estimates of the percentage of independent day person visit days made by tourists

Pattern of visitor use	DoE District	Percentage of independent day person visit days made by tourists	
		Conservative estimate	Less conservative estimate
Islands in the Great Barrier Reef	Cairns Coastal, Far North Coast, Hinchinbrook, Whitsundays, Curtis Capricorn	10	10
Sand Islands	Great Sandy, Moreton Bay	70	70
Near Brisbane	Central Moreton,	10	10
Near provincial cities	Burdekin, Cumberland, Capricorn, Wide Bay Burnett, Toowoomba	30	50
Wet Tropics WHA	Wet Tropics	50	50
Tourist regions	South Coast, North Coast	30	50
Remote areas	Cape York, Tablelands, North West, Charleville, Longreach, Roma	70	70

Source: Kinhill Economics.

Type of accommodation

Tourists may stay in commercial accommodation or privately with friends and relatives. It was relevant to make a distinction between commercial or private accommodation, as the expenditure per visitor 'nights is higher for commercial accommodation.

According to the International Visitor Survey 1996, 35% of visitor nights to Australia were spent staying with friends and relatives and 65% of visitor nights were spent in commercial accommodation (BTR 1997). Domestic tourists in Queensland in 1995-96 spent 47% of visitor nights with friends and relatives or in their own holiday house, and 53% of visitor nights in commercial accommodation (BTR 1996). A conservative approach was taken and the domestic tourism split between commercial and private accommodation of 53% and 47% was used in this study.

Expenditure on commercial accommodation

Expenditure by visitors who stay in commercial accommodation is available from the Queensland Visitor Survey. For each region, the average expenditure per visitor night is reported for the categories shown in Table 4.5. For visitors who make a day trip into a protected area, two levels of accommodation expenditure have been estimated. The lower estimate is for accommodation only, and represents the minimum expenditure vital for supporting a day trip to the protected area. The higher estimate includes associated expenses made in a day in the region, and represents the actual expenditure by visitors to the region. The expenditure categories used in the estimates are shown in Table 4.6. Several cost categories have been excluded, to avoid double counting of day trip costs.

Table 4.5 Accommodation cost categories

QVS expenditure categories	Categories included: Accommodation only	Categories included: Accommodation plus other costs
Food and beverage at the accommodation establishment		√
Food and beverage bought elsewhere		
Pleasure shopping		√
Gambling		√
Entertainment and admission fees		
Transport fares		
Vehicle expenses		
Other incidental expenses		√
Accommodation	√	√

Table 4.6 Expenditure on commercial accommodation, 1996/97

DoE Districts	QVS region	Accommodation only ($) per person night	Accommodation plus other items ($) per person night
Central Moreton, Moreton Bay	Brisbane	46.61	100.73
South Coast	Gold Coast	41.14	99.84
North Coast	Sunshine Coast	33.17	62.80
Wide Bay Burnett, Great Sandy	Wide Bay Burnett	20.15	36.52
Capricorn	Fitzroy	33.76	65.06
Cumberland	Mackay	22.38	50.43
Burdekin	Northern	29.91	57.29
Wet Tropics, Tablelands, Cape York	Far North	49.12	106.20
Toowoomba	Darling Downs	26.86	59.03
Charleville, Longreach, Roma, North West	Western Queensland	22.96	43.85
Cairns Coastal, Far North Coast, Hinchinbrook, Whitsundays, Curtis Capricorn	Barrier Reef	86.71	135.14

Source: Queensland Visitor Survey 1996/97, QTTC.

Expenditure on private accommodation

Information on expenditure per visitor night by people staying with friends and relatives is not regularly collected by the Queensland or Commonwealth tourism research bodies. A one-off national study of expenditure on domestic tourism in 1992 found that people who made trips with the primary purpose of visiting friends and relatives,, on average incurred some accommodation costs. Those costs were 25% of the average accommodation costs of all domestic tourists (BTR 1993). A 1989 study of tourists to far north Queensland staying with friends and relatives provided an estimated expenditure by these visitors that equated to 22% of the expenditure in commercial accommodation (NCST&T, no date). For the purposes of this study, it is assumed that tourists staying in private accommodation have expenditure that is 25% of that by tourists staying in commercial accommodation.

4.1.5 Multiplier effects of expenditure

Direct expenditure generates multiplier effects in a regional or state economy as additional economic activity and employment ensues, as a result of the stimulus of direct expenditure. Multiplier effects are calculated using Input Output models or General Equilibrium models of regional or state economies. Industries are generally represented as 'sectors' and links to the rest of the economy are quantified in dollar and employment terms. In standard Input Output models, there is no single sector for 'tourism', as expenditure by tourists is spread across a number of sectors, including transport, retail and services. Tourism sectors have been constructed for some economic studies.

In the mid 1980s, regional Input Output models for Queensland coastal regions were augmented with a tourism sector in order to study the economic impacts of tourism in the Great Barrier Reef (DrimI 1987). Output multipliers in the order of 1.7 were indicated. This means that a $1 increase in direct expenditure on tourism in the regions generated a total of $1.70 output in the regions. This multiplier of 1.7 has been adopted for use in this study, noting limitations of the generalisation to all regions, and the time elapsed since the research was published.

4.1.6 Commercial tour operators survey

A significant commercial tour sector provides tours to protected areas in Queensland. A survey of operators with permits from the DoE to conduct tours in national parks and other protected areas was undertaken, in order to describe the number of active operators and employment supported. A list of operators with permits was supplied by DoE. The operators were surveyed by telephone. Excluded from this survey were resorts operating in protected areas with permits from DoE, as these were covered in the resort survey (see below). Also excluded were operators who visit the Great Barrier Reef and may visit Queensland marine parks, but who do not have permits to visit islands which are Queensland protected areas. There are over 1,000 such operators in the far north Region alone. Advice from DoE regional staff is that a proportion of these operators do visit marine areas and beaches adjacent to Queensland national parks. Excluding these operators, and the visitors they carry, from this analysis may underestimate the economic contribution of the protected areas included in this study.

Questions were asked in the telephone survey on the length and price of tours, the frequency of tours, numbers of vehicles, number of employees, business dependence on national parks and percentage of passengers who pay the full adult fare. No questions were asked about the number of visitors carried as this was considered potentially commercial information, which could not be expected to be obtained from a telephone survey.

Attempts were made to contact all operators on the lists provided by DoE. In a number of cases (27% of all operators listed), contact could not be made. Included in the non contacts were 11 % of operators listed where no contact number was provided by DoE, and these operators or firms were not located in telephone books or by directory assistance. In the remaining 16% of non contact cases, telephone calls were not answered, or messages left and not returned. All calls were made between the 14-24 April 1998. Time and budget constraints prevented further follow up of non-contacts.

When contact was successful, operators were asked if they would participate in the survey. A small number of operators (5%) refused to participate. Other operators (7%), advised that they had ceased operating or had not yet commenced. There were also some operators on the DoE list who held permits but did not use them. This group made up 6% of the operators.

Altogether, 176 operators were contacted, which represents 66% of those listed. The figure of 176 operators is a minimum estimate of the population of active operators. The actual population cannot be determined due to the non contacts. Results are presented for the 176 operators contacted.

4.1.7 Resorts survey

There are accommodation establishments located adjacent to protected areas, and some of which have leases to operate within protected areas, which potentially base their businesses on the attractions of the protected areas. A group of these was identified by. DoE regional staff as being particularly associated with protected areas. This group includes all twenty-two Great Barrier Reef Island resorts, three resorts on Fraser Island and seventeen mainland resorts. These accommodation establishments are only a proportion of establishments patronised by tourists who visit protected areas. A small study was undertaken to estimate takings from accommodation and employment associated with these selected resorts.

Economic information relating to the selected resorts was gathered from number of sources. The Australian Bureau of Statistics provides detailed information on the number, of establishments, employment, room occupancy rates, guest nights, guest arrivals, and takings from accommodation for the grouping of Great Barrier Reef (GBR) island resorts, as well as for all accommodation establishments in Queensland Statistical Divisions, in 'Tourist Accommodation' (Cat. No. -8635.3).

For the resorts other those in the GBR the *Queensland Accommodation and Touring Guide* published by the RACQ was used to determine the types and number of rooms available and tariff rates. It was also used to obtain telephone numbers, and these operators were contacted to obtain information relating to employee numbers and business dependence on national parks and protected areas.

Estimates of guest nights for resorts other than those on the GBR islands were estimated by multiplying the rooms available by two (the average number of people occupying one room) and then by 365 days. The figure derived was then multiplied by the establishment occupancy rate for the region (% of rooms occupied), which is reported by the ABS To derive estimates of accommodation takings, a similar methodology was employed. Room numbers were multiplied by the corresponding tariffs (for two people) and then by 365 days. This figure was then multiplied by the room occupancy rate for that particular region to derive a total estimate for 1997. This methodology provides estimates which may be less reliable than the ABS survey results.

4.1.8 Management expenditure

The DoE supplied information on expenditure on management of protected areas. In 1997, total expenditure was $33 million, of which $17 million was devoted to visitor management.

4.2 INDICATORS OF ECONOMIC ACTIVITY—RESULTS

4.2.1 Expenditure on visits to protected areas

Expenditure on access to protected areas was estimated to be $365 million in 1997.

Expenditure on accommodation makes a significant contribution to total expenditure. Estimates are sensitive to values chosen for a number of variables. The results were subjected to sensitivity analysis by using:

- two options for the percentage of independent day person visits days by tourists
- two options for accommodation costs
- three options for the number of nights for which expenses are included.

The results for expenditure on accommodation were compared, using the lowest estimates for the other variables, with the following results:

- For percentage of independent day person visits days by tourists, the 'less conservative' estimate gave a result 17% higher than the 'conservative' estimate.
- For accommodation costs, the 'accommodation plus other costs' estimate gave a result 109% higher than the 'accommodation only' estimate.
- For nights expenditure, the two night estimate gave a result 100% higher than the one night estimate, and the 1.5 night estimate gave a result 50% higher than the one night estimate.

As there is high variability shown in the results due to the selection of values for these variables, a range of results is reported here. The results are shown using the ‘conservative' estimate for the percentage of independent day person visits days by tourists, and the range of options for the other variables.

Table 4.7 summarises results for expenditure on access, expenditure on accommodation, the total direct expenditure, and expenditure with a 1.7 multiplier applied.

Table 4.7 Results of expenditure on access and accommodation analysis, Queensland protected areas 1997

	Accommodation only			Accommodation plus other items		
	1 nights accommodation ($ m.)	1.5 nights accommodation ($ m.)	2 nights accommodation ($ m.)	1 nights accommodation ($ m.)	1.5 nights accommodation ($ m.)	2 nights accommodation ($ m.)
Expenditure on access	365	365	365	365	365	365
Expenditure on accommodation	158	236	315	328	493	657
Total direct expenditure	523	602	681	694	858	1,022
Multiplier effect *	889	1,023	1,157	1,180	1,458	1,738

* *Using a 1.7 multiplier.*

Source: Kinhill Economics.

Using the conservative estimate for the proportion of tourists, the range of results for expenditure on accommodation is from $158-$657 million. The total direct expenditure ranges from $523-$1,022 million. The total output effects range from $889-$1,738 million. The mid range for estimates, based on 1.5 nights accommodation expenditure, is $602-$858 million in total direct expenditure, and $1,023-$1,458 million for total output effects.

4.2.2 The commercial tour sector

The results of the telephone survey of commercial operators are for the 176 tour operators contacted. This is a minimum estimate for the population of active operators.

Seventy-nine operators depend on national parks and other protected areas for more than three quarters of their business. A listing of the number and percentage of operators who depend on protected areas for various proportions of their business is shown in Table 4.8. The distribution shows that one third of operators depend only partly on protected areas. This includes some who make regular trips but who also go to other locations, plus the less regular users. The largest group of operators is comprised of those who rely on protected areas for more than three quarters of their business.

Table 4.8 Proportion of business dependent on protected areas

	Number of operators	(%)
1% to 25%	51	33
26% to 50%	13	8
5 1 % to 715%	12	8
76% to 100%	79	51

Source., Kinhill Economics.

Fifty-seven percent of the operators in Queensland offer regular daily or weekly trips, see Table 4.9. The remaining 43% offer charter trips on demand, other types of trips in Queensland with protected areas only occasionally visited, or operate more widely within Australia with occasional visits to Queensland protected areas.

Table 4.9 Frequency of visits to protected areas

	Number of operators	(%)
Regular, daily or several times weekly	101	57
Irregular charter andlor a small number of trips per year	75	43

source Kinhill Economics.

The many operators offer a range of trips of varying length. Sixty percent of operators offer day trips. Fifty percent of operators offer extended trips.Totals in Table 4.10 add to more than 100%, reflecting that some operators offer more than one type of trip.

Table 4.10 Lengths of tours to protected areas

	Number of operators	(%)
Day trips	106	60
Half day trips	38	22
Evening trips	12	7
Extended trips	88	50

Source Kinhill Economics

The 176 operators in Queensland own a total of one hundred and forty four vehicles, twenty three boats and four aircraft. The largest number of vehicles owned by one operator is thirty-six, and this operation is focused on Fraser Island. A number of operators do not own any vehicles in association with this part of their operations, and instead lease them as required.

A total of 2,249 people are employed by the 176 operators surveyed. Information on the split between full and part time employment was provided by only some of the operators, indicating full time employment of at least 904 people and part time employment *of* at least 799 people.

The gross turnover for operators providing visits to protected areas can be estimated by multiplying the number of passengers reported by the DoE to be carried into protected areas, by the average price per trip. The average prices *of* all tours for adult passengers found in the telephone survey are shown in Table 4.11. The average number of passengers who pay the full adult fare is 86%. These prices have also been broken down to regional level and the average prices per region are shown in Table 4.12. These data were used in calculating expenditure on access. Barron Gorge tour prices are not included.

The estimate of gross takings is $138 million. This is included in the expenditure on access estimate above.

Table 4.11 Commercial tour prices, all regions

	Number of observations	Mean price ($)
Day tours	100	89
Half day tours	35	66
Evening tours	9	103
Extended tours (price per day)	75	163

Source.-' Kinhill Economics

Table 4.12 Commercial tour prices by District and type

	Day tours	Half day tours	Evening tours	Extended tours (price per day)
Far North Region	98	74	10	162
Northern Region	87	153	-	191
South-east Region	84	48	107	104
South-west Region	75	- -	-	215
Island national parks	69	66	-	235
Boat tour prices	86	54	-	223

Source Kinhill Economics

4.2.3 Resorts associated with protected areas

It was found that the selected resorts contacted depend on national parks and/or Marine Parks for an average of 95% of their business.

The number of guest nights estimated for the forty-two selected resorts total over 1.5 million guest nights and represent over. 8% of guest nights staying in resorts, hotels and motels in Queensland (see Table 4.13). The total number of rooms are shown in Table 4.14.

The takings of the selected resorts are estimated at $126 million, which represents 13% of gross takings from accommodation in Queensland (see Table 4.15). The takings from 'other' resorts were estimated at 75% of the advertised tariffs. The remaining 25% of accommodation fees have been deducted to account for any commission which may be paid to booking operators or to account for any discounts the resorts may offer.

Table 4.13 Guest nights (1997)

	Number of guests nights (1997)	% total Qld hotels and motels
GBR islands*	1,237,087	6.8
Other **	291,667	1.6
Total Queensland*	18,282,324	100

* *ABS 8635.3*
** *Kinhill Economics estimate*

Table 4.14 N umber of rooms (1997)

	Number of rooms (1997)	% total Qld hotels and motels
GBR islands*	2,783	6.1
Other **	717	1.6
Total Queensland*	45,689	100

* *ABS 8635.3.*
** *Kinhill Economics estmate.*

Table 4.15 Takings from accommodation (1997)

	Takings ($'000)	% total Qld hotels & motels
GBR islands*	99,967	10.2
Other **	26,025	2.7
Total Queensland*	976,260	100

***** ***ASS 86-153.***

****** ***Kinhill Ecwomics esdmate***

Information on employment was collected from ABS and by telephone survey of the selected resorts. Employee numbers are presented in Table 4.16. The employment figure for the *GBR* islands is the average of all employees for 1997, provided by the *ABS.* The employment figure for, the 'other' category is also an average figure, but likely to be an underestimate as only fifteen of the twenty resorts contacted provided this information. Based on the figures in Table 4.15, at least 10% of all employees in resorts, hotels and motels in Queensland work in the selected resorts.

Table 4.16 Resort employment (1997)

	Number o~ employees	% total Qld hotels and motels
Great Barrier Reef islands	2,696	8.3
Other **	407	1.3
Total Queensland	32,342	9.6

***** ***ABS 8635.3.***
** ***Kinhill Economics es#mate.***

4.3 NET ECONOMIC BENEFITS--METHODOLOGIES FOR THIS STUDY

4.3.1 Benefit transfer for consumers' surplus

There have been only a few studies ever conducted in Queensland protected areas to calculate consumers' surplus arising from visitor use. The results of these vary somewhat, raising questions about the methodology and its application. There is a need for more research in this area, if this type of data is to be used in policy development. Nevertheless it was decided to present an indicative estimate of the consumers' surplus associated with visits to protected areas by using the benefit transfer technique to apply results from a few sites to all protected areas.

The benefit transfer technique was used to make an order of magnitude estimate of consumers' surplus arising from visits to protected areas in Queensland. This technique uses estimates from studies of sites similar to those under investigation and transfers the study results to the sites in question. The conditions for using the technique are discussed in Appendix A, as are the results of a literature review of relevant studies. Estimates of consumers' surplus arising from visits to some protected areas in Queensland and New South Wales, considered suitable for use in this study, ranged from $8 to $17 per person visit day. As some studies in

Queensland protected areas provided higher dollar value estimates, those used in this study art considered conservative.

The benefit transfer technique was effected by applying a range of $10 to $17 per person visit day to those protected areas which are particularly popular with high visitor numbers, near large population centres, and have attractions including beaches, marine areas, and rainforest. These protected areas were classified as Category 1. A value of $8 per person visit day was applied to protected areas in the more remote and drier areas, classified as Category 2 protected areas. The classification onto categories was by necessity somewhat arbitrary. It followed the method used in a study of south-east Queensland protected areas (Kinhill Economics 1998, in press) for those protected areas. For other areas, classification was made more broadly by District, based on the predominant types of protected areas in each district.

4.3.2 Net economic benefits of visits to protected areas

Net economic benefits of tourism and recreation in protected areas have been defined as:

(consumers' surplus + producers' surplus)-(management costs + environmental damage costs)

Estimates are made in this study of consumers' surplus, and management costs are reported above. It was not possible to measure producers' surplus in this study. There has been no assessment, or any economic valuation, of any potential environmental damage costs for this study. The net economic benefits estimated from the data available may therefore be overstated if there are damage costs.

4.4 NET ECONOMIC BENEFITS--RESULTS

4.4.1 Estimated consumers' surplus

The estimates of consumers' surplus made using the benefit transfer technique are meant to be order of magnitude estimates only. The consumers' surplus estimates represent the amount visitors would be willing to pay, over and above the costs they now incur, in order to experience the natural attractions provided by national parks and other protected areas. 'Low' and 'high' values are presented to account for the fact that for Category 1 areas, a range of $10 to $17 per person visit day was used. For Category 2 protected areas, a single value of $8 per person visit day was used. Results by District are shown on Table 4.16.

The total consumers' surplus for visits to all Queensland protected areas is estimated to be between $121 million and $196 million (see Table 4.1 g).

Table 4.17 Estimates of consumers surplus for visits to Queensland protected areas, by category and District

	Category 1 Low estimate ($10 per person visit day) ($)	Category 1 High estimate ($17 per person visit day) ($)	Category 2 ($8 per person visit day) ($)
Far North	45,509,270	72,265,759	461,832
Northern	10,156,520	17,266,084	1,804,072
Central Coastal	14,750,830	25,076,411	1,581,312
South-eastern	39,803,240	67,665,508	7,109,176
South-western	-	-	2,998,432

Source: Kinhill Economics.

Table 4.18 Estimates of consumers surplus for visits to all Queensland protected areas

	All protected areas Low estimate	All protected areas High estimate
Total	121,175,000	196,228,000

Source: Kinhill Economics.

4.4.2 Indicative net economic benefits

Net economic benefits are indicated by placing the dollar values that are available into the equation presented in Section 4. 1. 10 above. The findings are thus:

Net economic benefits = ($121 million to $196 million + producers' surplus) -- ($17 million + environmental damage costs)

Provided environmental damage costs are not high, net economic benefits are positive and possibly significant. This estimate represents the potential net benefits if tourism and recreation is being managed to be ecologically sustainable. It may be that higher management costs will be required to meet ecological sustainability goals. In this case, net benefits would be somewhat lower.

No definitive statements can however be made on net economic benefits, without more research into the magnitude of any producers' surplus and any environmental damage costs.

4.5 SUMMARY OF RESULTS

Information is presented on estimates of a range of economic indicators. Expenditure on visiting to protected areas and accommodation associated with visits to protected areas was estimated using several options for some of the relevant variables, giving a range of results. The mid range results are:

- $602-$858 million in total direct expenditure
- $1,023-$1,458 million for total output effects.

0

4-18

The commercial tour sector in protected areas consists of at least 176 active operators. The majority of these operators depend on protected areas for over 75% of their

business. These operators employ 2,249 people. Gross visitor expenditure on tours is around $138 million per annum a figure included in the above expenditure on access estimate.

There are many resorts in Queensland which are located adjacent to protected areas and which base their business on the attractions of these natural areas. A selection of forty-two resorts was made to represent those accommodation establishments perhaps most associated with protected areas. The gross takings for these resorts was estimated at $126 million per annum A proportion of these takings would have been already included in the above estimates of expenditure on accommodation, but a proportion would be in addition, representing additional nights spent in the accommodation. Other accommodation establishments throughout Queensland also benefit from visitors attracted by protected areas.

The DoE spends around $17 million annually in provision of visitor management in Queensland protected areas. This expenditure supports economic activity and employment in rural and regional areas of Queensland.

An estimate of consumers' surplus was made using the benefit transfer technique. An order of magnitude estimate of $121-$106 million is indicated.

The net economic benefits of tourism and recreation in protected areas could not be calculated because dollar value estimates are not available for producers' surplus or any environmental damage costs. The indication of net economic benefits gained by comparing consumers' surplus to management costs is of a significant positive benefit. More information is required on whether there are any significant environment damage costs that may be reducing the indicated net benefit.

4.6 RESEARCH RECOMMENDATIONS

There is a strong argument for refining the estimates of tourism and recreation values and continuing to monitor these estimates. The methodology has been established and it is a matter of continually improving the basis of estimates by improving information on which assumptions and extrapolations are based.

The steps required to improve estimates include:

- improving the QNPSW estimates of visitor numbers-possibly using surveys at a sample of sites to 'ground truth' estimates;

- conducting surveys of visitors at a sample of sites, to gather data on expenditure and origin (the Department is currently supporting research at Noosa National Park by Leonic Pearson, who is investigating alternative data collection approaches);

- conducting Travel Cost Analysis at a greater range of sites in Queensland;

- investigating further the links between protected areas and accommodation establishments adjacent.

The project to improve the estimates could extend over a few years, with a program of surveys to be conducted using parks staff and employed interviewers, and possibly

students, as resources are available. An annual, budget of the order of $30,000 to $50,000 would provide considerable improvements in the estimates over three years.

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