1-1-2003

The economic value of tourism and recreation in forested areas of Western Australia

Rachel Goff
Edith Cowan University

Edith Cowan University

Copyright Warning

RESEARCH THESIS:

THE ECONOMIC VALUE OF TOURISM AND RECREATION IN FORESTED AREAS OF WESTERN AUSTRALIA

Student Name: Rachel Goff, Bachelor of Commerce (Marketing)

Student Number: [redacted]

For the Degree of: Master of Business

Principal Supervisor: Dr Ross Dowling

Date of Submission: 26 May 2003

USE OF THESIS

The Use of Thesis statement is not included in this version of the thesis.

DECLARATION

I certify that this thesis does not, to the best of my knowledge and belief:

incorporate without acknowledgement any material previously submitted for a degree or diploma in any institution of higher education;

contain any material previously published or written by another person except where due reference is made in the text; or

contain any defamatory material.

Signed:

26 May 2003

Rachel Goff Date

ACKNOWLEDGEMENTS

The author would like to acknowledge the support of the following organisations and individuals:

CRC for Sustainable Tourism

Department of Conservation and Land Management, Western Australia

Western Australian Tourism Commission

Supervisors: Dr Ross Dowling (Edith Cowan University)

Dr Jack Carlsen (Curtin University)

Friends and family, particularly John Goff and Glenn May.

ABSTRACT

In recent years, natural area tourism has been presented as a more profitable, labour intensive and environmentally sound industry than the traditional extractive industries which have resulted in the depletion of primary resources in many countries (Burr, 1995). However, in order for economic returns from tourism to be maintained over a long period of time, investment in resources and infrastructure that support and encourage *sustainable* tourism and recreation activity in natural areas is required.

The key to sustainability is maintaining the capital stock of resources (Garrod & Fyall, 1998; Russell, 2001). In a society driven by economics, resources are allocated according to their representative worth to the population. However, the true value of the environmental resources, which underpin tourism and recreation in natural areas, is hidden due to the non-price and common-good attributes (Marcouiller, 1998). The application of measurement techniques which capture economic values for these resources provides a decision framework which promotes sustainability in the sector.

This thesis estimates the gross economic value of tourism and recreation in the forested areas of the South West of Western Australia. The research utilises an established non-market valuation technique, travel cost analysis. The determination of travel costs by visitors to forested areas is used as a market substitute to estimate the tourism and recreation value of the forests in the Conservation and Land Management's Central and Southern Forest regions in the South West of Western Australia.

The findings presented in this thesis provide an order of magnitude estimate of the gross market value of tourism and recreation in the Central and Southern Forest regions in 2000-2001 at between $122 million and $160 million.

Primary research at a single forest site in the region, the Valley of the Giants, Tree Top Walk, Walpole, provides an estimate of the annual gross market value at between $27.8 million (intrastate market only) and $28.9 million (entire market) using an attribution factor of 70%. This calculation is based on all visitors to the site, with 70% of

their visitor expenditure in the region (Manjimup/ Walpole/ Denmark) being attributable to the Valley of the Giants site. With the inclusion of the opportunity cost of travel time, the estimate increases to $33.16 million (based on the intrastate market only and an attribution factor of 70%).

The consumer surplus value of the Valley of the Giants site, without accounting for the money spent on park entry fees to the site, is estimated at $50.84 million (measure based on the intrastate market only who account for 79% of the market and without the inclusion of the opportunity costs of travel time). With an attribution factor of 70% the consumer surplus value is $35.58 million. Intrastate visitors to the Valley of the Giants spent approximately $760,000 on park entry fees to the Valley of the Giants site in 2000-2001. Therefore with the attribution factor applied, the consumer surplus value, net the park entry fees is approximately $35 million . With a visitation rate of approximately 151,200 intrastate visitors in 2000-2001, the benefits accruing to each individual are $231.48 per person or $83 per person per day spent in the Manjimup/ Walpole/ Denmark region (average length of stay 2.8 days).

The findings from this study provides a significant contribution to the management of forested areas in Western Australia providing valuable economic information with which to compare other forest use values. This information can be used to facilitate zoning decisions and multiple-use management strategies in forested areas, particularly when aggregated with other valuation studies.

In a climate where public funds are limited, the economic measurement of tourism and recreation in forested areas provides justification for the allocation of government resources to facilitate the sustainable management of tourism in the region.

In addition, the methodology adopted will provide a basis for future repeat studies and may also be applicable to other forest regions around Australia.

TABLE OF CONTENTS

List of Figures

List of Tables

1. INTRODUCTION

Forests have long been recognised for their extractive use values. The value of forests in terms of timber production is easily measured and the tangible end products are readily visible to the consumer. On the other hand, the value of forests for tourism and recreation although well recognised, have received little research attention for the quantification of economic benefits. This is largely due to the common good attributes of most forest resources utilised for tourism and recreation. These resources are not captured by the market system and are therefore incorrectly priced and misallocated by a society that is largely driven by economics.

In addition, tourism is an intangible experience that is subjective, complex and difficult to define. The dynamism and complexity of the tourism 'product' and the degree of cross-industry involvement in the 'tourism production process' provide numerous obstacles for measurement. Until recently tourism has been viewed as a somewhat trivial industry, attached to self-satisfying motivations rather than clearly defined industry outputs (Buckley, 2000; Eagles, 2002; Ward, 2001). However, with the advances in technology, especially in the areas of transport and communication, tourism is now recognised as a significant contributor to a country's gross domestic product warranting the attention of national governments.

In parallel to industry development, in recent times there has been widespread recognition that the human life support system, the environment, is showing signs of non-renewable resource depletion. In a world where economics is the dominant world paradigm, regions must skillfully balance resource consumption and production over time to sustain their populations. Sustainability has become a key issue where long term projections of the existing use of environmental resources have proved untenable. Worldwide, the destruction of forests for timber production and agricultural land, and the resultant environmental impacts are widely reported. Tourism provides an economic

alternative, which if managed sustainably, provides value whilst preserving the environmental resource base from which it is derived.

In Australia, 17.6 million hectares out of a total 156 million hectares of native forest (11.3%) is currently set aside in conservation reserves (Department of Agriculture Fisheries and Forestry - Australia, 2002). These conservation reserves, particularly in the past two decades, have received increased demand from the commercial nature, eco and adventure tourism (NEAT) sector as well as for private outdoor recreation (Buckley, 2000; Font & Tribe, 2000).

Despite increasing pressure from the tourism industry, the resource commitment to research and development from governments have lagged behind industry and public participation in natural area tourism. This lag threatens to undermine the very environmental assets that support the industry. In 1994-1995 tourism represented 7.1% of gross domestic product, yet received only 0.4% funding on research and development. (Bushell, Prosser, Faulkner, & Jafari, 2001)

This study aims to help address the knowledge gap in the area of natural area tourism management in Western Australia. The study focuses particularly on the quantification of economic benefits arising from tourism and recreational activities undertaken in the Department of Conservation and Land Management (CALM) – managed forest estates in the South West of Western Australia shown in Figure 1.

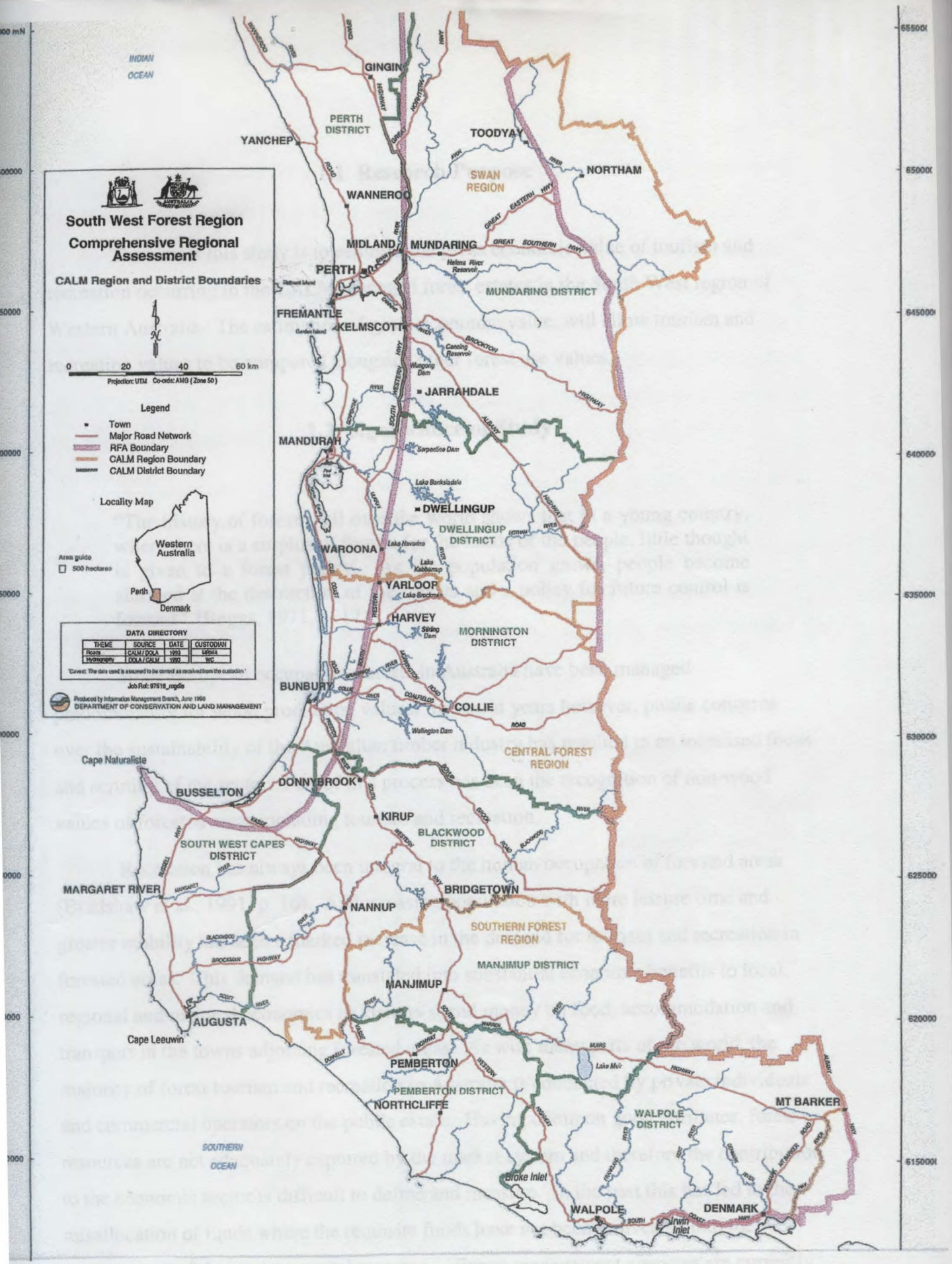


Figure 1: Map of CALM Forest Regions in Western Australia (Commonwealth of Australia and the Western Australian Regional Forest Agreement (RFA) Steering Committee, 1998, p.2)

1.1 Research Purpose

The aim of this study is to estimate the gross economic value of tourism and recreation occurring in the CALM managed forest estates in the South West region of Western Australia. The estimation of gross economic value, will allow tourism and recreation values to be compared alongside other forest use values.

1.2 Significance of Study

> "The history of forestry all over the world shows that in a young country, where there is a surplus of forests for the needs of the people, little thought is given to a forest policy. As the population grows, people become alarmed at the destruction of the forests and a policy for future control is formed". (Beggs, 1971, p. 17)

Since European occupation, forests in Australia have been managed predominantly for wood production values. In recent years however, public concerns over the sustainability of the Australian timber industry has resulted in an increased focus and scrutiny of the sector. Part of this process has been the recognition of non-wood values of forested areas including tourism and recreation.

Recreation has always been integral to the human occupation of forested areas (Bradshaw et al., 1991, p. 16). An increasing population with more leisure time and greater mobility has seen a marked increase in the demand for tourism and recreation in forested areas. This demand has translated into substantial economic benefits to local, regional and national economies as visitors spend money on food, accommodation and transport in the towns adjoining forested areas. As with many parts of the world, the majority of forest tourism and recreation in Australia is conducted by private individuals and commercial operators on the public estate. Having common good attributes, forest resources are not adequately captured by the market system and therefore the contribution to the economic sector is difficult to define and measure. In the past this has led to the misallocation of funds where the requisite funds have not been reinvested into the management of the environmental resource. Forest management agencies are currently

unable to adequately respond with diminishing budgets available to manage areas under increasing pressure from tourism (Buckley, 2000).

Numerous non-market valuation techniques have been developed to address the void of information on non-wood values of forested areas and to better provide for the future management of these areas. This study has been conducted in collaboration with industry partners, the Western Australian Tourism Commission and the Department of Conservation and Land Management and part funded by the Cooperative Research Centre for Sustainable Tourism.

The study provides a significant contribution to the management of forested areas in Western Australia for two main reasons. Firstly, the measurement of tourism and recreation in forested areas provides valuable economic information with which to compare other forest uses. This information can be used to facilitate zoning decisions and multiple-use management strategies in forested areas, particularly when aggregated with other valuation studies.

Secondly, the economic measurement of tourism and recreation in forested areas provides justification for the allocation of government resources to facilitate the sustainable management of areas.

> "Showing that the value of parks and protected areas is much higher than entry charges and visitor spending per day can help justify funding over and above direct revenue generated by parks themselves. In effect, their social value can be used as a political lever to indicate the need for funds to acquire, extend, and manage these natural resources in the same way the grants and subsidies to the arts are justified." (Eagles, MacLean, & Stabler, 2000, p. 69)

Overall the findings of this research will inform future policy and planning in reference to tourism and recreation in forested areas of the South West of Western Australia for both the Department of CALM and the WATC.

The thesis will also address ways of improving the collection, compilation and analysis of visitation data to recreation sites to facilitate more accurate and reliable estimates of gross economic values to inform agency decision-makers.

1.3 Research Problem

What is the estimated gross economic value of tourism and recreation in the Department of Conservation and Land Management (CALM) defined Southern Forest and Central Forest Regions in the South West of Western Australia? The study will use the most recent economic expenditure and visitation data available and will be calculated for the period of one year. The economic value will be reported as gross economic value, prior to the netting of costs associated with the production of the economic wealth including environmental damage etc. Gross economic value includes market values and non-market values.

1.4 Research Objectives

To provide an estimate of the gross economic value of tourism and recreation in forested areas in a representative case study region, the South West of Western Australia.

Describe the economic significance of tourism and recreation in forested areas of the case study region.

To provide recommendations for the collection, compilation and analysis of visitation data to recreation sites that will facilitate more accurate, reliable and comparable information for agency decision making.

1.5 Operational Definitions

Benefit Transfer

The benefit transfer technique was developed in the United States (Walsh, Johnson, & McKean, 1992) and imputes values from the results of previous economic studies in similar areas. The technique is widely used in the United States and was used extensively in Australia during the Regional Forest Agreements process. (Driml, 1998, p. 64)

Forest

This thesis will adopt the National Forest Inventory (Australia) definition of forest;

> '. . an area, incorporating all living and non-living components, that is dominated by trees having usually a single stem and a mature or potentially mature stand height exceeding 2 metres and with existing or potential crown cover of over storey strata about equal to or greater than 20 per cent. This definition includes Australia's diverse native forests and plantations, regardless of age. It is also sufficiently broad to encompass areas of trees that are sometimes described as woodlands.' (Department of Agriculture Fisheries and Forestry - Australia, 2002)

Forested Areas

Forested areas will include the forest regions defined by CALM as the Central (South West), Southern Forest (Warren) regions of Western Australia. In 2002 these regions were renamed to those in the brackets above. These regions are shown in Figure 1.

Forest Recreation

Forest recreation is defined as all activities, both active and passive, other than those that are work related, undertaken in forested areas on a day trip from the person's usual place of residence.

Forest Tourism

Forest tourism is defined as all activities, both active and passive, other than those that are work related, undertaken in forest areas that involve an overnight stay away from the person's usual place of residence.

CALM records information on the number of visits or visitors to sites within the forest region, these include tourists and recreationists.

For the purpose of this study "tourism and recreation in forested areas" will be defined as all visits to CALM sites included in the study area. This will include tourists from overseas, interstate and local residents. It will include those traveling on a day trip and those spending one night or more in the region.

Extractive Use Value

The values derived through the consumptive use of the natural environment. For example, timber production, wildflower harvesting and mining.

Non-Extractive Use Value

The values derived through the non-consumptive use of the natural environment. For example, ecotourism may be described as a non-extractive use value.

Market Value

The monetary value or price placed on a good or service that is traded in a conventional market.

Non-Market Value

The value or price that people are willing to pay for a good or service that is not traded in a conventional market.

Gross Economic Value

Economic value is the gross value (prior to netting the associated costs of service provision etc.) of tourism and recreation in forested areas including the measurable commercial component (market value) and the component not traded in markets (non-

market value). In this study non-market values will be determined using visitor expenditure on travel costs used a market surrogate.

Travel Costs

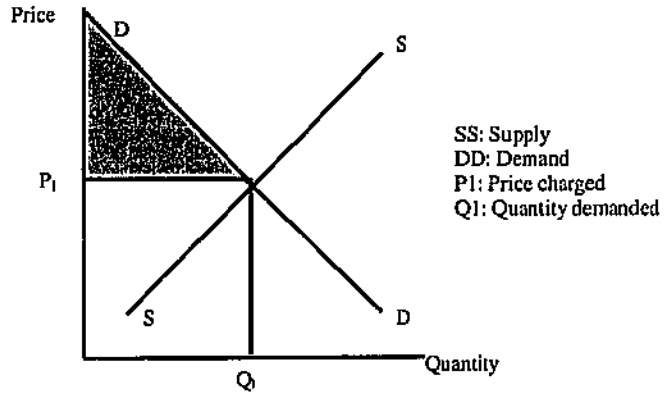
Travel costs include all expenditure incurred by the visitors in their travel associated with visiting a site. Expenditure on food, accommodation, transportation and entry fees will be included in the calculation. In addition, a value for travel time will be calculated at 25% of the annual wage rate.

Travel Cost Analysis or Travel Cost Method

A non-market valuation technique that can be used to estimate the economic value of tourism and recreation in the absence of a conventional market. Travel costs to a site are used to derive a demand curve for visitation and to arrive at an estimation of the consumer surplus.

Consumer Surplus

The total price people are willing to pay for a good or service over and above the price that is currently charged.



1.6 List of Abbreviations

ABS	Australian Bureau of Statistics
BTR	Bureau of Tourism Research
CALM	Department of Conservation and Land Management
FMP	Forest Management Plan
IVS	International Visitor Survey
LGA	Local Government Area
NFPS	National Forest Policy Statement
NVS	National Visitor Survey
NP	National Park
RFA	Regional Forest Agreement
TC	Travel Cost
VISTAT	Department of Conservation and Land Management Visitation Database System
WA	Western Australia
WATC	Western Australian Tourism Commission
WATS	Western Australian Travel Survey

1.7 Structure of Thesis

This thesis contains 7 chapters, with Chapter 1 providing an introduction and establishing the research purpose, significance and objectives of the study. Operational definitions and abbreviations are also included in Chapter 1. Chapter 2 provides an overview of the literature in relation to forests, providing an international, national and regional perspective. At the regional level the review of literature provides a detailed profile of tourism and recreation in the case study region: the South West of Western Australia. Chapter 3 provides a review of the literature on the application of economics to environmental evaluation and in particular, the measurement of tourism and recreation value in forested areas. Chapter 3 also discusses the notion of sustainability and the factors that have given rise to the transition of economies from the traditional extractive industries to industries that provide for environmental enhancement. Chapter 4 reviews the methodologies available for the economic valuation of tourism and recreation in natural areas, providing market and non-market valuation techniques. In this chapter travel cost methodology is discussed in some detail, as this method is selected for the primary research conducted in the study. Chapter 5 provides an account of the research procedure and findings from the study and is divided into two sections. Section 5.1 in this chapter provides an account of the order-of-magnitude study concluding with an estimate of market values based on secondary data sources. The calculation of these values required explicit assumptions which are discussed at the beginning of the section. Section 5.2 provides an estimate of market and non-market values for a single forest site in the case study region. Travel cost methodology has been employed in the calculation of these values and is outlined in the section. Chapter 6 of the thesis outlines limitations of the study. Chapter 7 presents conclusions from the findings of the thesis, recommendations for future studies of this type and areas for discussion.

2. FORESTS – AN INTERNATIONAL, NATIONAL AND REGIONAL PERSPECTIVE

2.1 Forests – The Global Picture

According to the National Forest Inventory (Australia) a forest is defined as;

> '. . an area, incorporating all living and non-living components, that is dominated by trees having usually a single stem and a mature or potentially mature stand height exceeding 2 metres and with existing or potential crown cover of over storey strata about equal to or greater than 20 per cent.' (Department of Agriculture Fisheries and Forestry - Australia, 2002)

Forests cover approximately 25% of the earth's land surface excluding Antarctica and Greenland (United Nations Development Programme, United Nations Environment Programme, World Bank, & World Resources Institute, 2000). In 1990 the land area covered by forests was estimated at about 3.4 billion hectares (Food and Agricultural Organisation, 1995 in (Tacconi, 2000, p. 6). Since pre-agricultural times forest coverage worldwide has declined by at least 20% with less than 40% of forests remaining subject to only minimal human disturbance (United Nations Development Programme et al., 2000). The greatest threats to forests are the conversion to other forms of land use and the fragmentation caused by agriculture, logging and road construction (United Nations Development Programme et al., 2000, p. 90).

Globally, forests have been used as a platform for industrial and socio-economic development. In developing nations populations are highly dependent on forests for both domestic consumption and for export earnings. In industrialised countries however, deforestation has slowed in recent years as these countries meet their domestic requirements through local timber production and the importation of wood products from developing nations – thus further fuelling deforestation in countries with poor forest

management practices. To highlight this, in 1997-1998 Australia recorded a $1.5 billion trade deficit in wood products, importing $2.7 billion in forest products (Mercer, 2000).

Traditionally forest management has focused on the maximisation of commodity production in real time. In addition traditional forest management aims to maintain timber production levels at less than or equal to their growth or renewal rate.

One of the most important international developments for forest management since the Rio Earth Summit in 1992 has been the development of international criteria and indicators for the measurement of sustainable management (Department of Agriculture Fisheries and Forestry - Australia, 2002). Criteria relates to the broad forest values that a society seeks to sustain and indicators which enable the measurement of change in the criteria, provide a common unit for comparison internationally.

Globally, 'sustainable forest management' or 'forest ecosystem management' is focused on sustainable commodity production, maintaining future options and taking into account the full suite of forest ecosystem and social values (Bengston, 1994). Unlike traditional forest management, sustainable forest management is not solely output-focused. Forests are managed to maintain their full range of benefits - environmental, economic and social where biological diversity and ecosystem processes are assessed alongside the goods and services produced for consumption. The relative importance of these benefits or values depend on the community context and the nature of the forest environment (Department of Agriculture Fisheries and Forestry - Australia, 2002).

2.2 Forest Management in Australia

"The greatest challenge facing the Australian community, indeed the global community is how to bridge the gap between today's unsustainable resource use practices and a sustainable resource use future" (Dr Bob Brown, Minister for the Environment, Australia in Harris & Leiper, 1995, p. vii)

In a sustainable economy, economic growth shifts from the environmentally damaging industries to those that promote environmental enhancement (Common, 1996).

Australia has traditionally relied on the extractive industries such as mining, fishing, agriculture and timber production for it's economic well-being. The exporting of comparatively low-value raw materials has seen the rapid depletion of Australia's primary resources (Buckley, 2000). This is particularly apparent in the timber production industry. In 1788, when Australia was first settled by Europeans tree-felling began. Forests were a source of raw materials to support the development of Australia's colonies. Wood resources, particularly the hardwoods and cedars were exploited for fine timber (Pritchard & Donaldson, 2000).

In addition vast areas were cleared, (and continue to be cleared) for agriculture.

> "Today's distribution of forests in Australia represents about 60 per cent of the cover before the arrival of Europeans in 1778. Broad national-level data suggest Australia has lost about 25 per cent of rain forests, 45 per cent of open forests, 32 per cent of woodland forests and 30 per cent of mallee forests during the past 200 years." (Department of Agriculture Fisheries and Forestry - Australia, 2002)

Laurance and Bierregaard reported in 1997 that 90% of Western Australia's forest cover had been irrevocably lost with the remaining 10% in a degraded state (Mercer, 2000).

In the 1992 National Forest Policy Statement (NFPS) the Federal Government set out aims for the sustainable management of all forests including public and private areas and all tenure classifications (reserve, production forest or plantation).

The NFPS outlines the following three principles for the sustainable management of forests in Australia:

- maintaining the ecological processes within forests (the formation of soil, energy flows, and the carbon, nutrient and water cycles);
- maintaining the biological diversity of forests; and
- optimising the full range of environmental, economic and social benefits to the community from all uses of forests within ecological constraints.

(Department of Agriculture Fisheries and Forestry - Australia, 2002)

As a result of the development of the 1992 NFPS, in 1995 Regional Forest Agreements (RFA), joint federal and state agreements, were made as the basis for forest management nationwide. These agreements set out sustainable forest management guidelines promoting the states "to work together towards a shared vision for Australia's forests" (Commonwealth of Australia and the Western Australian Regional Forest Agreement (RFA) Steering Committee, n.d.).

> The RFA for Western Australia was signed in 1999 aligning the State to the national RFA objectives outlined below:
>
> To protect environmental values in a world class system of national parks and other reserves, based on nationally agreed criteria
>
> to encourage job creation and growth in forest-based industries, including wood products, tourism and minerals; and
>
> to manage all native forests in a sustainable way.
>
> (Commonwealth of Australia and the Western Australian Regional Forest Agreement (RFA) Steering Committee, n.d.)

Measures were employed by the government on private estate included policies to encourage private small-scale forestry operations. These policies were aimed at enhancing socio-economic opportunities in regional Australia, promoting value-add industries in the native forestry sector and arresting natural resource degradation such as salinity problems (Pritchard & Donaldson, 2000).

The changing forest management policies in Western Australia has had a profound impact on the development of tourism and recreation in the South West of the state. When the RFA process began, little focus was afforded to tourism and recreation with the main agenda being timber production. This was despite strong evidence that the timber industry in Australia was being highly subsidised and that the export market for timber products faced increased uncertainty (Department of the Environment Sport and Territories, 1996; Mercer, 2000). In fact, economic analysis, although well established in Australian research, had only a limited application in the RFA process which was restricted to industrial values of resource change rather than a broader framework incorporating non-commodity values (Dargravel, Proctor, & Kanowski, 2000, p. 113) .

Overall, the result of the RFA process has seen accelerated logging in forest areas of high conservation value and only small concessionary measures taken in the provision of protected areas with little resources allocated to manage them (Buckley, 2000). Since the RFA process evidence suggests that in areas of Australia, despite the existence of industry subsidies, woodchips are sold at as low as 9 cents per tonne (Buckley, 2000). In Western Australia marri trees are being "felled to waste" as the cost of exporting them is greater than the price they would fetch in international markets. (Conservation Commission of Western Australia, 2002b)

Public concerns over the long-term viability of the Australian timber industry have increased in the last decade since the advent of the RFA process. In 2001, as a result of public outcry the new State Government in Western Australia introduced radical forest policies leading to an immediate end of timber harvesting in old-growth forests and committing to create 30 new national parks and two new conservation parks in the south west forest region (Coakes Consulting, 2002).

In parallel with the concern over the sustainability of the native timber industry, there has also been an increasing awareness of tourism as an economic alternative for regional areas traditionally reliant on timber production (Mercer, 2000). In fact, tourism and recreation have emerged as vital elements in the future of forests in Australia, highlighted by the recent involvement of the mainstream tourism industry in forest-related policy determination. A high priority of the tourism industry has been to conduct economic valuation studies on tourism in natural areas, including forests, in order to convince the government of the significance of the sector to the economy at large. Australia's Co-operative Research Centre for Sustainable Tourism has committed considerable resources to this task.

Using various non-market valuation techniques, several Australian studies have already highlighted the higher comparative value of tourism over timber production in forested areas (Driml, 1997; Ward, 2001). In addition, longitudinal studies are being conducted to demonstrate the long-term viability of tourism, over the alternative land uses such as forestry and agriculture.

2.3 Forest Tourism and Recreation

"There are very few outdoor settings for recreation that do not have trees, either close up or in the background, and there are also very few tourism activities that cannot take place in a forest environment."(Font & Tribe, 2000, p. 2)

Forest recreation is defined as all activities, both active and passive, other than those that are work related, undertaken in forested areas on a day trip from the person's usual place of residence. Forest tourism is defined as all activities, both active and passive, other than those that are work related, undertaken in forest areas that involve an overnight stay away from the person's usual place of residence.

Forests provide many benefits as a setting for tourism and recreation. Individual forest tourists derive values including a sense of peace, general nature appreciation, freedom from the human-made environment, release of stress and wildlife appreciation to name a few (Chapman, 1995, p. 63).

Forest-based outdoor activities may be categorised according to the degree of dependency on the resource base. Marcouiller (1998) includes pristine amenity-based recreation and reliant nature-based tourism in the highest resource dependency category. Consumptive nature-based tourism including wildlife hunting and berry harvesting may also be included in this category. (Font & Tribe, 2000)

At the other end of the spectrum are forest tourism and recreation types with low resource dependency. In these instances, the forest is usually a background for leisure activities. For example, in countries with hot climates, the forest provides shelter from the sun and a welcome cool atmosphere to recreate in. Forests can also provide a setting for motorised outdoor recreation pursuits (Marcouiller, 1998), a visual amenity to visitors (Holgen, Mattsson, & Li, 2000), while others may visit the forest for peace and solitude (Schmidt, 1980).

Australian tourism research of travel motivations highlight the popularity of destinations with natural attractions such as forests. According to the Bureau of Tourism Research in 1995, 50% of all international visitors to Australia in that year, went to at least one National Park at some time during their stay (Blamey, 1995, p. 2). In the

National Visitor Survey of Australia conducted in 1999 over 9.9 million (nearly 6%) of day trips included a visit to a national park and or a bushwalk (Smith, 1994).

A number of studies undertaken in forested national parks have highlighted that forests are a significant drawcard for visitors to natural areas. The 1989 New England – Dorrigo Rainforest Tourism Study found that 71% of visitors cited the rainforest as of considerable importance to them when undertaking their visit (Parsonson, Wearing, Anderson, Robertson, & Veal, 1989). The popularity of forest tourism attractions is also reflected in the concentration of tourism accommodation and tourist towns in forested areas.

Forests are described by various writers as the capital stock, raw material, factor inputs, physical plant and scenic resources in the production of tourism and recreation (Common, 1995; Herath, 2002; Hudson, 1998; Loomis & Walsh, 1997; Marcouiller, 1998). The strong link with the environment suggests that tourism and recreation is largely supply led with current resource decisions effecting the future capabilities of the industry (Herath, 2002). To add to this complexity, forest resources are often managed for multiple uses including timber production, recreation, water catchment and wildflower harvesting. These forest uses do not however, do not have to be mutually exclusive. (Clawson, 1975; Marcouiller, 1998)

2.4 Forests of Western Australia

When compared internationally, Western Australia has a rich forest cover boasting 2.6 million hectares of forest within close proximity of the major gateway city for the State. The main forest types in Western Australia are jarrah, karri and tuart and are found predominantly in the South West region. In the semi-arid areas further east, areas of woodland are found, including wandoo, salmon gum, morrel, gimlet and mallet. (Beggs, 1971)

Table 1 provides an overview of the forested areas according to forest and tenure type within the forest management plan boundaries set out in the RFA agreement. The table details the forested areas currently existing in formal conservation reserves and the proposed additions under the new Forest Management Plan (FMP) (Conservation Commission of Western Australia, 2002a).

Table 1: Regional Forest Agreement Areas Swan, Warren and South West Regions by Forest and Tenure type (ha) (Conservation Commission of Western Australia, 2002a)

Forest Type	**Present extent on all lands within FMP Boundaries (ha)**	**Existing in Formal Conservation Reserves** (Additions Proposed under the new FMP)
Jarrah Dominant	1,806,650	176,780 (433,850)
Karri Dominant	190,160	49,180 (43,380)
Wandoo Dominant	218,680	38,640 (55,900)
Other Forest (including Tuart)	408,570	171,480 (135,520)
Total	**2,624,060**	**436,080** **Under new FMP 1,104,730**

2.4.1 Jarrah Forest

Jarrah is the principal timber production tree for the state and is regarded as one of the finest hardwood stands in the world. The tree grows best in red loam soils of the deep river valleys, however most of these areas have now been cleared for other uses. Other trees found in the jarrah forest include marri, blackbutt, flooded gum, banksia and sheoak. Although the jarrah forest is the most prominent forest type in Western Australia, it lacks the aesthetic qualities of the karri forest (Beggs, 1971).

2.4.2 Karri Forest

The karri forest which comprises approximately 200, 000 ha and occupies less than one-sixth of the area of state forests, national parks and nature reserves, has a special significance to tourism in the State (Christensen, 1992). "Being the only temperate eucalypt rain forest in WA it is logical that it be used for recreation..." (Beggs, 1971, , p. 60). Karri is also one of the world's tallest hardwood species and with an optimum height of 90 metres, the tree is a spectacular sight for tourists. Other important species of the karri forest include the red and yellow tingle, the red flowering gum, the Western Australian peppermint and the Warren River cedar.

2.4.3 Tuart Forest

The third main forest type in Western Australia is the tuart forest. Tuart is found only in limestone soils. Tuart is characterised by a fairly open formation with a sparse under storey. The forest usually grows in a pure stand, however is sometimes characterised by a mix of marri and/or jarrah and flooded gum or yate in the swampy regions (Beggs, 1971).

2.4.4 The Department of Conservation and Land Management and the Conservation Commission of Western Australia

CALM is the government agency responsible for the management of 23,577,533 hectares of marine and terrestrial public estate in Western Australia. These lands are vested in the Conservation Commission of Western Australia and managed by the Department of Conservation and Land Management according to management plans prepared under the direction of the Conservation Commission and approved by the Minister for Environment and Heritage (Conservation Commission of Western Australia, 2002a, 9). The terrestrial area under CALM's management represents approximately 8.87% of the total land area of Western Australia (Department of Conservation and Land Management, 2001a).

The forested areas within Western Australia are located predominantly in the South West corner of the State. Figure 2 outlines the lands vested in the Conservation Commission and managed by CALM in this region.

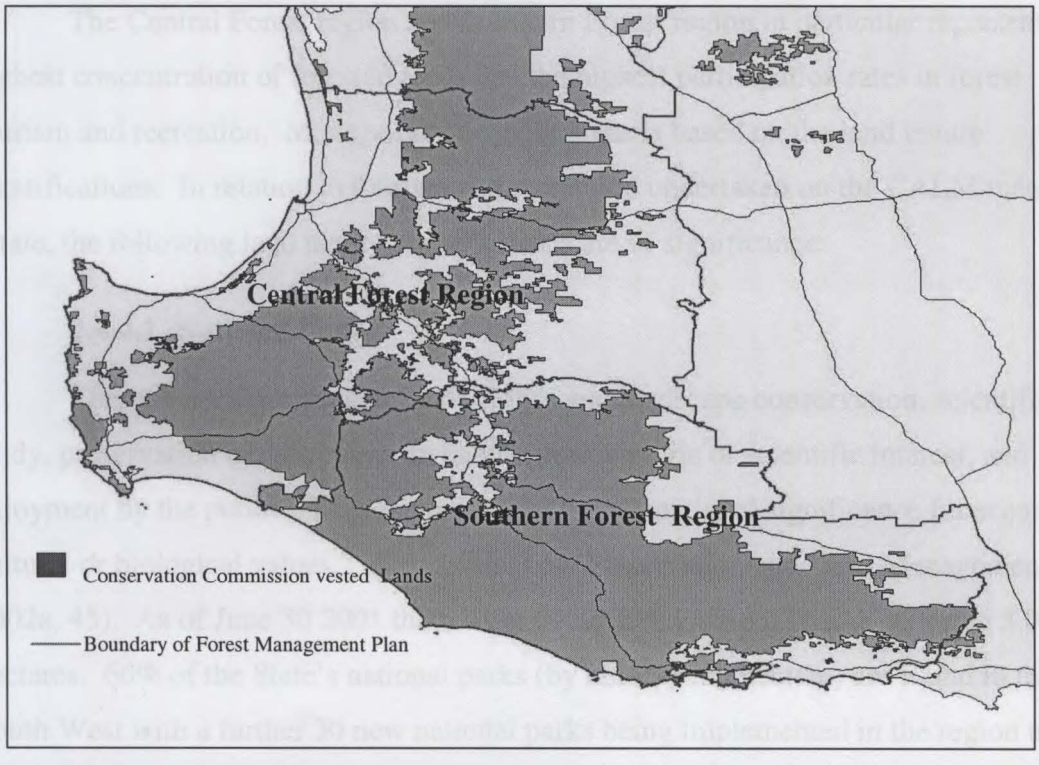


Figure 2: Conservation Commission Vested Lands in the South West region of WA
(Adapted from Coakes Consulting, 2002)

The Conservation and Land Management Act (1984) and following Amendments as well as the new Forest Management Plan (Conservation Commission of Western Australia, 2002a) require that native State forest shall be managed to satisfy one or a combination of the following purposes:

1. Conservation
2. Recreation
3. Timber production
4. Water catchment protection

Other purposes including minerals, soils, cultural heritage and carbon.

Although only a small percentage of land is allocated with recreation as its primary purpose, leisure activities are permitted and encouraged in most other land classifications (Underwood, Walker, Schuster, Sands, & Lush, 1991, p. 30). It is only nature reserves where active forms of tourism and recreation are discouraged.

The Central Forest region and Southern Forest region in particular represent the highest concentration of forested areas and the highest participation rates in forest tourism and recreation. Management of these areas is based on the land tenure classifications. In relation to tourism and recreation undertaken on the CALM managed estate, the following land tenure classifications are of significance:

2.4.4.1 National Parks

These areas are managed "for wildlife and landscape conservation, scientific study, preservation of features of archaeological, historic or scientific interest, and enjoyment by the public. They have national or international significance for scenic, cultural or biological values." (Department of Conservation and Land Management, 2002a, 45). As of June 30 2001 there were 69 declared national parks covering 5,092,210 hectares. 66% of the State's national parks (by number not hectare) are found in the South West with a further 30 new national parks being implemented in the region under the new Forest Management Plan.

2.4.4.2 Conservation Parks

These areas are managed for the same purposes as national parks, however they may have only local or regional significance in terms of the conservation or recreational values. This area covered 704,205 hectares as at June 30 2001.

2.4.4.3 Nature Reserves

Nature reserves are managed "for wildlife and landscape conservation, scientific study, preservation of features of archaeological, historic or scientific interest." (Department of Conservation and Land Management, 2001a, p.45) In these areas only recreation that is not harmful to the natural ecosystems is permitted. Nature reserves covered an area of 10,818,199 hectares as at June 30 2001.

2.4.4.4 State Forest

State forests are "managed for multiple purposes including water catchment protection, recreation, timber production on a sustained yield basis, and conservation. Provision is also made for public utilities and mineral production." (Department of Conservation and Land Management, 2001a) Within state forests, separate areas are designated for different management purposes. State forests cover an area of 1,727,286 hectares as at June 30 2001. 69% of State Forests are found in the Central and Southern Forest regions (refer to Table 2).

Table 2 provides a summary of the Central and Southern Forest regions and their associated tenure classifications as defined above.

Table 2: Existing tenure classification and size (ha) of CALM managed regions relevant to study including the percentage of the state total for each classification (in brackets) (Source: Annual Report 2000-2002 (Department of Conservation and Land Management, 2002a)

Tenure Classification	Central Forest (ha)	Southern Forest (ha)
National Park	31,836	239,937
percentage of state total	(0.6%)	(5%)
Conservation Park	581	-
percentage of state total	(<1%)	
Nature Reserve	9,783	32,849
percentage of state total	(3%)	(0.3%)
State Forest	656,404	547,187
percentage of state total	(38%)	(31%)

2.5 Forests of the South West region of Western Australia

For the purposes of this study, the Southern Forest and Central Forest regions have been selected as they contain the majority of forests in Western Australia, totalling approximately 1.5 million hectares. These two regions correlate closely with the local government boundaries for the South West region. (See Figure 3 for a map of the local government boundaries for the South West region encompassing the Southern Forest and Central Forest regions).

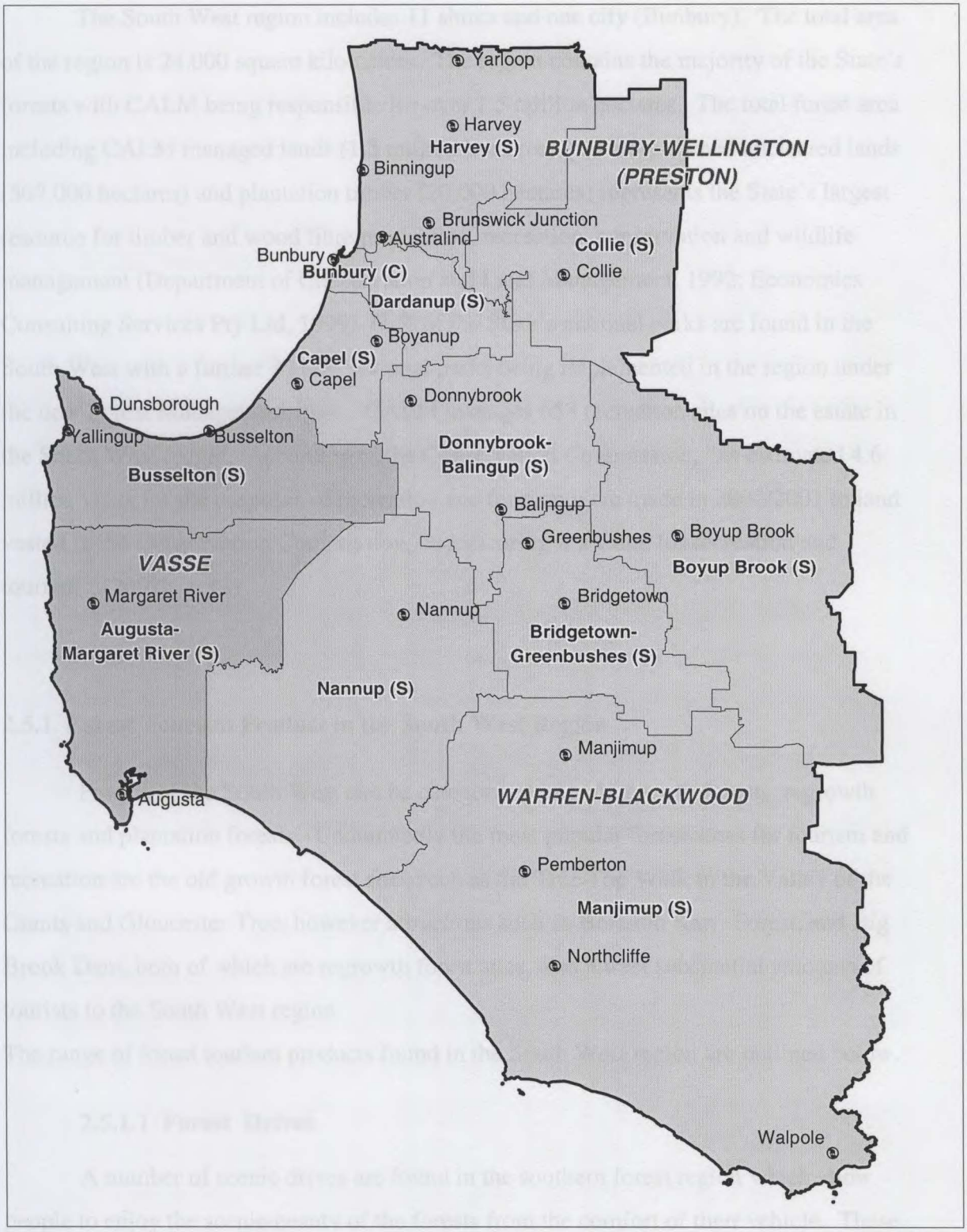


Figure 3: Map of South West Region Local Government Administrative Zones (Economics Consulting Services Pty Ltd, 1999, , p. 15)

The South West region includes 11 shires and one city (Bunbury). The total area of the region is 24,000 square kilometres. The region contains the majority of the State's forests with CALM being responsible for over 1.5 million hectares. The total forest area including CALM managed lands (1.5 million hectares), privately-owned uncleared lands (507,000 hectares) and plantation timber (20,000 hectares) represents the State's largest resource for timber and wood fibre production, recreation, conservation and wildlife management (Department of Conservation and Land Management, 1992; Economics Consulting Services Pty Ltd, 1999) 66% of the State's national parks are found in the South West with a further 30 new national parks being implemented in the region under the new Forest Management Plan. CALM manages 653 recreation sites on the estate in the South West region. According to the Conservation Commission, "an estimated 4.6 million visits for the purposes of recreation and tourism were made in 2000/2001 to land vested in the Conservation Commission, underscoring it's value for recreation and tourism". (2002b, p.48)

2.5.1 Forest Tourism Product in the South West Region

Forests of the South West can be categorised into old growth forests, regrowth forests and plantation forests. Undoubtedly the most popular forest areas for tourism and recreation are the old growth forest sites such as the Tree Top Walk in the Valley of the Giants and Gloucester Tree, however attractions such as Boranup Karri Forest, and Big Brook Dam, both of which are regrowth forest sites, also attract substantial amounts of tourists to the South West region.

The range of forest tourism products found in the South West region are outlined below.

2.5.1.1 Forest Drives

A number of scenic drives are found in the southern forest region which allow people to enjoy the scenic beauty of the forests from the comfort of their vehicle. These are particularly popular for self-drive tourists, those with limited time or with restricted mobility to participate in other forest activities.

One such scenic drive in the South West region is the Great Forest Trees drive established in 1996. It is a 48 kilometre drive which winds through old growth Karri forest in Shannon National Park. The drive incorporates radio broadcasts on the history of the region and six picnic and information areas. This site recorded 9500 visits in 2000/2001.

2.5.1.2 Individual Tree Climbs

These include the three trees, which collectively have become known as 'the three trees climb', Diamond Tree, Dave Evans Bicentennial Tree and Gloucester Tree. All of these trees were once fire lookouts that have become obsolete since the development of spotter aircraft for fire detection. Gloucester tree is the most popular tree climb in the region and in 2000/2001 142,241 visits were recorded to the site.

2.5.1.3 Walktrails

A number of walk trails traverse the South West region and bushwalking or hiking is identified as a popular activity for visitors to the region. In the last Western Australian Travel Survey conducted (1996/1997) over 50% of overnight visitors to the South West region cited 'walking' as an activity undertaken during their stay (Economics Consulting Services Pty Ltd, 1999).
The Cape to Cape Walk and the Bibbulmun track are the most famous walks in the South West region.

The Bibbulmun track is a long distance walktrail extending from Kalamunda to Albany, a total distance of 963.1 kilometres. The walktrail is punctuated by 48 modern campsites which are spaced within a comfortable day's walking distance. The walk trail traverses the South West of the state taking in a large proportion of forested areas. The 'track' is internationally recognised with visitors coming from all over the world to walk either a section of the track or for the adventurous – end to end.
The Cape to Cape walk is largely focused on the coastal area, however it does pass through Boranup Karri Forest, which houses popular recreation sites for walkers. Leeuwin- Naturaliste National Park which encompasses the Cape to Cape walktrail is the most popular national park in the state recording 1,876,852 visits in 2000/2001.

2.5.1.4 Forest Heritage Sites

There has always been a keen interest in forest management activity in Western Australia and these are catered for with forest heritage sites (Christensen, 1992). These sites cater to those visitors with an interest in the activities of the timber harvesting industry from the days of the early settlers to the current forest management regime. Greenbushes Eco Cultural Discovery Centre, located south of Balingup tells the story of human impact on the environment including the town's history of timber milling, tin mining and farming. Forest heritage sites range in the degree of infrastracture offered, from those offering simple interpretative shelters, such as the Quinninup Forest Walks to small museums and heritage centres such as the Wellington Forest Discovery Centre.

2.5.1.5 Mill and Forestry Settlements

A number of former mill and forestry settlements have been leased for recreational interests. These include Donnelly River, Tone River, Lewana and Wellington Mills. These have become successful accommodation providers for individual and group bookings.

2.5.1.6 Forest Discovery Centres

The Karri Discovery Centre in Pemberton is an example of the educational centres that help to facilitate the tourist experience in the region. The centre offers interactive displays, interpretative panels and walk trails through the 122 hectare forest park. These education centres not only act as a tourism drawcard in their own right, they also provide value to tourism and conservation through their educational role.

2.5.1.7 Wildlife Observation

In addition to the trees themselves, the south-west forest ecosystem houses a multitude of unique flora and fauna, some of which date back to Australia's Gondwanic heritage. Biologically, the region has been internationally recognised as a 'biodiversity hotspot', one of only 25 in the world (Myers, N. et. al. 2000 in Verstegen, 2002, p. 4). The large concentration of rare fauna, many of which are now extinct or under threat in other parts of Australia is a major drawcard for the region. (Department of Conservation and Land Management, 2002b)

Perup Forest Ecology Centre, located 50 kilometres east of Manjimup is an educational centre located in 52,000 hectares of jarrah forest and wandoo woodland. According to CALM it is the single best location in Australia for observing wildlife as it offers the visitors a chance to see six rare Australian mammals in the wild (Department of Conservation and Land Management, 2002b). These include the numbat, chuditch, woylie, tammar wallaby, ringtail possum and the southern brown bandicoot.

2.5.1.8 Environmental Tourism Packages

The environmental tourism packages have been developed by the Western Australian Tourism Commission with the dual aim of providing tourists with an interactive experience with nature and generating funds for future conservation and preservation projects throughout the state (Western Australian Tourism Commission, 2002). An example of an environmental tourism package is the 'Forest Discovery Wheel' which includes a map and three interpretive wheels of the southern forest flora. Part proceeds from the sale of every Forest Discovery Wheel are donated to Western Everlasting, a major state government initiative aimed at the future conservation of flora. The funds go to support university research into taxonomic problems in threatened flora species.

2.5.1.9 Native Woodcrafts

The South West is becoming internationally recognised as a major centre for fine woodcrafts. With restrictions placed on the timber industry under the new Forest Management Plan a change in focus for the industry aims to value add to the rare native timbers through craft and design. The Fine Woodcraft Gallery in Pemberton and the Dwellingup School of Wood which exhibit in the Forest Heritage Centre are two examples that showcase Western Australia's native wood crafts. Many of the wood products are crafted from dead wood found in State Forests and private properties which have naturally seasoned over time. The most popular timber for woodcraft is jarrah, however other native species such as karri, sheoak, marri, sandalwood, peppermint, river banksia and blackboy are also being crafted. These native woodcraft outlets are becoming sought after by tourists to the region.

2.5.2 Recreation Sites

CALM provides a range of recreation opportunities within the forested areas. The Department uses a classification scheme to categorise sites according to different characteristics including access, visitation, onsite modification and management. The sites are classified into 'primitive', 'intermediate' and 'developed' according to where the majority of factors are applicable to the site. The classification scheme is known as the 'Recreational Opportunity Spectrum and the details are outlined in Appendix 1.

An example of a developed forest site is Wellington Forest National Park, an intermediate is Diamond Tree and a primitive site is Fernhook Falls. These sites provide people with a range of recreational opportunities, to suit all tastes, budgets and travel motivations.

2.5.2.2 Iconic sites - Valley of the Giants, Tree Top Walk

The Valley of the Giants is located in Walpole-Nornalup National Park, 430 kilometres or five hours south of Perth and 100 kilometres west of the City of Albany.

The site features a "Tree Top Walk" which enables people to walk through the canopy of the old growth tingle and karri forest on suspended walkways. At ground level there is a second interpretative walk, through "The Ancient Empire". The site houses limited facilities which include toilets, a small souvenir shop and picnic tables.

The Valley of the Giants is Western Australia's most visited individual forest site for tourism and recreation. The annual visitation for the site was 192,063 for the year 2000/2001. Compared with other forest sites in the South West region, the Tree Top Walk attracts a larger proportion of tourists from interstate (10%) and overseas (15%). (Department of Conservation and Land Management, 1999).

The development of this forest site, which incurred a $2 million initial investment has generated substantial increases in visitors to the region. Table 3 below shows the visitor arrivals increase with the introduction of the Tree Top Walk which was opened in September 1996 (effects were felt the following year).

Table 3: Increase in Visitor Arrivals to Key South West Tourist Bureaux Post-Tree Top Walk Opening (Western Australian Tourism Commission, 2000b)

Bureau	1996/1997 (pre tree-top walk)	1997/1998 (post tree-top walk)	% increase
Pemberton	90,168	135,607	33%
Walpole	42,455	49,449	14%

2.6 An Industry Profile : Forest Tourism and Recreation in the South West Region

2.6.1 Tourism Investment

Tourism is a major contributor to the South West's gross domestic product, contributing $563 million, second only to the mining and mineral processing sector which contributes $1.7 billion. (South West Development Commission, 2002, p. 18)

Table 4 demonstrates the State Government's investment commitment in the 2002-2003 financial year to the forests of the South West.

Table 4: 2002-2003 Investment Highlights (South West Development Commission, 2002)

Works commencing or continuing in 2002-2003	Government Investment $	Total Estimated Investment $
Investment in the Karri Tingle Interpretative Centre	1,000,000	1,000,000
National Parks infrastructure to protect old growth forests	3,070,000	9,670,000
Forest Enhancement Program	500,000	2,497,000

In addition to these direct forest investment projects, there are also a number of major transport infrastructure investments which are largely attributable to increased traffic flow from tourism. Some of these listed in the budget commitment for 2002-2003

include works to Bussell Highway, Muirs Road, Mowen Road and Perth to Bunbury Highway.

The South West has the fastest tourism infrastructure growth rate across the regions. As of December 2000 there were 11 projects that were completed in the previous calendar year, 14 projects under construction with a further 36 projects at the planning stage. The total amount of investment from the private sector for these tourism developments is estimated at $356.2 million (Western Australian Tourism Commission, 2000a, p. 81) .

A survey of 197 South West tourism operators in 1999 found that of the total estimated operating costs ($33 million), 61% or $20 million was tourist related (Economics Consulting Services Pty Ltd, 1999). Tourism South West valued the South West tourism operators investment commitment to the intrastate tourism market alone at $6 million (Tourism South West, 2000).

Table 5 outlines the number and type of tourism operators in the South West according to the Western Australian Tourism Commission register.

Table 5: Number and Type of South West Tourism Operators (Western Australian Tourism Commission Database as at October 2002)

Type	No. Operators
Self Contained	146
B &B	77
Hotel/Motel	60
Cottage/Chalet	51
Caravan park	32
Resort	16
Backpacker	14
Guesthouse	6
Holiday House	6
Cabin	5

Serviced Apartment	3
Camping Ground	2
Health Resort	2
Lodge	1
Total	**421**

The number of operators and the economic benefits arising from these operations is very significant to the residents of the South West region. In a survey of 1,100 residents of the Regional Forest Agreement regions in 1997, people were asked to respond to the statement "Tourism is very important in the area in which I live". For the Southern Forest region 92.2% reported 'yes, very important' and for the Margaret River region 96.4% reported 'yes, very important' (Environment and Behaviour Consultants Townsville, 1997).

2.6.2 Accommodation Providers

The largest area of private tourism investment and the largest provider of tourism related employment is in accommodation establishments. It was estimated that in 1999 393 accommodation establishments provided a total of 3,983 commercial rooms with each establishment having on average six rooms. (Economics Consulting Services Pty Ltd, 1999)

2.6.3 Employment

Tourism related employment includes direct employment in the hospitality sector and indirect employment which occurs as a result of the flow on effect from this sector. The seasonal nature of the tourism sector results in a large transitional workforce with sizeable amounts of casual and part time employment. The Western Australian Tourism Commission estimate that in 2001 5,500 people were employed in tourism, directly and indirectly in the South West region. The 1999 South West Tourism Study (Economics Consulting Services Pty Ltd, 1999) estimated total expenditure by tourism operators on employee wages totaled $75 million.

A case study on tourism in Pemberton was conducted in 1997 and found that employment in the industry included 87 owner operators, 83 full-time employees and 148 part-time and casual employees, totalling 318 people or the equivalent of 233 full time employees (Commonwealth of Australia and the Western Australian Regional Forest Agreement (RFA) Steering Committee, p. 24). The growth rate in the full-time tourism employment was estimated to have increased at 12.9% per annum from 57 in 1988 to 170 in 1997 (Commonwealth of Australia and the Western Australian Regional Forest Agreement (RFA) Steering Committee, p. 24).

2.6.4 Domestic Visitors

In the year to date March 2002, 1,557,000 domestic visitors were estimated to have visited the South West Region (Bureau of Tourism Research, 2002). Based on the 1999 and 2000 survey results approximately 85% of these visitors were from Perth region on a three night trip with an average spend of $424 per trip or $141.33 per night (Bureau of Tourism Research, 1999; Johnson, Foo, Buchanan, & Henrick, 2001). These daily spend estimates vary dramatically across different reported tourism research. The 1999 South West Region Tourism Study (Economics Consulting Services Pty Ltd, 1999) estimated that in 1996/1997 approximately $50 per visitor per night was spent in the region, significantly under the $141.33 per day figure cited by Johnson, Foo, et al (2001). The most recent figures from the Domestic Tourism Expenditure Research Programme, 1999, estimate average daily visitor expenditure at $85 and average visitor expenditure per visit at $268 (G. Ashford, Western Australian Tourism Commission, personal communication, 8 June 2002).

The visitor arrivals listed below in Table 6, provide an indication of the significance of the tourism sector to the shires and cities of the South West.

Table 6: Visitor Arrivals to South West Tourist Bureaus 1999/2000 Financial Year (WATC 2001)

Bureau	Arrivals
Augusta	16,297
Margaret River	263,589
Bridgetown	62,544
Boyup Brook	1,312 (1998/1999)
Bunbury	141,216
Busselton	113,633
Collie	20,493
Donnybrook	10,053
Dunsborough	91,971
Harvey	28,558
Manjimup	61,834
Nannup	24,943
Northcliffe	6,014
Pemberton	128,827 (1998/1999)
Walpole	66,286

2.6.5 International Visitors

In terms of visitation to the South West Region, international visitors represent less than 5% of total visitors to the South West and only 13% of total international arrivals to the state. Their impact on the overall value of tourism expenditure in the South West region is limited, however it should not be discounted as overall international visitation to the region has a high growth rate and an excellent potential for increasing

market share. In addition, these visitors have a far greater yield than their domestic counterparts with an average per trip spend of $1,376 (Johnson et al., 2001). It is interesting to note that 28% of all international visitors to Perth arrive in Australia on travel packages with pre-determined attractions and sites to visit (Johnson et al., 2001) .

2.6.6 Visitors to National Parks

The results of the 1999 International Visitor Survey identified 276,276 visitors or greater than 51% of visitors to Western Australia visit national parks, participate in bushwalking or forest walks. This figure was 13% higher than the previous year with the annual growth rate being close to three times higher than the national growth rate of just 4.5% (Chua, 2001). The survey also found that 23% of all visitors to Australia were particularly influenced by the opportunity to experience Australia's natural landscapes and wildlife, with the German and Japanese tourists being most influenced by these factors (Chua, 2001) .

In the domestic market in 1999 over 6% of day trips and 13% of overnight trips undertaken in Australia included a visit to a national park or a bushwalk. The South West region was among the top 20 day trip destinations in Australia for bushwalking or visiting a national park. In addition the survey reported that 323,000 visitors were estimated to have undertaken a visit to a national park at some time during their overnight trip to the south-west region (Robertson, 2001). A Newspoll telephone survey conducted in 1994 found that 53% of the sample (1,200) indicated that they are likely to take a tourist trip in the next 12 months that involves visiting a natural attraction or national park (Blamey, 1995).

In the overall tourism market, previous studies have estimated at least 50% of visitors to the South West region participate in bushwalking, visiting national parks or visits to forested areas with other survey findings listing nature-based activities in the top 20 activities undertaken (Economics Consulting Services Pty Ltd, 1999; Western Australian Tourism Commission, 1998)

CALM record tourism visitation to their managed recreational sites in the South West region. These estimates vary in their reliability, depending on whether they are

pay-to-enter sites, ranger-monitored sites or estimates taken from traffic counters. All recreation sites record individual visits rather than actual visitor numbers, therefore multiple visits by one visitor are double counted. The estimate for visits to all the CALM managed sites for the South West region for 2000/2001 was 4.6 million (Conservation Commission of Western Australia, 2002a, p. 48). It must be noted that this estimate includes sites not located in forested areas. A more accurate figure is estimated at 3.6 million (this is based on researcher-adjusted to include forest recreation sites only within the Central Forest, Southern Forest and Swan Regions) (Department of Conservation and Land Management, 2001b).

2.6.7 Community Recreation

Aside from tourist use of the forests, there are also local communities that use the forest areas for recreational purposes.

A survey of 1,100 people living in five regional sectors of Western Australia was conducted for the Department of Primary Industry and Energy -Social Assessment Unit, Forestry Branch in 1997 to assess the social and forest values of the community within the WA regional forest agreement (Environment and Behaviour Consultants Townsville, 1997). Of those surveyed, 77% visited forests within the last year with 50% visiting at least once a month. These visitors reported visiting parks mainly in close proximity to their place of residence.

Blamey and Braithwaite (1995) found, among 1680 valid responses from a national survey, approximately 66 per cent of the adult population reported they would like to spend some of their holidays in the next twelve months increasing their understanding and appreciation of nature.

A study of the regional parks (in close proximity to Perth metropolitan area) of which included the Darling Range National Park found that 88% of users were repeat visitors, with 34% visiting weekly, and a further 16% visiting monthly (The Boshe Group, 2001). This highlights that some forest sites are used largely by local users.

2.6.8 Forest Visitor Profiles

Previous studies of visitors to forested areas found that most commonly cited activities undertaken in forested areas are passive activities including bushwalking, picnicking and sightseeing (Environment and Behaviour Consultants Townsville, 1997; Parsonson et al., 1989; Schmidt, 1980). Results from the Department of CALM annual visitor survey of visitors to Western Australian national parks and recreation sites also reported similar visitor profiles (Department of Conservation and Land Management, 2001c). In a study of 19 nature-based tourism operators listed with the Western Australian Tourism Commission, Finucane (1993) found that operators cited bushwalking, bird watching and wildlife observation as the top activities undertaken by their visitors.

Previous studies on ecotourists, a large segment of forest visitors, have found that this market to be from a higher-than-average income bracket, with a reasonable level of education and having flexible leisure time (Dowling & Charters, 2000). In addition, it has been found that ecotourists generally travel in small group sizes to natural areas where they seek some level of interaction with the natural environment (Dowling & Charters, 2000).

Motivations of this market have been extensively studied by Chapman, first in a study with Armstrong in 1994 where over 1500 visitors to the state forests of New South Wales were surveyed. From this survey he categorised the market into five segments of which 'Sensitive souls' represented the highest portion (38%) with the 'Life! Be in it!' a close second (30%). 'Sensitive souls' were usually traveling either alone or with a small group, usually close friends or family members. This segment were found to enjoy an escape from crowds, enjoying passive activities in a tranquil environment setting. 'The

Life! Be in it!' segment were found to be motivated by elements of challenge, experience, adventure, skills, exercise and interaction with nature (Blamey, 1995, p. 125-126).

In 1995, Chapman studied forest ecotourists motivations using a more stringent criteria. In this study it was found that the majority of the ecotourists (54%) fell into the 'Nature first!' segment. This segment of forest ecotourists had two dimensions, the first of which was the sensitivity to the natural environment and the second of which was their desire to interact with and to learn more about the natural environment (Chapman, 1995).

2.6.9 Operator Profiles

In 1995 Econsult Pty Ltd estimated that there were 81 'ecotourism' operators in Western Australia (Econsult Pty Ltd, 1995, p. 21) .

CALM provides tourism permits allowing businesses to operate on State lands. According to CALM as at June 2002, 160 (36.7%) tour operator permits were issued for the Swan region, 127 (29.1%) for the South-West (formerly Central) region and 149 (34.1%) for the Warren (formerly Southern Forest) region (Coakes Consulting, 2002, p. 62).

Table 7 shows the wide range of forest based tourism and recreation activities occurring in the region, with the most common activities being bushwalking, camping, 4WD and safari tours.

Table 7: Top Ten Tour Operator Activities in CALM Regions (CALM, 2002 in Coakes Consulting, 2002, p. 62)

Activity	South West (formerly Central Forest)	Warren (formerly Southern Forest)
Bushwalking	97	118
4WD	72	89
Safari Tours	72	89
Camping	61	78
Coach	56	65
Minibus	40	49
Caving	34	39
Canoeing	25	35
Rock climbing	20	23
Abseiling	16	18

Note: Most operators are licensed to undertake a number of activities.

The West Australian market is characterised generally by small businesses, with low annual turnovers and low levels of staff, many of whom are casual. Like elsewhere in the world, many of the operators have entered the tourism industry for non-commercial motivations such as a 'lifestyle choice' (Benson, 1993 in Blamey, 1995; McKercher & Robbins, 1998)

In 1998, 37 forest area tour operators in Western Australia responded to a survey "to identify what parts of the forests were used, what additional forest areas tour operators may use in the future and who visits the forest areas." (Robinson, 1998, p. 2). This survey was commissioned by Tourism South West as part of the submission to the Forests Task Force (WA). The findings are summarised in Table 8.

Table 8: Results of Forest Areas Operator Survey (Robinson, 1998)

Question relating to:	Results (Ranked from highest to lowest response rate)
Current forest uses	Education and information Day tours (vehicle) Hiking/ camping overnight
Areas of forest operation	Walpole-Nornalup National Park/ Blackwood River Pemberton (Treen Brook, Big Brook, Giblett, Hawke blocks, Cascades and Charlie block) Leeuwin Naturaliste National Park
Additional areas to be retained for the tourism industry (general responses)	All old growth forest in the South West As much as possible All existing natural forest areas
Additional areas to be retained for the tourism industry (specific responses)	Manjimup/ Pemberton block Forest along the Blackwood
Physical characteristics of areas the make them potential tourism destinations	uniqueness wilderness/ tall trees/ natural beauty native animals and birds
Human interaction characteristics of areas the make them potential tourism destinations	Unspoilt/ undisturbed forests Facilities Non-commercialised
Facilities required in forest areas to ensure they are used sustainably	Toilets Walktrails Designated camping areas

Qualities of facilities in forest areas to ensure they are used sustainably	Minimal human disturbance Well planned, managed and monitored areas (dieback, traffic, appropriate facilities for public use, safe areas)
Key visitor target markets	Intrastate (1. Schools 2. Backpackers 3. Seniors/ Corporate) Interstate International (1. Europe 2. North America 3. Asia)
What do visitors want to see?	Natural forests – unlogged, old growth, native, undisturbed Flora Fauna
What do visitors want to experience?	Peace, solitude and serenity Feel the magnificence and grandeur Remoteness

The findings from this research indicate that the forests of the South West region are a significant tourism drawcard. Importantly, the research concludes that the 'undisturbed' 'remote' areas of forest with 'minimal human disturbance' and exhibiting 'unique' 'wilderness' qualities are the prime reasons for forest visitors to the South West. These qualities are difficult to come by in other parts of the world, and are difficult to maintain with the pressures of other industries and with the pressure of increased tourism numbers.

A qualitative study conducted by Coakes Consulting (2002) reported the following comments from tour operators in the South West Region indicating the strong reliance on these forested areas for their tourism businesses.

"More National Parks, reserves etc will encourage tourism. At least 50% of my business is from tourists to Nannup, so conserving more forest will help my business". (Coakes Consulting, 2002, p. 44)

"The increase in National Parks and conservation areas is a strong positive development for our growing nature tour business. The attractiveness of the far south forests as a destination and the opportunity for future bushwalking tours is much enhanced. We expect to see very strong growth over the next 3 years for our walking holidays in WA far southern forests". (Coakes Consulting, 2002, p. 44)

"The increase of National Parks and the proposed connection of National Parks in the southern regions is very positive for us because we conduct interpretive tourism in these areas and they become protected and managed" {Coakes Consulting, 2002 #41p. 44}

Operators surveyed by Finucane (1993) nominated national parks and bushland as key destinations with operators rating the natural landscape features as most important (78.9%) and the unique flora and fauna of secondary importance (68.4%). This study again highlighted the strong dependence of Western Australian tourism on the natural features such as the forest environments of the South West.

In 1997 the Department of CALM and the WATC released a Nature Based Tourism Strategy for the State which aims to "provide the framework to ensure that nature based tourism in Western Australia grows in a way that is sustainable as well as economically and socially beneficial." (*Nature Based Tourism Strategy for Western Australia*, 1997, n.p.). This strategy was developed in line with the National Ecotourism Strategy (1994) establishing a co-operative approach between industry and government stakeholders in the sustainable development of the industry under five guiding principles outlined in the strategy.

It was during this period in the 1990s that the awareness of ecotourism increased among industry operators with many adopting best practice principles in their businesses.

Research indicating the awareness of ecotourism, conducted prior to the release of the National Ecotourism Strategy in 1994 and the Nature Based Tourism Strategy for Western Australia in 1997, still highlights the growing awareness of ecotourism among

industry operators in Western Australia. This is demonstrated in Table 9 which provides a summary of definitions of ecotourism provided by West Australian tour operators in 1993.

Table 9: Definitions of Ecotourism given by WA Tour Operators (Finucane, 1993)

Rank[1] Response[2]	Common Element	Per cent
1	Primary focus on enjoyment and appreciation of the natural environment	63.2
2	Low impact tourism	52.6
3	Aim to educate about the environment	31.6
4	Activities maintain natural systems	21.1
5	Small groups of participants	15.8
6	Contributes economically on a local scale	10.5
7	Sustainable development	5.3

[1] Ranked by percentage of responses by tourism operators
[2] Percent of respondents that included this element in their definition of ecotourism. (Percentages do not total 100 as tour operators included more than one element in their definitions.)

2.7 Chapter Summary

Tourism is the second major industry in the South West region. Forests are a major drawcard for visitors to the region and tourism provides the main source of income for many residents in the South West, particularly since the demise of the timber industry in many of the South West towns. Tourists are particularly motivated by the undisturbed, wilderness qualities of the forests in the region. Sustainability is an important concern of the stakeholders of the nature based tourism sector as competition from other land uses, as well as the tourism industry itself, places pressure on the environmental resources on which it depends. In order to retain the qualities of the tourism asset that draw visitors to the region, a nature based tourism strategy was released in 1997. This strategy is largely about balancing the interests of stakeholders including economic, environmental and social interests to ensure a sustainable industry into the future.

The following chapter of this thesis will examine the multiple values provided by forests in general, economics and the measurement of these values and lastly sustainability and the tourism sector.

3. FORESTS, ECONOMICS AND TOURISM

3.1 Values

> "Cultural understandings are impinging on the environment and this is seen in people's values, how they see the future and how they do business." (Newman, 2001, p. 5)

Natural resource management is essentially "a social process involving values, choices and tradeoffs." (Campbell, 2001, p. v)

Value is a subjective concept. Values are appropriated by humans when utility is derived from an object. Forests house a multitude of human-derived values, highlighted by the fact that forests are often described as environmental **resources** or **assets**.

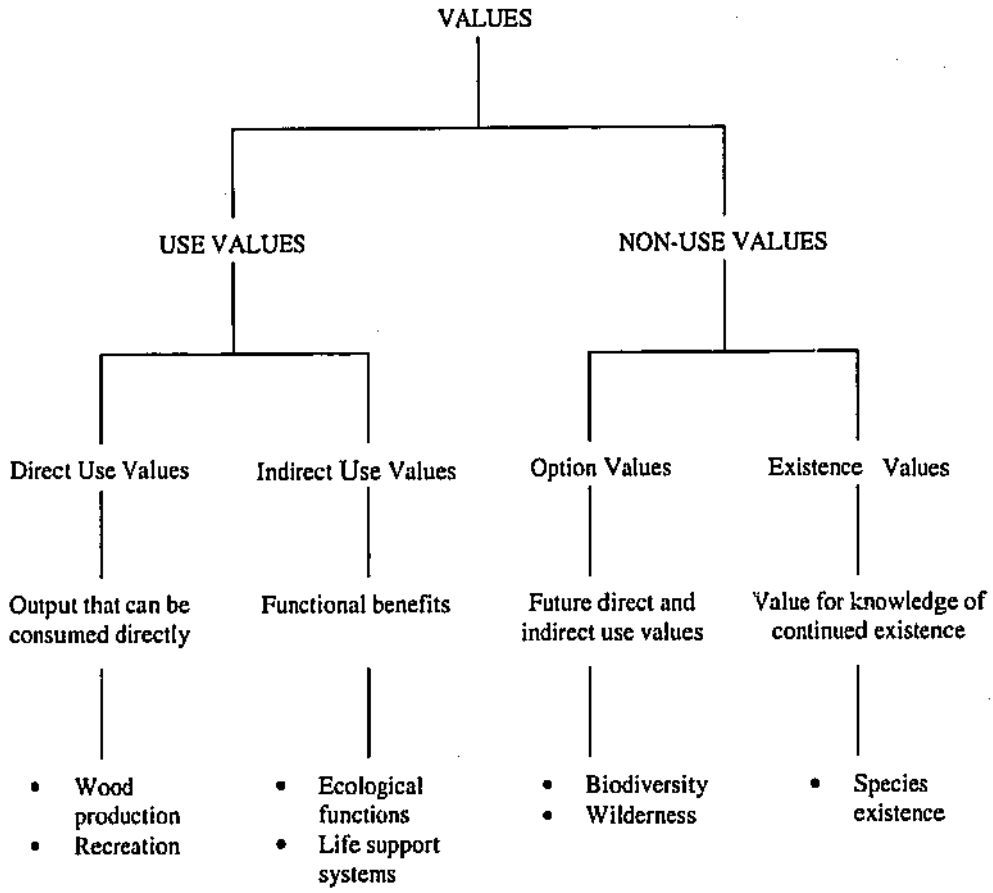


Figure 4: Commonly Recognised Values of Natural Environments (adapted from (Munasighe, 1993)

Commonly recognized values attributed to forests include use and non-use values are represented in Figure 4.

Use values refer to both direct and indirect uses of a forest. Direct uses are those that are directly consumable including timber, recreation, education, research, food and medicinal products. A recent report identified 29 use values of native forests in Australia (Department of the Environment Sport and Territories, 1996).

Indirect use values derived from forests are the functional benefits including the nutrient cycles, provision of watersheds, carbon storage and carbon sequestering functions.

Option values are also categorized as a use value and are used to describe the future direct and indirect values derived from the forest such as biodiversity and conservation of habitats.

Non use values include **bequest values** and **existence values**. Bequest values refer to the value of preserving the forest for future generations (providing for future direct and indirect use values). Existence value is the perceived 'intrinsic' value of preserving a forest to allow for it's continued existence.

Forests values may also be categorised according to their sphere of influence or impact. These include social, environmental, educational, cultural, heritage, political and economic values. With the exception of economic value, the costs and benefits accruing from these values often defy measurement. This has caused a problem in a world where decision-making is largely driven by economic values.

If decision-making is based on return-on-investment, financial bottom-lines and quantifiable resource efficiency, non-market values such as those listed above are overlooked in the operational context of society.

3.2 Economics and the Environment

"Our society is obsessed by economic growth and the measurement paraphernalia that is required for judging how well we are doing..." (Russell, 2001, p. 298)

Economics is the market mechanism used to allocate and distribute resources among the population. It "is fundamentally concerned with making resource allocation decisions where the outcome of the decision produces something for consumers and for which the worth of the decision can be expressed in monetary terms to the people." (Ward & Beal, 2000, p. 33)

However, environmental resources, which underpin all human systems, are not adequately captured by the market system. Their true value is hidden due to the non-price common good attributes (Marcouiller, 1998). Environmental resources are described by Bennett, Gillespie, Powell and Chalmers (1996, p. 229) as the 'natural capital' often not traded in markets yet contributing to the economic welfare of society. The resultant outcome is that environmental resources are often incorrectly priced and therefore misallocated by the market system.

Figure 5 illustrates the relationship between the natural environment and the economy. The diagram depicts producers and consumers and the exchange of goods and services within the economic environment. The natural environment provides a range of goods and services that contribute to the economy, yet are not fully accounted for by the economic system.

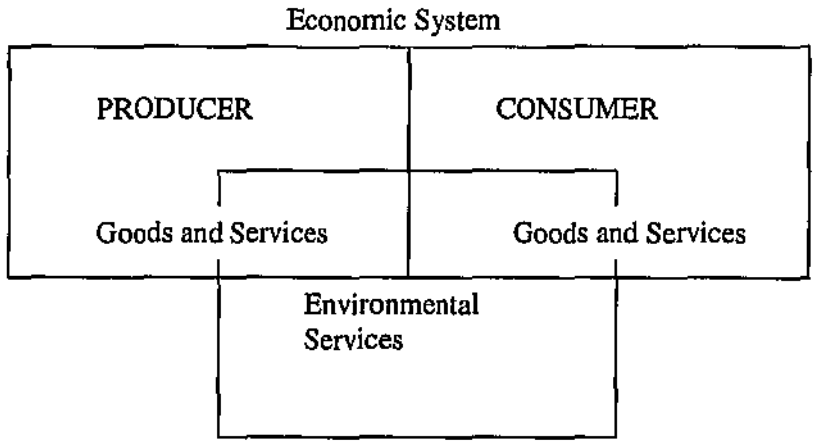


Figure 5: Sources of economic welfare, including environmental services
(Hufschmidt, James, Meister, Bower, & Dixon, 1983, p. 44)

Common (1995) described the following forest 'inputs' into the economic system:

Natural resources – those forest products utilised directly by the economic system including: timber and food products derived from the plants and animals; and resources used indirectly such as land area with soil to grow crops.

Natural amenities – these include the forest areas used for recreation or providing visual amenity to passers by. Natural amenities may be enjoyed directly through onsite participation or indirectly through media items, photographs or stories.

Waste assimilation – Forest areas provide a 'waste sink' (water, air and ecosystems). This is an area where humans dispose of by-products of their consumption. This activity occurs outside the market system as there is no expenditure required, it is absorbed into the environment.

Basic life support system – Forests are part of the entire ecosystem that humans depend on for survival. Whether directly or indirectly, forests provide air, water, food and habitat required for survival.

Many of these environmental services are not accounted for in the market-place which is represented diagrammatically in Figure 5. For example, forests provide a visual amenity or scenic resource, yet although people derive this value from the forest, they do not pay a monetary figure for the benefit. As resources are allocated according to their attached dollar value the visual amenity of forests is ignored in the system and forests are therefore incorrectly priced and allocated.

Economics, put simply, is a tool used to measure the values appropriated by humans. Economists do not disregard other measures of value, including social and environmental value, they merely aim to provide a common measuring unit for comparison among values (Driml, 1994). The extent to which values are expressed through economics depends on the willingness and ability of people to appropriate monetary figures as representative of their worth.

Although the application of economics appears relatively straight-forward, there are numerous areas of ambiguity, particularly in the use of models and methodologies that are based on a number of assumptions on the operation of a 'perfect market'. There are also numerous divisions in the opinions of academics in the application of economics to the allocation of environment resources.

Pearce and Moran (1994) and Gowdy (1995) surmise that economic forces actually drive the depletion of the worlds biological resources. As resources become more scarce, the greater the economic incentive to consume or destroy them for economic gain. Ironically, economic activities associated with the destruction of biological resources are worth more than the value placed on the biological resources themselves. This has been evident around the world, particularly in third world economies where the reliance on the primary industries is greatest. Nayak (2001) writing on the deforestation of India, concludes that the cause of resource depletion "boils down to market policy failures" whereby the scarcity value of forest resources has not been reflected in the market signals. The challenge is not to abandon the pursuit of economic growth, but to achieve the pattern of economic growth that a properly functioning price mechanism would realise (Common, 1996, p. 18).

On a per capita basis Australia is superficially rich in terms of its forest cover by comparison with many other countries in the world (Mercer, 2000). However, Australia provides an excellent example of the failure of economics to reflect the true value of forests. In 1996 the Department of Environment, Sport and the Territories reviewed thirteen reports on the values of the forests in Australia with the aim of finding a common method of valuation. The 1996 report found, "there is indeed evidence of serious weaknesses in the determination of the financial values of native forest timber. Our analysis indicates the very strong likelihood that native forest timber harvesting, as a commercial activity is being subsidised, is inefficient and poorly managed."(Department of the Environment Sport and Territories, 1996, p. 3). The report concluded that in the past financial values were over-inflated and non-financial values of forests were under-estimated.

It is only in recent years, with the recognition of the finite capacity of earth's resources, that more attention has been placed on the correct valuation of resources and the otherwise wider implications of resource depletion. Price (1988) found that during the 20th century forestry policy in the United States and Switzerland had an increasing emphasis on the public good. However, he also found that strategies were more reactive than proactive and that policies were focused on short-term economic factors and

imposed in a top-down approach from the national governments, precluding community stewardship over resources.

As with many natural resources forests, provide private and public goods simultaneously. Private goods are those that can be consumed by individuals to the exclusion of others. Public goods are non-excludable with benefits flowing to all without exclusion. Public goods are usually provided by the government as there is little incentive for private individuals to supply goods which may be obtained freely by others. "In reality there is a continuum between public and private goods." (Driml, 1998, p. 2.6) As a consequence the valuing process is difficult as the whole value of forests is likely to be greater than the sum of the parts that can be identified. In addition the issue of property rights means that individuals are often ill-informed of the real costs and benefits of their actions in the market place.

Nayak (2001) found as people have received benefits, both individually and collectively without normal market processes, they do not appreciate the true total economic and ecological value of the forests. For example, forests are often valued according to the value accruing to the land owner, not to the society as a whole. In addition, the societal costs of clearing a forest are sizeable yet often represent a profit on the individual landowners balance sheet. This provides in part an explanation for the attractiveness of deforestation. Land owners predominantly have control over the fate of their own lands, with benefits for clearing land accruing to the individuals.

The temporal factor is also extremely important to discuss in the context of economics and the allocation of resources. Economic forces drive the allocation of resources in the most efficient manner in real time. Public and private management agencies also adopt a short-term focus to realise benefits during their period of power or in the case of an individual, in their lifetime. This has been exemplified in the process of the rapid clearing of land, the major determinant of biodiversity loss in Australia (Bradshaw, 2001; Yencken & Wilkinson, 2001). Many argue that there is little regard for the bequest values of the environment as the current management do not stand to receive the benefits or suffer the losses as a consequence of their environmental actions.

In addition, changes in environmental states usually occur at a gradual rate with the greatest environmental consequences felt long after an economic decision is made. This factor fuels entrepreneurial risk taking whereby the environment is waged for short term gain. This may be addressed through a system of discounting, however it is difficult to put a price on the future social welfare impact of an environmental action (Gowdy & McDaniel, 1995).

Political and institutional lethargy in relation to new forest industries have also had a bearing on the amount of quantifiable data sought for non-wood production values. Ward (2001) explained the management agencies' reticence in the adoption of practices to take into account the impact of non-wood forest values as due to the inability to translate some non-wood economic values into immediate cash flows and the operational constraints placed on agencies commanding financial self-sufficiency. "Forestry [also] provides an unfortunately large number of situations where perverse incentives have produced very inefficient and unsustainable outcomes." (Tietenberg, 1996, 258) .

The previous discussion focuses on the limitation of economics in the application of a measurement to human-derived values of the environment with particular reference to forests. However, proponents of traditional forms of economics generally assume that individuals are the only legitimate source of values (Tacconi, 2000, p. 42). Values, however may also include 'existence' or 'intrinsic' values of the environmental asset itself without confining it to a utilitarian context of value. "Economists tend to find this puzzling, focusing as we do on human society" (Russell, 2001, p. 125). Recognition of intrinsic value is perhaps the most subjective, in that it is largely motivated by moral concern, obligation or altruism (Pearce & Moran, 1994). For example, the economic resources allocated to save whales that beach themselves are far greater than the a priori rules of economics would estimate.

Despite the limitations of economics outlined above, it is widely recognised that economics can play a role in environmental policy making for a sustainable future. The field of environmental economics is relatively new in the context of the economics discipline. It attempts to integrate the social science of economics with the natural

science of the environment recognising the benefits of an interdisciplinary approach to sustainability.

> "An alliance of economics and the natural sciences, especially the life sciences, offers the best hope for sustaining economic progress in the developing world." (Pearce, 1998, p. 34).

Environmental economics attempts to breakdown the notion of 'disciplinary parochialism' (Godoy & Contreras, 2001). For example, an interdisciplinary approach incorporating education, economics and the environment has found that environmental education can provide an inexpensive solution to deforestation. Engin and Shonkwiler (1995) also observed in their study of the European Union, that increased co-operation of economists and scientists is required for greater rationality and cost-efficiency in the development of environmental policy.

Overall, there are many ways that economics can contribute to environmental policy. The application of environmental economics provides a framework for decision making which facilitates the maximisation of total benefits to society. This is achieved by providing a common measure for comparison, enabling the evaluation of alternatives in a given problem setting. (Green & Tunstall, 1991; Russell, 2001; Ward & Beal, 2000) The value of environmental resources and their common property characteristics are recognised in this field of economics, providing the opportunity for reversal of market failure (Harrington & Oakley, 1992). Ward and Beal (2000) found that when people are confronted with the real cost of their actions they make better environmental decisions.

Economic measures allow environmental policy decisions to be evaluated in a consistent manner addressing temporal characteristics such as the effect of current actions on the future availability of resources. This is particularly prevalent in the area of government subsidies placed on environmental resources. Environmental economics can be used to demonstrate the effect of the employment of government subsidies on natural resources. For example, in many parts of the world including Australia, logging practices have been subsidised promoting unsustainable harvesting practices.

> "That it is currently economically viable to harvest trees on crown/state lands that are wood chipped for paper is not the result of freely operating market forces, but of a policy decision to continue subsidisation of a particular sector of industry, through putting a low price on a natural resource." (Wills & Tonkin, 1998, p. 58)

The potential application of environmental economics to remove subsidies and correctly price environmental services would lead directly to more efficient resource use. (United Nations Development Programme et al., 2000; Wills & Tonkin, 1998)

Economics also aids decisions on policy instruments, their monitoring and enforcement methods (Russell, 2001). Economic modeling is employed to facilitate the identification of relevant variables, their relationships and impacts, providing important information to fuel decision-making (Folmer & Thijssen, 1996).

Although historically in Australia the uptake on the employment of these economic instruments have been slow, in the last decade there has been a marked change with many reforms in the sector. In the Prime Minister's Environment Statement (1989) it was stated:

"It is vital also that governments ensure that they are not inadvertently encouraging environmental damage through tax concessions, subsidies and other special assistance." (The Hon R.J.L. Hawke, 1989)

Ultimately, "economics can address uncertainty by bridging the gaps in knowledge, providing prescriptive guidance and descriptive observation on elements of uncertainty." (Russell, 2001, p. 10) Science and management is dependent on measurement (Eagles et al., 2000, p. 62). A detailed, accurate measurement provides for a more informed decision, ultimately leading to a better outcome.

"Without a stronger base of scientific knowledge and indicators at local, national and global levels, we are ill-prepared to judge ecosystems' productive capacity, to recognize the tradeoffs we are making or to assess the long-term consequences of these tradeoffs." (United Nations Development Programme et al., 2000, p. 229)

3.3 The Theory of Sustainability

"Sooner or later, ... the expansion of human-created economic systems will be constrained by biological laws because the human economic enterprise cannot exceed the limits that all biological systems obey." (Gowdy & McDaniel, 1995, p. 187).

The integration of environmental and economic objectives for long term gain is reflected in the theory of sustainability. Worldwide, as non-renewable resources have increasingly shown signs of depletion the quest for sustainability has heightened. A number of significant events starting in the 1970s firmly placed sustainability on the global agenda. These included the publication of Limits to Growth in 1972 (Meadows, Meadows, Randers, & Behrens, 1972), the release of the International Union for the Conservation of Nature (IUCN) World Conservation Strategy, the 1987 Brundtland Report, Our Common Future and the 1992 United Nations Conference on Environment and Development. (Harris & Leiper, 1995; Hutte, 2000) Forested regions were featured prominently in these events. Hutte (2000) reviewed IUCN library publications and forestry abstracts dating from 1950 to 1995 and found a strong correlation between the key events and the proliferation of literary debate on sustainability of forests.

Not refined to the academic world, it can be said that there has been a general 'greening' of the populace. People have become more environmentally aware, with the sensitivities to the environment apparent in their change of purchasing behaviour and actions (Dowling, 2001; Harris & Leiper, 1995; Weaver & Oppermann, 2000; Wight, 1993). The increasing popularity of the 'green' vote in countries such as Australia and Germany also highlights this shift in values.

Views on sustainability are rooted in individual value and belief systems. Generally societal view can be divided into two main approaches, the ecocentric or earth-centred approach and the anthropocentric or human-centred approach. The former views the environment as having intrinsic value while the latter views the environment purely as a resource for human utilisation. The dominant western environmental paradigm is grounded in the latter, anthropocentric approach although popular thought is shifting towards a new green paradigm (Weaver & Oppermann, 2000).

"Biologically, sustainability means avoiding extinction and living to survive and reproduce. Economically, it means avoiding major disruptions and collapses, hedging against instabilities and discontinuities" (Costanza & Patten, 1995, p. 194).

Although it has been stated previously that the concept of sustainability is grounded in the ideological belief of the individual, most exponents generally agree on the equitable distribution and efficient allocation of resources and the notion of inter-generational equity (Costanza & Patten, 1995; Dowling, 2001).

The key to sustainability is the notion of 'constant capital', or maintaining the capital stock of resources (Garrod & Fyall, 1998; Russell, 2001). However there are disparaging arguments to the composition of 'capital stock'. For example, some argue that technological substitutes can fill the void of depleted natural resources to provide for 'constant capital' requirements. The ecocentric viewpoint argue that constant capital refers only to natural assets and no man-made substitutes are acceptable.

Weaver (2001) raises many other controversial issues in the sustainability debate including intergenerational vs intragenerational equity, balancing out existing inequalities, product or market led sustainability, the area to be sustained and steady state or enhancive sustainability.

It is obvious that at times the pursuit of sustainability, depending on the ideological background, can result in conflicting agendas. Despite these ideological divisions, it is widely recognised that some industries are more sustainable than others.

3.4 Complexities in the Tourism and Recreation Industry

Sustainable forest management practices require the precise financial evaluation of the various combinations of forest uses. In the past financial information on the value of tourism and recreation in forested areas have received little attention, with inadequate data available resulting in an industry that has been undervalued and somewhat trivialised (Buckley, 2000; Eagles, 2002; Ward, 2001).

> "the economic impact of park tourism is poorly known, not well documented and weakly communicated...this can lead to severe under representation of the importance of park tourism within the fiscal sectors of government and business. Therefore, the parks do not compare well to other economic generators, such as manufacturing or forestry, industries where the volumes and economic value of the products are carefully documented and reported within a continuous stream of information". (Eagles, 2002, p. 136)

The first difficulty that occurs in the measurement of tourism and recreation in forested areas is the value placed on the natural resources themselves. As mentioned in section 3.2, environmental resources are free goods, they underpin the economic system, yet are not traded in the economic market place. This results in the resources being mis-allocated or mis-priced by the market system. Other factors arising to the under-valuing of natural resources were already covered in section 1.1, however there are specific factors in the tourism field which also give rise to measurement complexities.

Recreation and tourism activity generally is difficult to measure in terms of economics as the economic activity associated with its production cuts across many sectors, levels and interests making it difficult to define (Cater, 1995; Marcouiller, 1998; Weaver & Oppermann, 2000). Tour operators, travel agents, hotels, passenger carriers, tourism associations, government tourism offices are all part of the tourism industry. The attribution of economic information to the tourism sector is therefore difficult, with many of the stakeholders operating across different economic sectors and with potential overlaps in deriving financial information.

Tourism activities also often occur in non-excludable areas, such as publicly owned forest estates. The forest estate can provide a tourism and recreation business with a support base; a sense of place; a basis for marketing and a basis for individual firm competitiveness (Marcouiller, 1998). Each business activity has different markets and business objectives and different environmental and social impacts. (Forsyth, 1997; Herath, 2002) These are felt industry-wide and can have an impact on the future viability of tourism in forested areas. Due to the attribution problem of activities occurring on common property these impacts are difficult to measure and allocate.

In addition, tourism and recreation in forested areas are concerned with experiences. Unlike the purchase of a tangible product, the tourist purchases an intangible experience which can not be seen, felt or tasted prior to consumption. The experience is highly individualised, with each person having a different perception of the value. To add to this complexity, individuals predominantly select settings for leisure activities based on destination attributes rather than individual site or operator attributes. This provides difficulty in measuring the value and attribution of an individual part of a tourism or recreation experience.

It is also important to note that the relationship between tourism and forest attractions is interdependent. For example, social conflict among escalating numbers of tourists and degradation of the environment are two common problems with the promotion of tourism to an area that in turn affects the future demand for tourism. This is important to the valuation of the forest tourism product as the management of the resource today could affect the value of the resource in the future. This is reinforced by Buckley (1994), Chapman (1995) and highlighted by Bennett in the statement "if visitation increases to the point where existence values are threatened, any increase in use values could be at the expense of non-use values"(1996, p. 239).

Tourism is often presented as a more profitable, labour intensive and environmentally sound industry with the potential to provide rural economic development to areas where the traditional economic base has been tied to an untenable natural resource use (Burr, 1995). However, in order to obtain policy and investment commitment, the industry must be quantified in economic terms. Despite the inherent complexities in the measurement of the tourism sector mentioned above, techniques have been developed to aid in the quantification of these values. Once complete, economic valuation studies of tourism to natural areas can provide valuable information to the tourism sector to aid in the future management of an area.

3.5 Theoretical Framework

The theoretical framework represented in Figure 6 demonstrates the relationship between tourism and the environment. The **environmental resources**, the forest attractions and attributes provide value to tourism and recreationists. This value is not captured by the **economic system** in terms of any direct observable flow of dollars from tourist to the environment.

Within the **economic environment** are the traditional producer/ consumer or supply and demand roles. In this case those responsible for **tourism demand (tourists)** and those responsible for **tourism supply (industry and government)**. The tourism supply proponents provide tourism goods and services and the tourism demand proponents provide payment for these services. The tourism supply side, industry and government are responsible for the management of the environmental resources that provide value for the tourists.

A resource's **value** can be measured in the application of economics. The allotted value determines the allocation of that resource. In the case of environmental resources that are not captured by the market system, the value can be determined using a variety of non-market valuation techniques.

When the gross economic value incorporating both the market value and non-market value of the resource is ascertained, management of the tourism supply (industry and government) can make better management decisions about the allocation of resources to ensure long term sustainability.

Please note that although the author recognises other measurements of value including social and intrinsic values, the scope of this thesis is to examine the economic value of tourism and recreation in the defined forested areas of Western Australia. The following chapter of the thesis will examine methods for measuring value using economics.

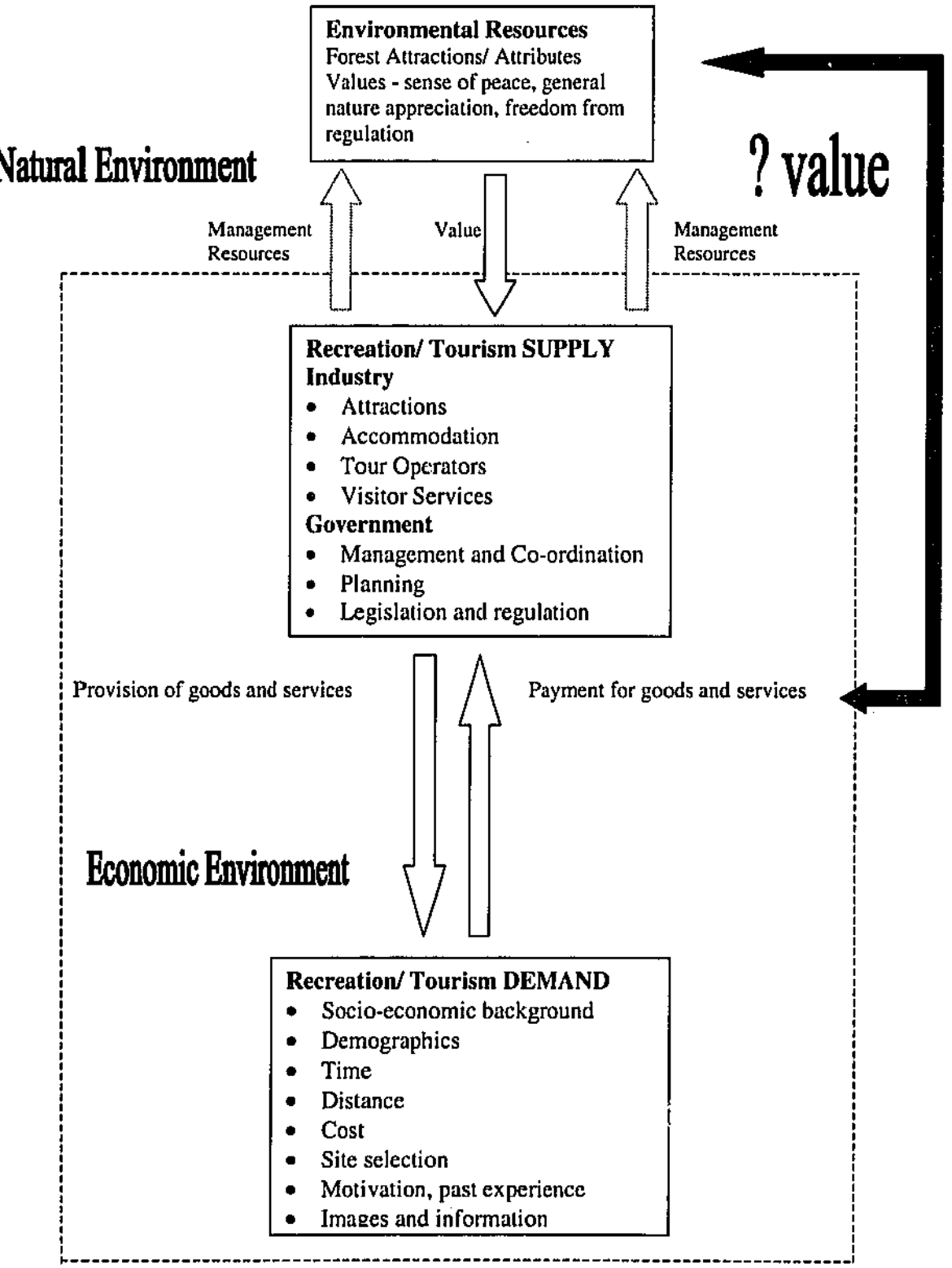


Figure 6: Theoretical Framework

4. METHODS FOR MEASURING VALUE

> "Men do not seek to maximise their material well being to the exclusion of all else. Everyone is Economic Man up to a point, but only up to a point. Other considerations, such as personal philosophy or ideology, religion, ethics, or other attitudinal relationships, or social pressures of the group of which govern the individual govern much individual conduct." (Clawson, 1975, p. 123)

The previous sections have established that among other values, forests provide tourism and recreational value. The satisfaction of these individual experiences has both positive and negative impacts on the social, economic, political and environmental systems of an area.

To aid in the management of resources agencies have developed techniques to quantify tourism and recreation impacts in economic terms. Two broad groups of economic indicators can be used to describe the value of tourism and recreation in natural areas (Driml, 1998) . The first group describes the impact of direct expenditure associated with tourism and recreation, generating activity and employment in the economy. These indicators are concerned with visitor expenditure on items associated with their travel to a region including and not limited to transport, recreational equipment, accommodation and commercial tours. The direct impact of visitor spending also leads to indirect impacts resulting from purchases from other sectors and induced impacts when workers spend income on goods and services. Direct impacts are 'multiplied' where successive rounds of employment and income are generated by the initial expenditure. Some of these impacts also leak out of the economy through purchases made outside the region. Figure 7 represents a simple diagram of economic impacts in the tourism sector explained above.

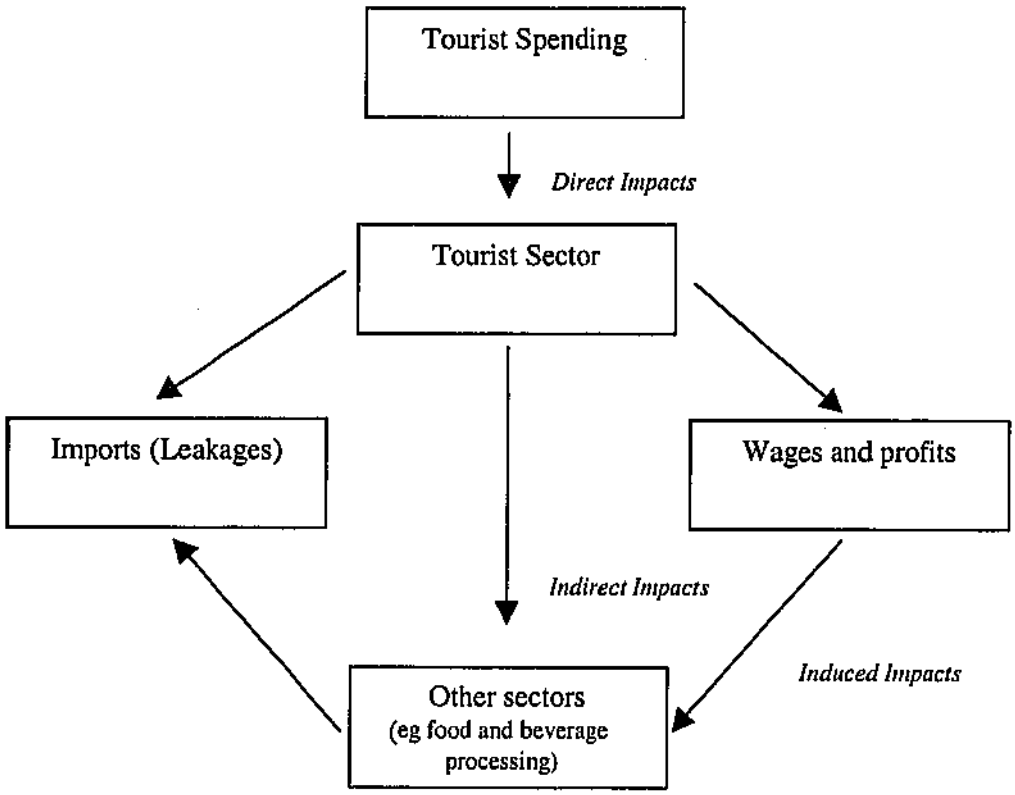


Figure 7: Economic Impacts in the Tourism Sector (Lindberg, 2001)

The second group of economic indicators is measured as net economic benefits or the total benefits derived by tourists and the businesses that service the tourism market, minus any costs to society in the provision of those benefits (Driml, 1998, p. 3.1). The benefits to visitors is measured in terms of 'consumer surplus'. The measure records how much a visitor is willing to pay above the price currently determined by market forces.

> "Economists generally accept the proposition that people are willing to trade money for changes in environmental quality – to pay something for more of a desired change; to accept compensation for suffering an undesired change. So, in principle, for every affected individual and every quality change there is assumed to be a discoverable schedule of marginal willingness to pay for a good or marginal willingness to accept for a bad." (Russell, 2001, p. 131)

A number of non-market valuation techniques may be used to measure the benefits not captured by the market system. These will be outlined in section 4.2.

4.1 Marl t Valuation Techniques

The direct impact of tourism and recreation can be ascertained through the collation of market values and indicators. This information may be derived from primary or secondary research methods. Primary research surveys of visitor expenditure and tourism operator financial information may be conducted to determine direct tourism expenditure. Secondary research on tourism impacts may be obtained from agencies such as the Australian Bureau of Statistics and the Bureau of Tourism Research. In addition, visitation data can be collected from public and private sector agencies including Department of Transport for traffic flow indications, National Park agencies, tourist bureaux and tourism operators for visitor origin, numbers and length of stay. There are numerous other potential sources of information to determine market values for tourism and recreation too numerous to mention in this thesis.

To gain a broad scale view of the economic value of tourism and recreation in an area meta-analytic techniques may be employed to enable 'order of magnitude' estimates of tourism impacts to be made. Meta-analysis refers to "the statistical analysis of a large collection of analysis results from individual studies for the purposes of integrating the findings"(Glass, 1976, p. 3). As Hunter & Schmidt (1990) concur the foundation of science is the cumulation of knowledge from the results of many studies. Meta-analysis has been employed in numerous tourism studies including those completed by Eagles et. al. (2000), Driml et. al. (1995) and Dutton et. al. (1995).

4.2 Non Market Valuation Techniques

There is a range of non-market valuation techniques that may be used to estimate total benefits which include those not measured by the market system. The following summary of techniques outlines the main methodologies employed in the tourism field for the purposes of non-market valuation.

4.2.1 Contingent Valuation Method

Contingent Valuation Method is a survey-based method whereby respondents are asked to indicate their willingness to pay (in financial terms) for a given scenario or experience. This method was used to determine consumers' willingness to pay for a whaleshark experience at Ningaloo Marine Park, Western Australia (Davis & Tisdell, 1988). Some limitations of this technique include the questionable accuracy of consumers indicated willingness to pay and their actual willingness to pay should the scenario occur. In the case of this study the willingness to pay indicated by survey responses was lower than the actual amounts paid by tourists. It was found that the time of surveying and demographic characteristics of respondents also often influences results.

As the contingent valuation method is usually based on visitors indicating an amount they would be willing to pay to prevent a plausible threat to a resource, the method is better for estimating preservation or non-use values than tourism and recreation (Bennett et al., 1996). Studies conducted in South East Australia by the Resource Assessment Commission found that the willingness to pay per person for preservation values was approximately three times higher than that for recreation values (Bennett et al., 1996).

4.2.2 Choice Modelling

Choice modeling is a method whereby respondents choose from a number of alternatives set out in a survey instrument. "Modeling the choice among a discrete set of recreation alternatives is driven by the possible patterns of substitution among sites" (Haab & Hicks, 1997, p. 127). An economic value can be ascertained by providing an option that is captured by the market system which may be used as a comparison to the other alternatives. This valuation technique provides the problem of bias whereby respondents choose from a set of alternatives provided for in the survey which may not truly reflect an individual's choice set. Haab and Hicks (1997) developed a model that allows for the possibility of heterogenous choice sets that are endogenously determined, however choice modeling still provides the problem of intention versus action.

4.2.3 Conjoint analysis

Conjoint analysis is a method whereby the respondent is asked to rank a set of preferences. This method gives rise to similar limitations imposed by the choice set or contingent valuation methods. Garrod and Willis (1997) used conjoint analysis to determine the public willingness to pay for changes in forest management standards designed to offer increasing levels of biodiversity at the expense of timber production.

4.2.4 Hedonic Price Method

Hedonic Price Method utilises other economic indicators such as changes in property prices and wage rates which occur as a result of the changes to industry in a region. A portion of the land value increase or decrease or the wage rate change may be attributed to the changes in tourism and recreation in an area. In the UK a comparative study of the recreational and amenity benefits of Forestry Commission forests was employed utilising the reflected values of nearby properties(Garrod & Willis, 1992). This measurement technique provides problems in the appropriation of value to tourism variables. The method is often referred to as the Land Value Method (Randall, 1987).

The comparative economic methods above have been used extensively worldwide, however the application and recognition of these methodologies in the valuation of Australia's native forests is limited (Ward, 2001).

Probably the most widely used methodology in the determination of the economic value of tourism and recreation in natural areas in Australia is the Travel Cost Methodology. Travel Cost Methodology is argued by many researchers to provide the most reliable estimates of value as it uses observable data rather than hypothetical data to determine results (Common, Bull, & Stoeckl, 1999). Details of the travel cost methodology, which has been employed in this study are contained in section 4.3.

4.3 Travel Cost Methodology

Non-market valuation is based on the premise that non-market goods and amenities have substitutes and or complements that are routinely exchanged and priced (Randall, 1987, p. 269). In the case of the travel cost method the value of tourism and recreation in a forested area is imputed from observation of the market for travel and subsistence purchased by the tourist. The technique

> "assumes people would consider a park fee in the same way as they would consider an increase in travel costs – the relationship between the hypothetical park fee and the number of visits made to the park describes the demand curve for the recreational use of the park" (Bennett et al., 1996, p. 231).

The majority of travel cost models, incorporate the following assumptions:

1. Visitors derive no net utility from the travel time.

2. Visitors to the site respond to entry fees as they would to changes in travel costs.

3. Visitors in each region participate in the same number of trips to the site at the same level of travel cost.

4. All visitors obtain the same benefit, this being equal to the travel cost of the most distant visitor.

5. The most distant visitor obtains a net benefit of zero as the derived benefits minus the travel cost is equal to zero. In addition, the closest visitor to the site accrues the greatest benefit, however most of their benefit accrues as consumer surplus.

6. Visitors are on a single destination trip, otherwise an apportionment of value needs to be accounted for in the case of multi-destination visitors.

The technique involves a two stage process; first a demand function is estimated based on the relationship of travel cost and the associated visitation to the site; second a demand curve is derived using a scale of hypothetical fees or travel costs.

Consumer surplus is the unit measure of economic value determined using the travel cost method. Consumer surplus measures the total price people are willing to pay for a good or service over and above the market price or entry fee that is currently charged. The market demand is typically measured according to the number of visits to a site or visitor days spent at the site. This measure of visitation is the dependent variable in the demand equation. Figure 8 depicts consumer surplus where P_1 is the current price charged for entry into the site and the shaded area under the demand curve represents visitors who are willing to pay a higher price for site entry. These visitors and their corresponding 'willingness to pay' can be totaled to determine the consumer surplus for the site.

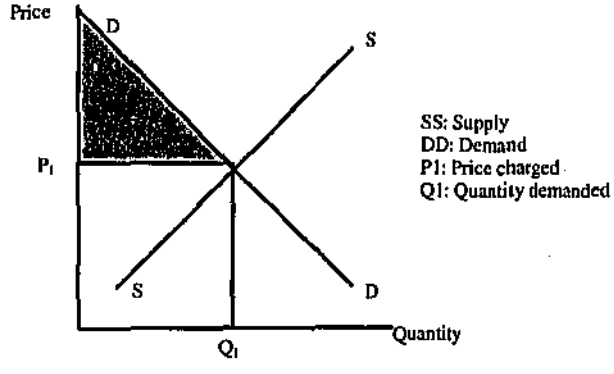


Figure 8: Consumer Surplus

The two stage process of the travel cost methodology are outlined below.

4.3.1 Estimating the Demand Function

In 1949 Harold Hotelling established the basic proposition that visitation to recreation sites decreases as the distance traveled increases. Travel costs in this study

will include the expenditure outlays for accommodation, park fees, transport to and from the destination, meals purchased in restaurants and cafes, souvenirs and a value for the opportunity cost for travel time. In addition to travel costs, prior studies have established three other main classes of independent variables: demographic variables, site variables and site substitutes (Ward, 1999). By testing the effects of these variables it is possible to explain the determinants of demand.

The recreation demand function is determined by:

$$Q_i = f(C_i, \text{other variables}_i) \qquad (1)$$

Q_i represents site visitation and is a function (f) of C_i.

C_i represents expenditure on travel costs

i indexes the zone of visitor origin.

This recreation demand function is estimated from observations of travel costs to, and number of visits made by, visitors who have traveled different distances from home to the site.

The number of visits from each zone of origin is divided by the total population (**P**) for that zone to ascertain the correct proportional figure. (Q_i/P_i)

Multiple linear regression analysis using Ordinary Least Squares is applied to the observations for the zones 1 to n to determine the effect of the independent variables and provide a function to best describe the range of zone observations.

The linear form of this function is:

$$Q_i/P_i = \alpha + \beta_1 C_i + \beta_2 X_{1i} + \beta_3 X_{2i} + \ldots$$

Where X_1 and X_2 are the independent variables from (1) that are possible determinants of Q_i/P_i

From previous travel cost studies the co-efficient for travel cost (**C**) should be negative to demonstrate the inverse relationship between travel cost and site visitation. Other significant variables are to be selected according to the results, that is if the coefficients for these variables are significantly different to zero.

Other functional forms may be tested for their suitability against the linear model.

The degree to which the function generated explains the observations of Q_i/P_i from all zones is tested using the R^2 statistic.

Once a recreation demand function goodness of fit has been determined a demand curve for hypothetical entry fees to the recreation site is derived.

4.3.2 Calculating the Consumer Surplus

The aim of this demand function is to calculate the number of visits to a site from each zone at various levels of travel costs (surrogate price for entry fees). A range of hypothetical fees are used to calculate the response in demand from each of the zones. (Please note that an individual travel cost model may be constructed for sites with frequent visitation from individuals, however for the purposes of the thesis, a zonal model is to be employed.)

The calculation of consumer surplus requires the conversion from logs to integers. The total zone population is multiplied out to give an actual per zone visitation demand based on the fee charged.

The equation is... $Q_i = \alpha' * (C_i + F_x)^{\beta_1} * ((X_{1i})^{\beta_2}) * (P_I)$

α' is the antilog of α and F_x is the entry fee.

$$Q_x = \sum_{i=1}^{n} Q_i$$

These two calculations are used to construct a table of the estimated visitation at various entry fees to the site. Linear regression is then applied to the table data to generate the entry fee demand function. This function takes the form $Qx = \alpha - \beta F_x$. By calculating the area under the demand curve a value of consumer surplus is determined. The consumer surplus measures the total value people are willing to pay for a recreational experience above the entry fee.

Estimates of the consumer surplus for the annual population can be calculated by multiplying the sampling fraction or averaging the consumer surplus for the sample and multiplying it by the number of visitors in the population.

The economic formulae outlined in sections 4.3.1 and 4.3.2 are commonly used formulae for travel cost studies and have been adapted from Driml's study (2001). As mentioned previously, it is possible that the linear function form does not provide the best 'fit' for the data. (Ward & Beal, 2000, p. 184) For this reason it is common to test other functional forms such as the log-linear and semi-log demand functions.

4.3.3 Methodological issues in the employment of the Travel Cost Method

Since the introduction of the travel cost method by Harold Hotelling in 1947 there has been much discussion surrounding the application of travel cost analysis. Although the basic principles remain undisputed, that is the inverse relationship between travel cost and distance traveled for recreation and the use of travel cost as a surrogate market substitute, there is much debate on the determination of the initial demand function (Ward & Beal, 2000, p. 217-218).

The following discussion will highlight the key issues in relation to cost estimation and the construction of the demand function.

4.3.3.1 Cost Determination

Travel cost information is collected on the cost of transport to and from the site according to the method of transport, the expenditure on accommodation and other costs associated with the travel to the site. There is much literature on what should, and should not, be included in the travel cost calculations. For example, Fix and Loomis (1997) in a study on the economic value of mountain biking in Moab, Utah did not include food or wear and tear on bikes as a variable expense in the calculation of travel cost. Knapman and Stanely (1993) included food and accommodation costs additional to those that would have been expended if the individual stayed at home. Other studies have included all food costs associated with travel in the region (Xue, Cook, & Tisdell, 2000).

Debate over the calculation of vehicle costs over distance is also presented in the literature. Some approaches use the assignment of standard vehicle running costs (Bennett, 1995) , while others collect specific information from respondents on vehicle engine capacity where associated running costs can be applied (Engin & Shonkwiler, 1995). Knapman et. al. (1993) in the travel cost study of Kakadu National Park, based running costs on the most common vehicle used by visitors to the park.

4.3.3.2 Researcher assigned travel costs

Problems associated with researcher-assigned travel costs have been coined "Randall's Difficulty" after his controversial article published in Land Economics in 1994. As the costs of travel to a destination are not directly observable, the researcher usually collects information on the distance traveled to a destination and then assigns costs based on distance. Randall identifies numerous difficulties with this method of valuation.

Put simply, the recreationist is part of the production of travel cost and therefore it is difficult to observe costs and difficult to generalise individual cases across populations. The standard travel cost procedure produces only ordinally measurable welfare estimates (Randall, 1994).

There have been numerous attempts to more accurately determine travel cost including incorporating users' perceptions of site quality in travel cost models (Siderelis, Moore, & Lee, 2000) the construction of random utility models to predict site choice (Haab & Hicks, 1997), more accurately deriving distance traveled through GIS mapping technology (Ward, 1999) and the collection of detailed direct expenditure information from the tourists themselves (Beal, 1995).

4.3.3.3 Valuation of travel time

There is considerable debate in the literature regarding the value of travel time for a tourist partaking in a recreational experience. The opportunity cost of travel time is measured in terms of lost wages; the sacrifice made in order to participate in the recreation experience. The time cost of travel is usually estimated by multiplying travel

time by a proportion of the visitor's hourly wage. A proportion of the total wage is applied as it is assumed that the trip itself offers a source of utility. (Randall, 1987) In Australia there have been some standards set in previous studies including 33% of the wage rate (Bennett et al., 1996; Ward, 1999) and 25% of the wage rate (Driml, 2001; Knapman & Stanley, 1993). Where children are included in a survey sample past studies have taken a quarter of the value applied to adults (Gillespie, 1997).

4.3.3.4 Accounting for multi-purpose trips

Accounting for multi-purpose trips is concerned with how much of the travel cost to attribute to the site being studied according to the purpose of visit, for example, spending time with friends and relatives or enjoying the forest. Different approaches have been used by researchers, for example Fix and Loomis (1997) in their case study of Moab asked respondents to nominate whether mountain biking was the sole purpose of their trip to Utah. If the response was positive they would include the respondent in their survey. Other approaches have included applying a weighting to different motivations for visits to study areas. For example, Ward (2001) asked respondents to allocate a percentage to the importance of the national park to their visit. Other studies have used contingency questions to ascertain main purpose of visit including questions such as "If the national park was not here would you still have visited this region? Why or why not?". Xue et al.(2000) asked respondents to allocate percentages to different aspects of the environmental resources in Changbai Mountain Biosphere Reserve as reasons for their visit to the site.

4.3.3.5 Accounting for multi-destinational trips

If a person undertakes a holiday encompassing several destinations, the researcher is faced with the problem of how much of the travel cost to attribute to the particular recreation site. Knapman and Stanley (1993) in their study of Kakadu surveyed respondents to ascertain the proportion of time spent in Kakadu in relation to other major destinations and their trip overall. This proportion was used to appropriate travel cost to the Park. Other methods have used a distance calculation asking respondents to nominate

their prior and post destinations and calculating the distance between the two (Ward, 1999).

Some studies have made a distinction between on-site costs and off-site costs. Driml (1994; 1998; 1999) looks purely at on-site costs in her studies believing the multi-destinational factor to be too significant to arrive at accurate off-site costs attributable to the individual sites studied. A. Font (2000) maintained that the travel cost method is more accurate in determining site values when the tourist decision process is divided into stages: 1. The tourist decision process prior to departure and 2. The tourist decision process once on-site. Fix, Loomis, & Eichorn (2000) concurred that endogenously chosen travel costs (on-site costs) should not be used as explanatory variables in the demand equation as they are an outcome of the choice process itself. Kerkvliet and Nowell (1999) researched the spatial limits of the travel cost model with findings that indicated that even within the on-site cost model several limitations exist.

4.3.3.6 Site Substitution and Site Attributes

The quality and price of recreation alternatives and individual site attributes such as distance to site, recreational amenities, crowdedness and environmental quality have an effect on the value of travel cost (Font, 2000; Haab & Hicks, 1997; Smith, 1989). A study of recreation trails in North Carolina found that user ratings of trail quality at the survey site and the substitute sites had a significant effect on the consumer surplus vale of the trail site (Siderelis et al., 2000). Extensions to traditional travel cost methods have incorporated these factors to more accurately estimate consumer surplus values (Fix & Loomis, 1997; Smith & Kaoru, 1990).

However the addition of substitute sites and site attributes in travel cost studies necessitates more intensive data collection requiring direct survey information from visitors rather than straight observation data (Driml, 2001).

Many studies therefore do not include substitute sites including studies by Gillespie (1997) Bennett (1995) Driml (2001) Xue et al. (2000).

4.3.3.7 Individual, Zone or Hybrid Observations

Travel cost can be calculated as an average of individual travel costs scaled up to entire population or on a zone by zone basis. Individual travel cost was used by Fix and Loomis (1997) where the site was frequently visited by the same users for the purpose of mountain biking. Sample surveys recorded individual visitor observations of expenditure.

Most of the studies done in Australia (Bennett, 1995; Driml, 2001; Knapman & Stanley, 1993; Ward, 2001) have employed the zonal method where responses are amalgamated into groups based on origins of varying distances from the recreation site. Less detailed data is required for the zonal calculation, requiring at the minimum, zone of origin and visitation levels. Early studies used concentric zones however it is now common to use statistical zones or Bureau of Tourism Research zones.

5. RESEARCH PROCEDURE AND FINDINGS

5.1 Order of Magnitude Estimate using secondary data

This section of the thesis aims to provide an 'order of magnitude estimate' of the market value of tourism and recreation in forested areas based on secondary data available from land management agencies and prior studies. The method has been adopted from previous studies by Driml et. al. (1995), Dutton et. al. (1995) and Eagles et. al. (2000). These studies use a combination of site activity data, visitor participation data and tourism expenditure data to arrive at a total market value of tourism and recreation for areas identified. The secondary research sources consulted are included in Appendix 2.

As outlined previously, the area identified as relevant to this study is the geographic region in Western Australia that houses the majority of forest cover, the South West region housing the Central and Southern Forest regions, public estate administered by the Department of CALM. The South West region area covers 11 local government areas. (Refer to Figure 3).

The first stage in the research procedure was to conduct a 'desktop' study of secondary data available in relation to economic value of tourism and recreation in the forested areas of the South West region. Visitation data to key forest recreation sites in the identified regions was collated using CALM's VISTAT database system. Visitation data is collected for the financial year on a monthly basis from July 1 2000 June 30 2001. Visitation data is provided as individual visits to the site and is collated on the ground using a variety of methods which vary in terms of their degree of accuracy and reliability. Pay-to-enter sites record fairly accurate data on actual visitors to the recreation sites, with basic information such as visitor origin also often recorded. Pricing information can also be used from these sites to determine adult and concession visitors.

Traffic counters are used at most sites providing information on vehicle class and raw visitation numbers, that is they do not account for multiple entry visitors or local usage. Rangers provide estimates of passengers per vehicle class.

Figure 9 provides an overview of a VISTAT database detail record with vehicle classes and estimations.

CALMweb HOME

VISTAT database detail record

Park:	GLOUCESTER (link to NatureBase)
Tenure:	NATIONAL PARK
District:	PEMBERTON
Region:	SOUTHERN FOREST
Site code:	
Site name:	
Location of counter:	GLOUCESTER TREE
Period:	MARCH
Financial year:	2000 - 2001
MetroCount Vehicle Classifier	A Class 1: Sedan, Wagon, 4WD, Utility, Light Van, Motorcycle etc B Class 2: Class 1 towing - Trailer, Caravan, Boat etc C Class 3: Two axle buses and trucks D Class 4: Three axle buses and trucks
Traffic Counters (Non-Classifier type counters)	E Counter registers 1 count(s) per vehicle F 150,881 Previous month's final recording G 155,380 Current month's final recording (Recorded on 31/3/2001) H 18 Estimated Class 3 and 4 (buses only) for month
Estimated Vehicle Counts (No recording device used)	I Total Class 1 and 2 J Estimated number of buses Class 3 and 4
Estimations	K 2.75 Estimated number of passengers per Class 1 and 2 vehicles L 21 Estimated number of passengers per Class 3 and 4 vehicles (buses only) M 67 Estimated number of service/staff Class 1 and 2 vehicles going into the reserve N 12 Estimated number of service/staff Class 3 and 4 vehicles going into the reserve
Monthly visitor numbers based upon visitor fee receipts	O Class 1 and 2 (Number of vehicle receipts multiplied by estimated number of passengers per vehicle. Figures based on park passes will be added at a later stage) P Class 3 and 4
Pedestrian visitor numbers:	Q Exact pedestrian visitor number from counter R 450 Estimated pedestrian visitor numbers
	This record represents percent of the total visitation for the period.
Comments:	
Recorder:	JOHN MCKENZIE

Calculations	No. of vehicles Class 1 and 2	No. of visitors Class 1 and 2	No. of vehicles Class 3 and 4	No. of visitors Class 3 and 4
MetroCount Vehicle Classifier				
Traffic Counters (Non-Classifier type counters)	4,402	12,105.5	6	126
Estimated vehicle counts				
Monthly visitor numbers based upon visitor fee receipts				
Total by vehicle class	4,402	12,105.5	6	126
Total visitor numbers	12,681.5			

Update the above details

Figure 9: VISTAT Database Record (Department of Conservation and Land Management, 2001)

As can be seen from Figure 9, pedestrian counters are also used in some recreation sites, or rangers provide estimates for the period. Records can be tested for accuracy by comparing visitor numbers for previous years in the same month or alternatively visitor trends can be tracked by comparing information across sites.

For the purposes of this study, forest recreation sites were identified in the two study regions. These were sites where it was reasonable to assume that forests were a significant part of the visitor experience at that site. Almost all of the sites identified in the study are located in an area of forest. The few sites that do not have significant forest coverage, are located in close proximity (<10km) to significant forested areas, as to make it impossible for the experience not to have included forest attributes. It is noted by the author that many of these sites are multipurpose sites, that is that they are not visited by tourists and recreationists purely for forest qualities. However it is reasonable to assume that forests form part of the reason for visitation to the site, whether it is due to forest ecosystems contribution to supply of the resource, or through the unique forest attributes demanded by visitors to the sites. In the case of Leeuwin-Naturaliste National Park and Wellington National Park, 50% of the site visitation has been included based on consultations with CALM staff who have indicated that the water resources and access to the coast (in the case of Leeuwin-Naturaliste) are also significant reasons for visitation to these sites.

Table 10 provides a detailed summary of individual forest recreation sites and their corresponding visitation rates in the Central Forest Region. Table 11 provides a detailed summary of individual forest recreation sites and their corresponding visitation rates in the Southern Forest Region. Figure 10 provides a graphical representation of the annual site visitation to forest recreation sites in the Southern Forest and Central Forest regions of the South West of Western Australia.

Table 10: Visit rates for forest sites in the Central Forest Region (CALM, 2001)

Forest Site	Annual Visitation	Distance to site from Perth (one way)
South West Capes		
Leeuwin Naturaliste NP	938,426*	261
Blackwood		
Barrabup	22121	280
Brockman	13103	338
Golden Valley Tree Park	13012	240
Wright's Bridge	10880	240
Bibbulmun Track Blackwood	5000	240
Bridgetown Jarrah Park	2033	270
Mornington		
Wellington NP	57,526*	200
Leschenault Peninsula	46028	150
Bibbulmun Track Mornington	9600	200
Hoffman	6920	140
Total visits to forest sites	**1,124,649**	

** 50% of the total visits recorded to these sites has been taken for the purposes of this evaluation as the sites have significant other attractions for tourism and recreation purposes including coastal or water features.*

Table 11: Visit rates for forest sites in the Southern Forest Region (CALM, 2001)

Forest Site	Annual Visitation	Distance to site from Perth (one way)
Manjimup		
Diamond Tree	50180	326
Glenoran Pool	15000	304
Donnelly Mill Holiday Village	12050	326
Four Aces	10000	327
King Jarrah	8227	327
One Tree Bridge	8000	326
Bibbulmun Track Manjimup	7500	304
Chappels Bridge	750	304
Chindalup Pool	500	304
Greens Island	500	304
Perup Forest Ecology Centre	457	358
Lake Unicup	250	368
Tone Bridge	250	368
Heartlea Settlement	200	320
Lake Muir Observatory	200	368
Lease Road Bridge	100	304
Meribup Arboretum	100	304
Pemberton		
Gloucester NP	142241	338
Beedelup NP	92000	338
Warren NP		
Bicentennial Tree	51489	338

Heartbreak Trail	15289	338
D'Entrecasteaux NP		
Lake Jasper	5314	368
Bibbulmun Track Pemberton	27500	338
Big Brook Block (Big Brook Dam)	21268	338
Shannon NP (Great Forest Trees Drive)	9500	357
Walpole-Nornalup NP		
Valley of the Giants	192063	438
Knoll Drive	22250	426
Hilltop Road	47138	426
Bibbulmun Track Walpole	50000	423
Fernhook Falls (Ordnance Block)	17000	385
Total Visits to Forest Sites	**820,110**	

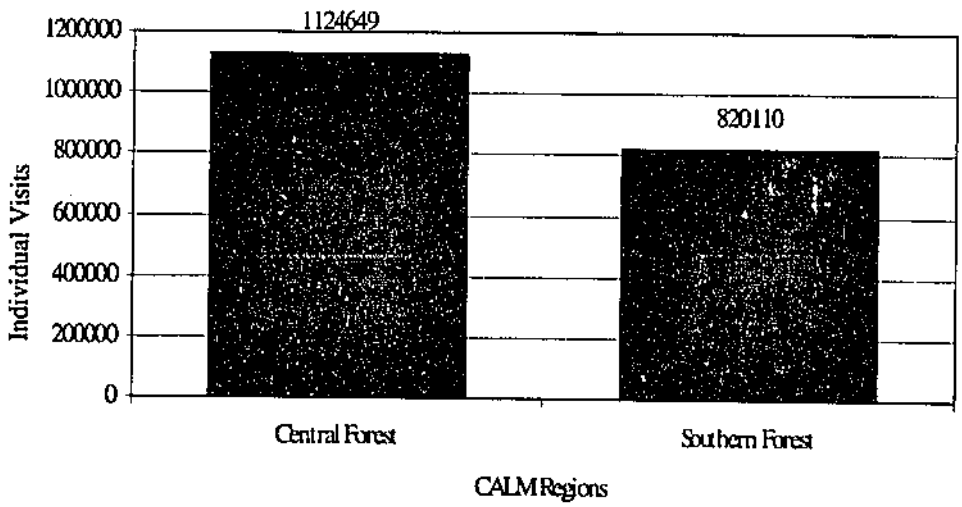


Figure 10: Visitation to Forested Sites in CALM Regions 2000-2001 (CALM, 2001)

5.1.1 Economic Implications of Visitation

The number of visits to the regions alone signify the economic importance of tourism and recreation in forested areas of the state. In addition, the data, when used in conjunction with detailed visitor information, including the origin of visitors, their travel distance, the travel group size, the frequency of their visit, their expenditures on travel, tours, park entry fees, food, accommodation, souvenirs and equipment can provide an estimate of the local economic impact of visits to these sites. (Eagles et al., 2000)

5.1.2 General Assumptions

Several assumptions were required to make estimations of tourism and recreational values based on the available data. Specific assumptions are outlined when the individual calculation is explained, however some general assumptions were made for this stage of the methodology. Previous studies have adopted similar assumptions (Driml & Common, 1995; Dutton et al., 1995).

5.1.2.1 Attribution of Visitor Expenditure to Forest Sites

An assumption is required as to the amount of individual visitor expenditure that can be attributed to visits to the forest sites. For example, a visitor may visit numerous attractions whilst in the region with forest-related reasons making only part of their daily visitor experience. Using the approach adopted by Carlsen (1997) in the economic evaluation of tourism in the natural areas of New South Wales, Bureau of Tourism Research data on the main purpose of visit and the activities undertaken in the region are utilised to arrive at an attribution factor. Using the 'Purpose of Visit' information from the BTR domestic visitors report, approximately 62% of visitors identified holiday or leisure as their purpose of visit to the region. This segment of the market only has been included for the study and it is further assumed that no expenditure for other visitation reasons can be so attributed. In addition, the 'Leisure Activities Undertaken' identified by domestic tourists included bushwalking/ rainforest walks at 13%, picnic or barbecue at 10%, visit to national parks/state parks at 8% and go on day trip at 7%. International tourists rated each of these activities higher with greater than 51% of all visitors participating in visits to national parks, bushwalking or forest walks.

Other research including studies by Blamey (1995), WATC (1998) and Economics Consulting Services (1999) identified greater than 50% of visitors cite bushwalking/natural attractions/ national parks as a significant purpose of their travel to the South West region. From this information, it has been assumed that 50% of visitors to the South West region enjoy the forest environment as part of their visitor experience in the South West based on the fact that the majority of activity locations for bushwalking, natural attractions and national parks are in forested areas.

Using the main purpose of visit to the region 'holiday or leisure' segment (62%) plus an assumption that 50% of visitors to the South West region overall participate in forest-related activities' it is possible to provide a justifiable estimate of the market value of forests to tourism and recreation in the South West region. It is acknowledged by the author that this method is somewhat rudimentary in approach, however in the absence of accurate and reliable data on the attribution of individual tourist expenditure to forested areas it provides a best estimate approach and one that has been tested in other studies including those in the national parks of Canada by Eagles (2000) and in the public estate of northern New South Wales, Australia by Carlsen (1997).

5.1.2.2 Reporting Period

The Department of CALM report financial year data and therefore the figures in this study cover the 2000-2001 reporting period. The BTR provide results for the calendar year from January to December in most instances. Therefore the BTR figures for 2001, the latest available, have been utilised for the purposes of this study. Financial values that have been taken from studies prior to this period have been indexed in line with the Consumer Price Index.

5.1.2.3 Uniformity Across Forest Sites

This study assumes uniformity across forest sites. In addition, information collected in individual case studies relating to visitation to forest sites elsewhere in Western Australia and Australia have been used in some instances to make generalisations or to validate findings across the South West region.

5.1.2.4 Bureau of Tourism Research , Domestic Tourism Expenditure Research Programme Statistics- Based Estimates

The Bureau of Tourism Research Domestic Tourism Expenditure research programme uses the results from the National Visitor Survey conducted annually to provide regional estimates of visitor expenditure. Appendix 3 contains details on the expenditure categories covered in the BTR surveys.

5.1.2.5 Site activity data based on CALM VISTAT database system

The visitation for forested sites has been collated for the Central Forest and Southern Forest regions administered by CALM. The BTR regions differ to these regions as shown in Appendix 4. Estimates for forest sites in the Central Forest and Southern Forest regions will utilised BTR expenditure data for the BTR defined South West region.

5.1.3 Estimate Based on Forest Site Activity Data

Valuation based on the latest BTR estimates of visitors to the South West region, where the majority of forest sites are located, approximately 95% were domestic visitors and 5% international.

32% of visitor days in the South West region were spent on domestic day trips, while 68% of visitor days spent in the South West region were as a result of overnight visitors in the region.

Numerous studies (Carlsen, 1997; Pearson, Russell, & Woodford, 2000) indicate that visitors spend on average half a day at a national park or natural area. In addition the RFA report on forest visitation in Western Australia reports that on average people visit two forest sites per days. (Commonwealth of Australia and the Western Australian Regional Forest Agreement (RFA) Steering Committee)

Forest visits to the Central Forest and Southern Forest regions totaled 1,944,759 in 2000-2001.

BTR research reports daily overnight domestic visitor spend at approximately $81 and daily overnight international visitor spend at $31 and domestic day trip expenditure at $65.

Therefore the tourism market value of forest sites in the Central Forest and Southern Forest region is approximately equal to:

(proportion of domestic day trip visitor days x total forest site visits x domestic day trip expenditure) + (overnight forest site visits x international proportion x international overnight daily expenditure) + (overnight forest visits x proportion of domestic visitors x domestic overnight daily expenditure)

(32% x 1,944,759 x $65) + (1,322,437 x 5% x $31) + (1,322,437 x 95% x $85) =

$40.5 million (recreation) + $2 million (international tourism) + $106.8 million (domestic tourism) = $149.3 million

5.1.4 Estimate based on the latest BTR estimates of visitors to the South West region, where the majority of forest sites are located

In the 2001 1,457,000 domestic visitors and 73,000 international visitors were estimated to have stayed overnight in the South West region. (Total: 1,530,000)

With a length of stay of 3.4 nights on average, the total number of domestic visitor nights was 4,953,000 and for international 248,200 based on 3.4 nights.

Average daily expenditure associated with domestic visitors to the region is $81 and $31 for internationals. (This low figure for international visitors is explained by the fact that it does not include airfares or package-style holidays that are purchased outside Australia (Ashford, 2002).) A figure of $74 per night is reported by Johnson, Foo, Buchanan, & Henrick (2001) for international visitors to the Perth region which indicates that $31 is an underestimate of overnight international visitor expenditure in the South West region. The conservative figure of $31 is used in the calculation. Day trip expenditure is calculated at $65.

As stated in the assumptions, 62% of the visitor population are visiting for purposes of 'holiday or leisure' with 50% of expenditure associated with overnight international and domestic visitation to the region can be attributable to the forest sites.

Therefore the tourism market value of forest sites in the South West region is approximately equal to:

(domestic visitor nights x purpose of visit holiday or leisure x visitor expenditure rate attributable to forest sites x daily overnight rate domestic) +

(international visitor nights x purpose of visit holiday or leisure x visitor expenditure rate attributable to forest sites x daily overnight rate international) +

(domestic visitor day trippers x purpose of visit holiday or leisure x visitor expenditure attributable to forest sites x day tripper spend)

(4,953,000 x 62% x 50% x $81) + (248,200 x 62% x 50% x $31) + (1,655,000 x 50% x 62% x $65) =

124,369,830 + 2,385,202 + 33,348,250 = $160 million

5.1.5 Estimate based on the South West Regional Tourism Study (Economics Consulting Services Pty Ltd, 1999)

This study cited the Western Australian Travelers Survey (WATS) which was a state-wide tourism survey conducted annually prior to the adoption of the National Visitor Survey (NVS) and International Visitor Survey (IVS) for regional expenditure estimates in Western Australia. This survey can not be compared directly to the BTR NVS and IVS as the methodology is different and the WATS included both domestic and international visitors in the same survey.

The South West Regional Tourism Study estimated that $55 per visitor per night was spent in the region (transformed to 2000/2001 values).

In the 2001 1,457,000 domestic visitors and 73,000 international visitors were estimated to have stayed overnight in the South West region. (Total: 1,530,000)

With a length of stay of 3.4 nights on average, the total number of domestic visitor nights was 4,953,000 and for international 248,200 based on 3.4 nights.

Therefore the tourism market value of forest sites in the South West region is approximately equal to:

overnight visitor days (international and domestic) x overnight daily spend (WATS survey indexed with CPI) x 62% purpose of visit leisure or holiday x 50% attribution to forest sites

5,201,200 x $55 x 62% x 50% = $88.68 million (domestic and international tourism)

domestic day trip days x domestic day trip rate (BTR 2001) x 62% purpose of visit leisure or holiday x 50% attribution to forest sites

1,655,000 x $65 x 62% x 50% = $33.3 million (recreation)

Total tourism and recreation = $122 million

5.1.6 Summary

According to this research, the estimated gross market value of tourism and recreation in forested areas of the South West is between $122 million and $160 million. The lower estimate (in 5.1.5) of $122 million is based on the last Western Australian Travelers Survey reported overnight visitor spend which was reported in the South West Region Tourism Study in 1999. The CPI adjusted figure of $55 may have lead to a lower estimate as additional factors have lead to an increased per head spend in the South West region. Factors such as market demand, the marketing and promotion of the region and investment in infrastructure to support tourism have had an effect on the prices of accommodation, attractions, activities etc in the region.

The forest site activity data estimate (in 5.1.3), at $149.3 million captures only the visits that occur in measured forest recreation sites, on CALM managed lands. It could be argued that this estimate is therefore also a conservative estimate, as many tourists visit the South West region for forest-related reasons, without visiting a measured forest recreation site on CALM managed lands.

The estimate based on the latest BTR estimates of visitors to the South West, region where the majority of forest sites are located (5.1.4), at $160 million captures all visitors to the South West region, not just those that visit forest recreation sites. However using the assumption that 62% of the market can be counted as they visit for purposes of holiday or leisure and that 50% of the total expenditure from this segment can be attributed to the forests, a logical estimation is made.

It is likely that the true gross market value of forested areas of the South West lie between the lower an upper estimates of $122 and $160 million. Without a more detailed study, with specific data relating to forest tourists, their visit rates, length of stay, expenditure and the attribution of this expenditure to the forests of the South West it is difficult to arrive at more than a order of magnitude estimate. The mean of the three estimates is $144 million, which is the best estimate that can be provided for the gross market value of tourism and recreation to the forested areas of the South West region, given the limitations outlined previously.

In order to validate the findings of these estimations, a single case study site was valued using primary survey data. This is outlined in section 5.2.

5.2 Travel Cost Study - Valley of the Giants case study site

A case study site was adopted for the collection of primary visitor activity and expenditure data associated with a visit to a forest site in the South West region. The study, based on the travel cost methodology, was conducted at the Tree Top Walk, Valley of the Giants site in Walpole-Nornalup National Park. The travel cost study aimed to provide an estimate of the gross market value of tourism and recreation at the case study site measured in terms of the contribution to the region.

5.2.1 Methods

The gross market value of site visitation to the region (Manjimup/ Walpole/ Denmark) is calculated as:

Gross market value = number of visitors to the site per year x average expenditure per visitor spent in the region

5.2.1.1 Site Selection

The Valley of the Giants is located in Walpole Nornalup National Park in CALM-defined Southern Forest Region. It is 430km south of Perth and 100km west of Albany which is the nearest city. The location is marked on the map in Appendix 5.

The Valley of the Giants is one of Western Australia's most visited forest sites for tourism and recreation. The annual visitation for the site was 192,063 for the year 2000-2001. The site is located five hours drive from Perth and attracts a range of tourists from interstate, intrastate and overseas. The site has a "Tree Top Walk" which enables people to walk through the canopy of the tingle forest and a walk at ground level through "The Ancient Empire". The site houses limited facilities which include toilets, a small souvenir shop and picnic tables. As such the site is used almost solely for day trips, however, numerous visitors to the site stay in the surrounding region. Past statistics show that the development of this forest site as a tourism attraction has generated substantial increases in visitors to the region.

The site was chosen for the high visitation rate allowing for the collection of a representative sample of tourists and recreationists to the forests.

5.2.1.2 Estimates of visitor numbers

The annual estimate of visitor numbers to the Valley of the Giants site was taken from the CALM VISTAT system. This figure provides an accurate reflection of actual visitor numbers to the Tree Top Walk as the site is a pay-to-enter site and all visitors are captured as they enter the site. Bibbulmun Track walkers and other visitors that pass through the area without entering the Tree Top Walk site are not captured in the visitor number estimates for the site.

5.2.1.3 Target Population

The target population was visitors to the site for the purposes of participating in tourism and recreation. An on-site sample of 125 groups was taken, representing 378 individuals.

5.2.1.4 Survey Instrument

The survey instrument was a questionnaire administered on-site during a personal interview. A copy of the survey is included in Appendix 6.

5.2.1.5 Data Collection

The survey was conducted on Friday 31 May, Saturday 1 June and Sunday 2 June 2002. Saturday and Sunday were part of the Foundation Day long weekend celebrated in Western Australia. This weekend was chosen in order to maximise survey respondents in the time period available.

5.2.1.6 Multi-destinational visitors

Visitors were asked where they spent the previous night, how long they spent in the region and what their main places of visit were for their total trip. Visitor expenditure is allocated according to the length of stay 'in the region' which is defined as Manjimup/Walpole/Denmark region, encompassing Manjimup and Denmark Shires.

5.2.1.7 Type of Visitor

In this study all visitors are surveyed to ascertain their spend 'in the region'. There is no distinction made between overnight visitors, day trippers, international, domestic and locals. Local usage of the park as indicated by the survey was very low, presumably due to the nature of the site being pay-to-enter. In addition, the one local person that visited the site was accompanying a group of visitors. Due to this reason local expenditure, if any, was included in the calculation of gross market value to the region.

5.2.1.8 Allocation of Expenditure

The analysis of this case study focused on visitor expenditure in the region defined as Manjimup/Walpole/Denmark region. Expenditure was allocated to the region according to the calculations in Table 12.

Table 12: Expenditure Allocation per person per day in the region

Expenditure item	Calculation
Accommodation	A = Accommodation in region A = $\frac{\text{Accommodation expense}}{\text{Group size}}$
Meals in restaurants/ cafes	M = Meals in restaurants/ cafes in region M = $\frac{\text{Meals in restaurants}}{\text{Group size}}$ NB. Does not include food brought from home or self catering options as these items were expected to have been spent if the person had stayed at home.
Fares, car rentals, tour costs	F = All fares, car rentals, tour costs expended in the region F = $\frac{\text{Total fares}}{\text{Group size}}$
Petrol, oil, repairs	P = $\frac{\text{Total Petrol}}{\text{Group Size}}$
Airfares	This was excluded from the survey as no respondents reported airfare expenditure in relation to travelling to the region.
Camping gear, specialised equipment	This category was excluded from the survey as too few respondents reported expenditure in this category.
Park Fees	P = $\frac{\text{Total park fees}}{\text{Group size}}$
Other (souvenirs etc.)	O = $\frac{\text{Total other expenses}}{\text{Group size}}$

5.2.2 Findings

5.2.2.1 Visitor Origin

Useable responses were obtained from 125 groups, equating to 378 individuals (318 adults and 60 children).

One person from the group was interviewed, with that person answering on behalf of the group. Children were included in the per person estimate of travel costs as has been standard practice in numerous studies including one of the most recent studies in Australia, an estimation of the value of Tasmanian National Parks to park visitors (Madden, Groenewold, & Thapa, 2002). The origin of the respondents by region is listed in Table 13 below. Table 14 provides a summary of intrastate, interstate and international visitors captured in the survey.

Table 13: Summary of Visitor Origins by Region

Visitor Origin	Sample
Overseas	46
South Australia	2
New South Wales	8
Victoria	15
Queensland	8
Tasmania	2
Mid West Region	2
Pilbara Region	2
Goldfields Esperance Region	4
Perth Metropolitan Region	190
Peel Region	18

Great Southern Region	19
South West Region	62
TOTAL	**378**

Table 14: Summary of Visitor Origin (Intrastate, Interstate and International)

Visitor Origin		
Intrastate	297	79%
Interstate	35	9%
International	46	12%
Total	378	100%

5.2.2.3 Group Size

The average group size was 3 with 15% of the total population surveyed being children under the age of 18. The majority of people surveyed reported a personal income in the range of 30,000-45,000 (85%).

5.2.2.4 Frequency of Visit

The vast majority of visitors to the park were first time visitors. This is most likely due to the fact that the park is a pay-to-enter site and is treated by many as a 'once in a lifetime experience'. Those that were repeat visitors were usually taking visitors to the park.

5.2.2.5 Time spent in the region as a proportion of the entire trip length

This study aimed to identify the time spent in Manjimup and Denmark Shires to identify the gross market value of tourism and recreation to the region. Respondents were asked to identify the total trip length, and the time spent in the region (Manjimup/ Walpole/ Denmark). The mean average trip length was skewed due to one visitor having

a trip length of 500+ days. It is therefore more appropriate to use the median average which was 4 days for the total trip length. The average length of time spent in the region was 2.87 days. From the responses it is apparent that on average respondents spent 72% of their total trip in the Manjimup/ Walpole/ Denmark region.

5.2.2.6 Importance of the Forest to Regional Visitation

In order to determine the attribution of visitor expenditure to the forest estate, visitors were asked "how important would you rate the forests to your visit to this region?". 85.5% answered 'very important' and the remaining 14.5% answered 'moderately important'. No respondents answered that the forests were not important to their visit to the region.

5.2.2.7 Main reason for visiting the region

Respondents were asked to cite the main reason for their visit to the Manjimup/ Walpole/ Denmark region. The most popular response was 'Tree Top Walk' followed by 'trees/forest'. Figure 11 provides a summary of the main responses.

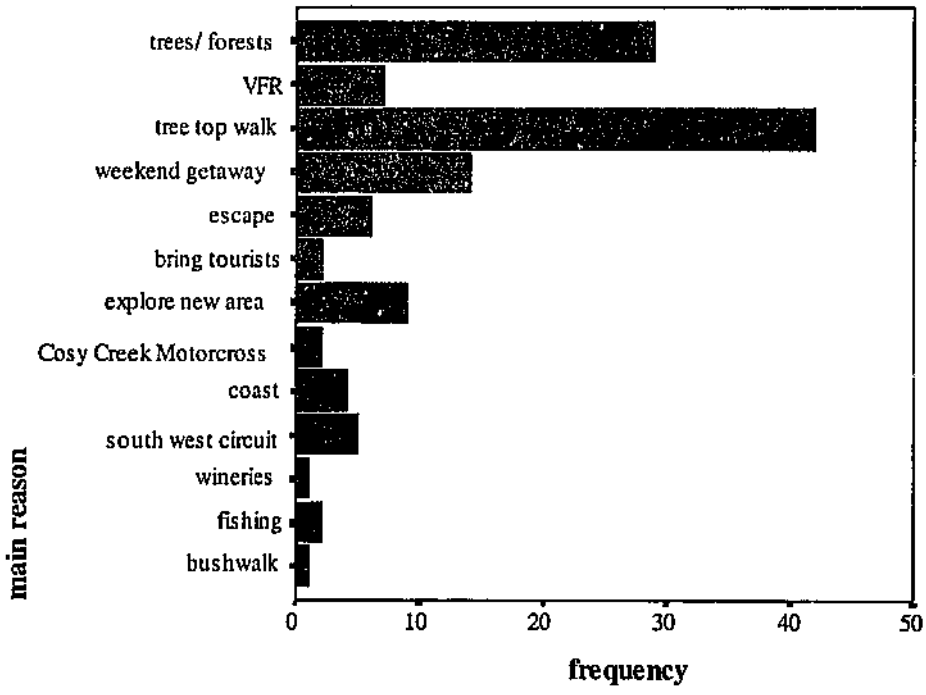


Figure 11: Main reason for visiting region

Using only the responses of 'trees/forest' and 'Tree Top Walk' as an indicator of the forest importance in the reason for travel to the region, it can be surmised that 57% of visitors to the region travel for this primary purpose. This does not include other reasons for travel which may also entail forest attributes, for example 'South West circuit', 'bushwalking', 'weekend getaway', 'escape', 'bring tourists' or 'explore new area'.

5.2.2.8 Site Attributes of the Tree Top Walk as a determining factor of visitation to the region

Respondents were asked whether they still would have visited to Manjimup/ Walpole/ Denmark region had the Tree Top Walk been closed. This question was asked to ascertain whether it was the site itself or the forests that were the main determinant of visitation to the Manjimup/ Walpole/ Denmark region. 75.8% of respondents reported that they still would have visited the region had the Tree Top Walk site been closed. Only 24.2% said that they would not have visited the region.

5.2.2.9 Main Places Visited

Respondents were asked to nominate the main places they visited on their entire trip. The results are contained in Table 15. Walpole was the most frequently cited place visited. As the average total trip length was 4 days, most people stayed overnight in one or two destinations. It was found that many visitors were doing a circuit route from Perth encompassing Albany, Denmark, Walpole and Pemberton. Denmark was the second most popular place visited, followed by Albany then Pemberton. Three of these destinations (Walpole, Denmark and Pemberton) are renowned for their unique forest environments, particularly the spectacular karri trees.

Table 15: Summary of Main Places Visited

Place	Frequency of response	Ranking
Walpole	91	1
Denmark	40	2
Albany	33	3
Pemberton	29	4
Around Australia	18	5
South West	15	6
Margaret River	10	7
Peaceful Bay	9	8
Manjimup	8	9
Busselton	4	10
Around WA	2	11
Bunbury	2	11
Bridgetown	1	12

Respondents were asked to nominate where they stayed 'last night'. The purpose of this question was to ascertain whether the trip to the Valley of the Giants entailed an overnight stay in the region. Figure 12 provides an overview of where people stayed the night prior to their visit to the Valley of the Giants.

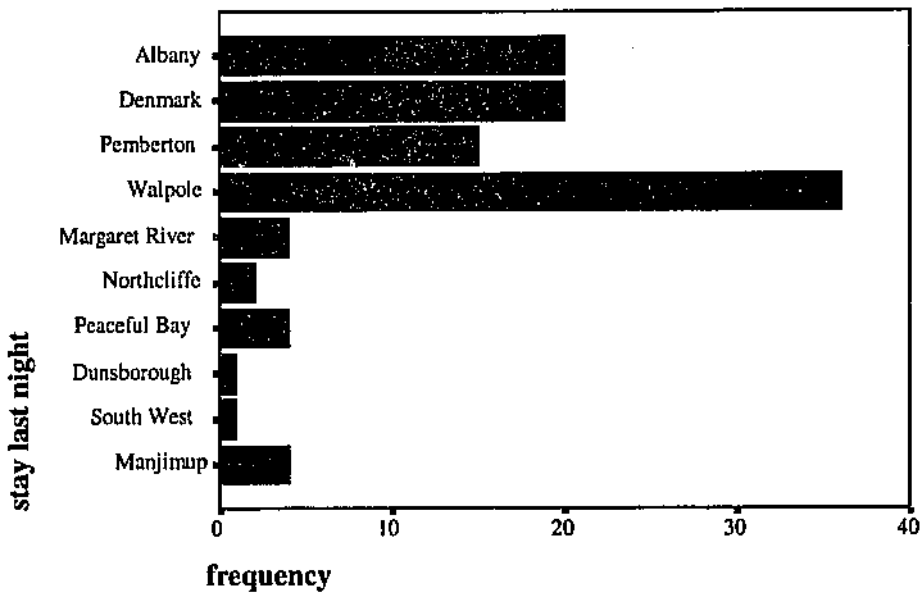


Figure 12: Location visitor spent night prior to visit

5.2.3 Expenditure in the Region

Respondents were asked to detail their expenditure in the region to provide an estimate of the gross market value of their visit to the region.

Table 16 outlines the average expenditures per person, per day in the region according to the expenditure category.

Table 16: Daily Expenditure per person in the Region

Expenditure Category	**per person/ per day**
Accommodation	$33.20
Meals in Restaurants or Cafes	$14.80
Fares, Car Rentals and Tour Costs	$5.16
Petrol, Oil and Repairs	$13.00

Park Fees	$1.75
Other (Souvenirs etc)	$6.75
Total	**$74.65**

5.2.3.1 Attribution of Visitor Expenditure

The information collected from visitors to the Valley of the Giants, Tree Top Walk can be utilised in a number of ways to estimate the gross market value of visitation to this forest site for the region.

From the data the following information supports the notion that the forests are a significant part of the visitor experience.

85.5% of respondents reported that the 'forests were very important' to their visit to the region with a further 14.5% of respondents reporting that 'forests were moderately important to their visit to the region'.

75.8% reported they would still have visited the region if the Tree Top Walk site was closed which indicates that the visitors are not purely site-oriented but forest-oriented.

57% of visitors to the region explicitly cited some element of 'forests'; 'trees'; or 'Tree Top Walk' as their main reason for visiting the region. This does not include reasons such as 'bushwalking' or 'weekend getaway' that may also have included forest elements.

Respondents reported that on average 72% of their total trip was spent in the Manjimup/ Walpole/ Denmark region.

Based on the supporting evidence outlined above, it is reasonable to assume that 70% of visitors expenditure could be assumed as resulting from the existence of forested areas in the region.

The annual visitation to the Valley of the Giants for 2000/2001was 192,063. Unlike some of the CALM estimates, this site is a pay-to-enter site therefore the number

presented is an accurate representation of visitors to the site. Assuming that the survey period was typical of the visitors that are likely to visit the Valley of the Giants year round, the following estimation can be made regarding the contribution of the site in terms of gross market value to the regional economy.

The calculation of a best estimate is as follows:

Based on this survey assume that all visitors to the site are first time visitors.

Based on this survey assume 70% of daily visitor expenditure in Manjimup/Walpole/Denmark region can be attributable to forest sites in the region.

Based on this survey assume that visitors spend on average $75 per person per day in the region.

Based on this survey assume that few locals visit the site for recreational purposes (largely due to the entry fee) , therefore all visitors are overnight tourists.

The estimated gross market value of the Valley of the Giants to the Manjimup/ Walpole/ Denmark region is equal to:

annual site visitation (2000-2001) x 70% of daily visitor expenditure attributable to forest sites in the region x daily spend by visitors in the region x length of stay in the region

192,063 x 70% x $75x 2.87 = $28.9 million.

5.2.4 Calculation of Consumer Surplus

As mentioned in the methodology section of this thesis, zonal travel cost method can be used to measure consumer surplus, that is the willingness to pay for tourism and recreation at the site above the price currently charged. This value does not include other non-use or extractive values only tourism and recreation values of the site.

The first step in the travel cost analysis is to estimate a demand curve for the site. As there is no variability in the cost to enter the site, only one point on the demand curve can be obtained from the present park entry fee. The travel cost method provides for the

estimation of a demand curve based on travel costs associated in visiting the site from different zones, therefore providing multiple points on the demand curve.

In this travel cost study, it was decided to analyse results collated for Western Australia only. The following reasons are provided for this decision:

Too smaller samples to complete a travel cost analysis for the domestic and international market.

The site is visited predominantly by West Australians (this market represented 79% of the total market of visitors to the site in the study).

Travel cost analysis is based on the assumption that visitors are on a single destination visit. This is most unlikely for the visitors outside Western Australia and more likely for the visitors within Western Australia.

The sample of visitors from Western Australia totaled 297 which represented 79% of the total visitor sample. Western Australia was divided into zones, according to the regional administrative zones set by the Regional Development Council of Western Australia. These are set out in the map in Figure 13. The major centre in each zone was used to determine the distance to the site, with distances taken from Main Roads Western Australia internet site. This was based on the assumption that most visitors to the site would come from the major centre in their region. Table 17 provides an overview of the survey sample which was transformed into annual visits to the site and then weighted according to the population from the visitor zone of origin to determine a visit rate per 1000 population. Population statistics for the zones were the 'population preliminary' statistics for the year 2000 listed on the Regional Development Council internet site.

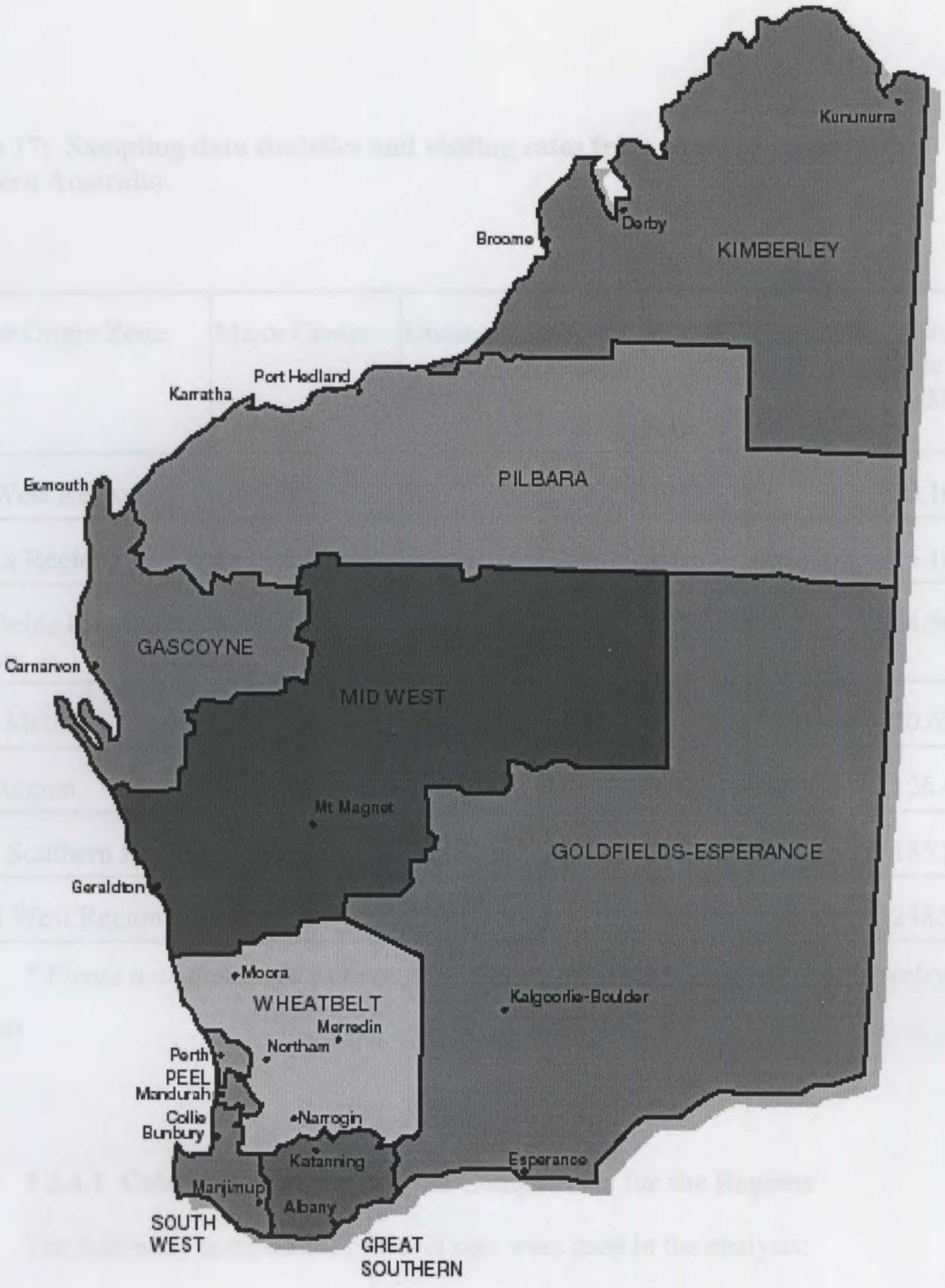


Figure 13: Zones of Origin according to the Regional Development Council of Western Australia (Regional Development Council of Western Australia, 2002)

Table 17: Sampling data statistics and visiting rates from zones of origin within Western Australia.

Visitor Origin Zone	Major Centre	Distance (one way)	Survey Sample	Annual Visits (Q)	Population '000 in zone	Visit Rate per 1000
Mid West Region	Geraldton	900	2	1018	50	20.16
Pilbara Region	Port Hedland	1955	2	1018	40	25.18
Goldfields Esperance Region	Kalgoorlie	1000	4	2036	59	34.56
Perth Metro	Perth	500	190	96725	1370	70.62
Peel Region	Mandurah	150	18	9163	72	126.47
Great Southern Region	Albany	100	19	9673	52	185.55
South West Region	Bunbury	250	62	31563	127	248.75

** Please note that there were no respondents from the Wheatbelt or Kimberley regions*

5.2.4.1 Calculation of Travel Cost Components for the Regions

The following components of travel cost were used in the analysis:

5.2.4.1.1 Calculation of the dependent variable - visitation rate

The total visitation to the Valley of the Giants site for the year 2000-2001 was recorded as 192,063 visitors. Table 18 summarises the proportion of visitors from Australia and overseas, based on the survey sample results. Table 19 summarises the

proportion of visitors from Western Australia out of the total domestic visitation to the site based on the survey sample results.

Table 18:

Proportion of Visitors by Origin (based on survey)		
International	12%	23,048
Domestic	88%	169,015
Total	**100%**	**192,063**

Table 19:

Visitor Origin Domestic Market		
Western Australia	79%	151,730
Rest of Australia	9%	15,211

Assuming the same proportion as in the sample, the total number of visitors per zone (Qi) to the Valley of the Giants site for 2000-2001 can be calculated. This is used as the dependent variable and is divided by the population for each zone to determine the visit rate from each zone. The zonal visit rate (Qi/Pi) is calculated per 1000 population.

Total number of visitors per zone = sample proportion x total site visitation (WA)

$(Q_i) =$ $n_i/297 \times 151,730$

5.2.4.1.2 Independent Variables

Travel cost is the independent variable under examination. The calculation of travel cost is completed with and without the inclusion of the opportunity cost of travel time.

5.2.4.1.2.1 Calculation of the total travel costs

The zonal travel costs include the following items:

Trip days were calculated according to the return travel distance divided by 500 km which was assumed as the maximum daily travel distance. As in the study by Knapman and Stanley (1993) 500km is estimated as the maximum daily distance purely site oriented visitors would travel. (To cover 500km at an average speed of 80km per hour, the visitors would be driving for just over six hours of the day.)

Transportation costs based on return distance to the site using a mileage rate for the standard vehicle engine capacity, 59.9 cents per kilometre from the Australian Taxation Office rates for 2000-2001. The total transportation cost was divided by the average group size reported in the survey.

Accommodation costs calculated by the trip days multiplied by the average standard hotel costs reported in the survey.

Food costs were calculated according to the average daily spend per head on food in restaurants or cafes from the survey and was calculated on the basis of a 500 km travel distance equating to one day.

Other expenses included average daily expenditure on souvenirs taken from the survey and were calculated on a daily rate per head based on travel distance of 500 km per day.

Park fees were calculated according to the average daily spend per head from the survey and was calculated on the basis of a 500 km travel distance equating to one day.

5.2.4.1.2.2 The inclusion of travel time

Both transportation costs and travel time are important factors in determining visitation to a site. The opportunity cost of travel time increases with the increase of distance from a recreation site. This can act as a deterrent to visitors as they weigh up alternatives for their time. In this study a rate of 25% of the average wage rate from the

survey has been applied to calculate the opportunity cost of travel time. Travel time includes only travel to and from the site and not time at the site itself as this is seen to be a benefit rather than a cost.

The travel time opportunity cost has been calculated as follows:

Average annual income according to survey / 52 weeks in the year / 37.5 hours (standard working week) x 25%

(37,500 / 52/ 37.5) x 25% = $4.81

Travel time is calculated on the basis of the return distance to the site divided by an average travelling speed of 80 kilometres per hour. Travel time is then multiplied by the opportunity cost value above to determine the travel time opportunity cost for each zone of the population.

Results are provided with and without the opportunity cost of travel time component, as is common with other travel cost studies.

5.2.4.1.2.3 Attribution of travel costs to the site

In other studies an attribution factor is employed to account for multi-destinational visitors. For this study, results are provided for both, one incorporating an attribution factor and the other reporting total travel costs without the inclusion of an attribution factor.

The attribution factor was calculated according to days spent in the region as a proportion of total trip length.

Table 20: Attribution factor for travel costs to the site according to zone of origin

Region of Origin	Attribution Factor
Mid West Region	1*
Pilbara Region	0.3
Goldfields Esperance Region	0.095744
Perth Metro	0.741558
Peel Region	0.642857
Great Southern Region	0.781818
South West Region	0.765306

* The Mid West region recorded an attribution factor of one as the survey respondents in the sample reported a long length of stay in the region as a proportion of their overall trip.

As the sample sizes for the zones were very small in some cases, an average attribution rate was used for all the zones. This was set at 70% which was the average time spent in region as a proportion of the total trip length. This is consistent with the attribution factor applied to the gross market value study in section 5.2.3.1.

5.2.4.2 Demand Equation

The equation including the attribution factor is therefore:

$$TC_I = (P_I + A_I + M_I + PF_I + OE_I + OPP_I) \times ATT$$

The equation excluding the attribution factor is therefore:

$$TC_I = (P_I + A_I + M_I + PF_I + OE_I + OPP_I)$$

Where:

P_I = transportation cost

= return distance to site multiplied by 0.599 mileage rate divided by the average group size.

A_I = accommodation cost

= average accommodation cost per day ($33.20) multiplied by the return distance to the site and divided by 500 which is equal to the number of days travelling.

M_I = meal cost

= average meal (restaurants and cafes) cost per day ($14.80) multiplied by the return distance to the site and divided by 500 which is equal to the number of days travelling.

PF_I = park fees

= average park fees cost per day ($1.75) multiplied by the return distance to the site and divided by 500 which is equal to the number of days travelling.

OE_I = other expenses

= average other expenses (souvenirs etc) cost per day ($6.75) multiplied by the return distance to the site and divided by 500 which is equal to the number of days travelling.

OPP_I = opportunity cost of travel time

= average annual salary rate from survey ($37,500) divided by 52 weeks divided by the average working week of 37.5 hours multiplied by 25% which is the proportion awarded as an opportunity cost of travel time. This equates to $4.81. $4.81 is then multiplied by return travel distance divided by 80 kilometres per hour which is taken to be the average speed of travel.

ATT_I = Days spent in region divided by total trip length (average across all zones).

Table 21 provides an overview for the travel cost components for each region with no accounting for opportunity cost of travel time and no attribution factor applied.

Table 21: Travel costs calculated according to zone of origin (excluding travel time)

	P	A	M	PF	OE	Individual TC	Annual Visits	Total TC
Mid West Region	359.4	119.52	53.28	6.3	24.3	562.8	1018	573021
Pilbara Region	780.7	259.624	115.736	13.685	52.785	1222.5	1018	1244730
Goldfields Esperance Region	399.3	132.8	59.2	7	27	625.3	2036	1273382
Perth Metro	199.7	66.4	29.6	3.5	13.5	312.7	96725	30242824
Peel Region	59.9	19.92	8.88	1.05	4.05	93.8	9163	859532
Great Southern Region	39.9	13.28	5.92	0.7	2.7	62.5	9673	604856
South West Region	99.8	33.2	14.8	1.75	6.75	156.3	31563	4934355
TOTALS							**151,196**	**$39,732,700**

The findings summarised in Table 21 report a gross market value of the site, using travel cost as a surrogate market, at $39,732,700. This reports only intrastate visitor expenditure, does not include the opportunity cost of travel time and is prior to the attribution factor being applied. With the application of a 70% attribution factor, the value of the site is calculated at $27.8 million which closely correlates with the findings reported in section 5.2.3.1 which placed a value of $28.9 million on the site. (This estimate included interstate and overseas visitors to the site).

Table 22 outlines the calculation of travel costs, including the opportunity cost of travel time to the site. This calculation provides an estimate of $47.37 million equating to a value of $33.16 million when the attribution factor of 70% is applied.

Table 22: Travel costs calculated according to zone of origin (including travel time)

	P	A	M	PF	OE	OPP	Individual TC	Total TC
Mid West Region	359.4	119.52	53.28	6.3	24.3	108.225	671.0	683,212
Pilbara Region	780.7	259.624	115.736	13.685	52.785	235.088 75	1457.6	1,484,089
Goldfields Esperance Region	399.3	132.8	59.2	7	27	120.25	745.6	1,518,250
Perth Metro	199.7	66.4	29.6	3.5	13.5	60.125	372.8	36,058,442
Peel Region	59.9	19.92	8.88	1.05	4.05	18.0375	111.8	1,024,818
Great Southern Region	39.9	13.28	5.92	0.7	2.7	12.025	74.6	721,168
South West Region	99.8	33.2	14.8	1.75	6.75	30.0625	186.4	5,883,219
TOTALS								**$47,373,201**

The next stage of the research was to plot the site visit rates and associated travel costs according to the zone of origin on a scatter graph to determine the consumer surplus

value over and above the current price (or travel costs) to the site. Figure 14 shows the graph of these points and was compiled from Table 21, the visit rates to the site according to travel costs without the inclusion of the opportunity cost of travel time. It was decided to calculate consumer surplus using these figures, as to provide a more conservative estimate of willingness to pay.

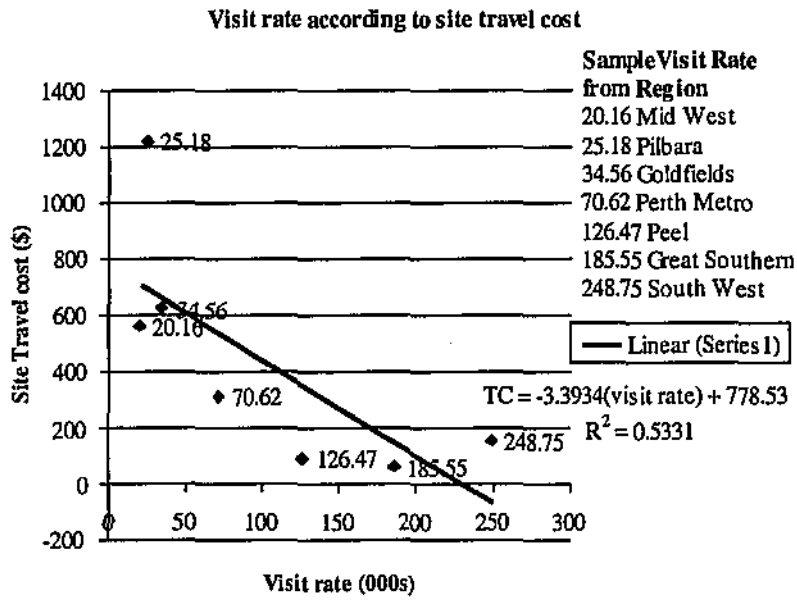


Figure 14: Sample Visit Rates and corresponding Travel Costs

5.2.4.3 Regression Analysis

In the first instance, linear regression was employed to determine the relationship between site visitation and the travel costs and to ultimately derive a demand function. Using linear regression the estimating function was TC = -3.3934(visit rate) + 778.53 with an R^2 statistic equal to 0.5331. Figure 14 shows the linear regression line employed. Other functional forms were also tested and it was found that the natural logarithm provided a more appropriate estimator of demand with an R^2 equal to 0.6653.

Therefore the demand function for the site was calculated utilising the equation:

TC = -336.44Ln(visit rate) + 1856.8

Where VR is equal to visit rate and TC is equal to Travel Costs.

The visit rate can be determined by the equation:

$$\text{Visit rate} = e^{\frac{y-1856.8}{-336.44}}$$

Figure 15 provides a chart of site visits according to the associated travel costs with a logarithm regression line employed.

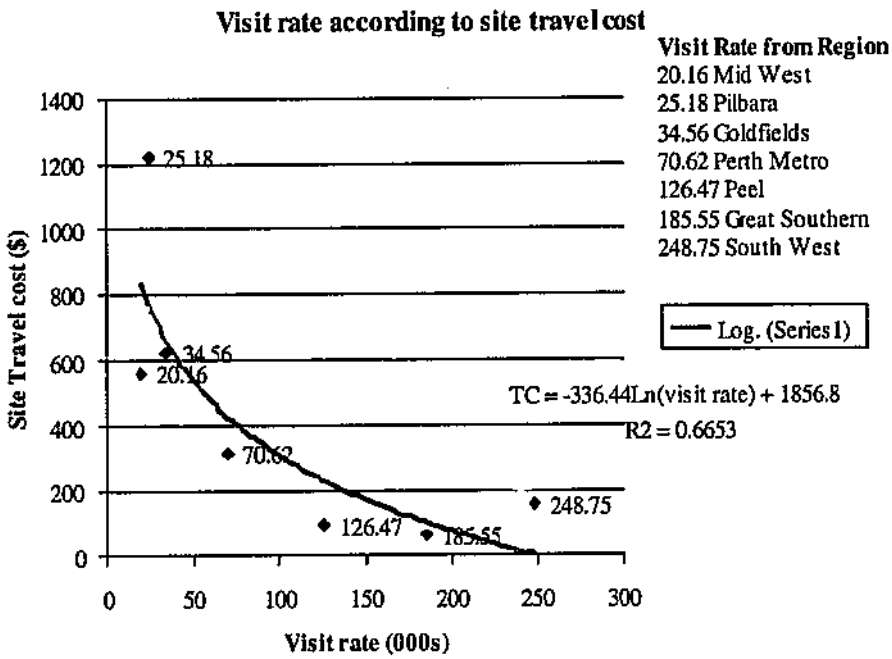


Figure 15: Sample Visit Rates and corresponding Travel Costs

This demand function is then used to estimate visitation from the zones of origin to the site at different levels of the travel cost (substitute for entry fee). The original

travel costs were adjusted according to the demand equation and then increments of the travel costs (TC) were added to the adjusted travel cost for each zone. The original travel cost, the adjusted travel cost and the visit rate from the zones of origin are displayed in Table 23.

Table 23: Original Travel Costs and Adjusted Travel Costs according to Estimated Demand Function

	Mid West Region	Pilbara Region	Goldfields Esperance Region	Perth Metro	Peel Region	Great Southern Region	South West Region
Original TC ($)	562.8	1222.52	625.33	312.67	93.8	62.53	156.33
Adjusted TC ($)	846.19	771.37	664.92	424.46	228.42	99.45	0.85
Visit Rate Per 000	20.16	25.18	34.55	70.62	126.47	185.55	248.74

One inherent problem encountered in using a logarithm functional form is that no finite price can reduce visits to zero. There are two main methods to deal with this situation. Firstly the researcher can determine the maximum travel cost that purely site oriented visitors consistently expend to get to the site. The second method is to select a low number of visits to the site and then solve the demand function for the price that would produce that number of visits. In this analysis the second method is chosen.

Table 24 provides the values and visitation from the zones at various levels of travel cost (TC) the substitute for the entry fee. These are measured in 000's of visitors from the various origin regions.

Table 24: Visitation from origin regions with increases in travel costs

Added TC	Mid West	Pilbara	Goldfields Esperance	Perth Metro	Peel	Great Southern	South West	Total Site Visitation
0	20.162	25.184	34.557	70.621	126.471	185.554	248.745	151.150
5	19.863	24.812	34.048	69.579	124.605	182.817	245.076	148.920
10	19.570	24.446	33.545	68.553	122.767	180.120	241.461	146.724
20	18.996	23.731	32.563	66.545	119.172	174.845	234.389	142.427
30	18.440	23.036	31.609	64.596	115.682	169.724	227.525	138.256
40	17.900	22.361	30.684	62.704	112.294	164.754	220.862	134.207
50	17.376	21.706	29.785	60.868	109.006	159.929	214.394	130.276
70	16.373	20.453	28.066	57.355	102.714	150.699	202.020	122.758
80	15.894	19.854	27.244	55.676	99.706	146.286	196.104	119.163
90	15.428	19.273	26.446	54.045	96.786	142.002	190.361	115.673
100	14.976	18.708	25.672	52.462	93.952	137.843	184.786	112.285
110	14.538	18.161	24.920	50.926	91.201	133.806	179.375	108.997
120	14.112	17.629	24.190	49.435	88.530	129.888	174.122	105.805
130	13.699	17.112	23.482	47.987	85.937	126.084	169.022	102.706
140	13.298	16.611	22.794	46.581	83.420	122.391	164.072	99.699
150	12.908	16.125	22.126	45.217	80.977	118.807	159.267	96.779
160	12.530	15.653	21.478	43.893	78.606	115.328	154.603	93.945
170	12.163	15.194	20.849	42.608	76.304	111.950	150.076	91.193
180	11.807	14.749	20.239	41.360	74.069	108.672	145.680	88.523
190	11.461	14.317	19.646	40.149	71.900	105.489	141.414	85.930
200	11.126	13.898	19.071	38.973	69.794	102.400	137.273	83.414
250	9.589	11.979	16.437	33.591	60.156	88.258	118.316	71.894
300	8.265	10.324	14.167	28.952	51.848	76.070	101.976	61.966
350	7.123	8.899	12.211	24.954	44.688	65.565	87.893	53.408
400	6.140	7.670	10.524	21.508	38.517	56.510	75.755	46.033
450	5.292	6.611	9.071	18.537	33.198	48.706	65.294	39.676
500	4.561	5.698	7.818	15.977	28.613	41.980	56.277	34.197
550	3.931	4.911	6.739	13.771	24.662	36.183	48.505	29.474
600	3.388	4.233	5.808	11.869	21.256	31.186	41.806	25.404
650	2.920	3.648	5.006	10.230	18.320	26.879	36.033	21.895
700	2.517	3.144	4.315	8.817	15.790	23.167	31.057	18.872
750	2.169	2.710	3.719	7.600	13.610	19.968	26.768	16.266
800	1.870	2.336	3.205	6.550	11.730	17.210	23.071	14.019
850	1.612	2.013	2.763	5.646	10.110	14.834	19.885	12.083
900	1.389	1.735	2.381	4.866	8.714	12.785	17.139	10.415
950	1.197	1.496	2.052	4.194	7.511	11.019	14.772	8.976
1000	1.032	1.289	1.769	3.615	6.473	9.498	12.732	7.737
1050	0.889	1.111	1.525	3.116	5.580	8.186	10.974	6.668
1100	0.767	0.958	1.314	2.685	4.809	7.056	9.458	5.747
1150	0.661	0.825	1.133	2.314	4.145	6.081	8.152	4.954
1200	0.569	0.711	0.976	1.995	3.572	5.241	7.026	4.270
1250	0.491	0.613	0.841	1.719	3.079	4.518	6.056	3.680
1300	0.423	0.528	0.725	1.482	2.654	3.894	5.220	3.172

Added TC	Mid West	Pilbara	Goldfields Esperance	Perth Metro	Peel	Great Southern	South West	Total Site Visitation
1350	0.365	0.455	0.625	1.277	2.287	3.356	4.499	2.734
1400	0.314	0.393	0.539	1.101	1.972	2.893	3.878	2.356
1450	0.271	0.338	0.464	0.949	1.699	2.493	3.342	2.031
1500	0.233	0.292	0.400	0.818	1.465	2.149	2.881	1.750
1550	0.201	0.251	0.345	0.705	1.262	1.852	2.483	1.509
1600	0.173	0.217	0.297	0.608	1.088	1.596	2.140	1.300
1650	0.149	0.187	0.256	0.524	0.938	1.376	1.844	1.121
1700	0.129	0.161	0.221	0.451	0.808	1.186	1.590	0.966
1750	0.111	0.139	0.190	0.389	0.697	1.022	1.370	0.833
1800	0.096	0.120	0.164	0.335	0.600	0.881	1.181	0.718
1850	0.082	0.103	0.141	0.289	0.518	0.759	1.018	0.618
1900	0.071	0.089	0.122	0.249	0.446	0.654	0.877	0.533
1950	0.061	0.077	0.105	0.215	0.384	0.564	0.756	0.459
2000	0.053	0.066	0.091	0.185	0.331	0.486	0.652	0.396
2050	0.046	0.057	0.078	0.159	0.286	0.419	0.562	0.341
2100	0.039	0.049	0.067	0.137	0.246	0.361	0.484	0.294
2150	0.034	0.042	0.058	0.118	0.212	0.311	0.417	0.254
2200	0.029	0.036	0.050	0.102	0.183	0.268	0.360	0.219
2250	0.025	0.031	0.043	0.088	0.158	0.231	0.310	0.188
2300	0.022	0.027	0.037	0.076	0.136	0.199	0.267	0.162
2350	0.019	0.023	0.032	0.065	0.117	0.172	0.230	0.140
2400	0.016	0.020	0.028	0.056	0.101	0.148	0.198	0.121
2450	0.014	0.017	0.024	0.049	0.087	0.128	0.171	0.104
2500	0.012	0.015	0.020	0.042	0.075	0.110	0.147	0.090
2550	0.010	0.013	0.018	0.036	0.065	0.095	0.127	0.077
2600	0.009	0.011	0.015	0.031	0.056	0.082	0.110	0.067
2650	0.008	0.010	0.013	0.027	0.048	0.070	0.094	0.057
2700	0.007	0.008	0.011	0.023	0.041	0.061	0.081	0.049
2750	0.006	0.007	0.010	0.020	0.036	0.052	0.070	0.043
2800	0.005	0.006	0.008	0.017	0.031	0.045	0.060	0.037
2850	0.004	0.005	0.007	0.015	0.026	0.039	0.052	0.032
2900	0.004	0.005	0.006	0.013	0.023	0.033	0.045	0.027
2950	0.003	0.004	0.005	0.011	0.020	0.029	0.039	0.024
3000	0.003	0.003	0.005	0.009	0.017	0.025	0.033	0.020
3050	0.002	0.003	0.004	0.008	0.015	0.021	0.029	0.017
3100	0.002	0.003	0.003	0.007	0.013	0.018	0.025	0.015
3150	0.002	0.002	0.003	0.006	0.011	0.016	0.021	0.013
3200	0.001	0.002	0.003	0.005	0.009	0.014	0.018	0.011
3250	0.001	0.002	0.002	0.005	0.008	0.012	0.016	0.010
3300	0.001	0.001	0.002	0.004	0.007	0.010	0.014	0.008
3350	0.001	0.001	0.002	0.003	0.006	0.009	0.012	0.007
3400	0.001	0.001	0.001	0.003	0.005	0.008	0.010	0.006
3450	0.001	0.001	0.001	0.002	0.004	0.007	0.009	0.005
3500	0.001	0.001	0.001	0.002	0.004	0.006	0.008	0.005
3550	0.001	0.001	0.001	0.002	0.003	0.005	0.007	0.004
3600	0.000	0.001	0.001	0.002	0.003	0.004	0.006	0.003

Added TC	Mid West	Pilbara	Goldfields Esperance	Perth Metro	Peel	Great Southern	South West	Total Site Visitation
3650	0.000	0.000	0.001	0.001	0.002	0.004	0.005	0.003
3700	0.000	0.000	0.001	0.001	0.002	0.003	0.004	0.003
3750	0.000	0.000	0.000	0.001	0.002	0.003	0.004	0.002
3800	0.000	0.000	0.000	0.001	0.002	0.002	0.003	0.002
3850	0.000	0.000	0.000	0.001	0.001	0.002	0.003	0.002
3900	0.000	0.000	0.000	0.001	0.001	0.002	0.002	0.001
3950	0.000	0.000	0.000	0.001	0.001	0.001	0.002	0.001
4000	0.000	0.000	0.000	0.000	0.001	0.001	0.002	0.001
4050	0.000	0.000	0.000	0.000	0.001	0.001	0.001	0.001

TC: Travel Cost *Visitation in 000's*

Table 24 shows that at an additional travel cost of $3900, only one person is likely to visit the site.

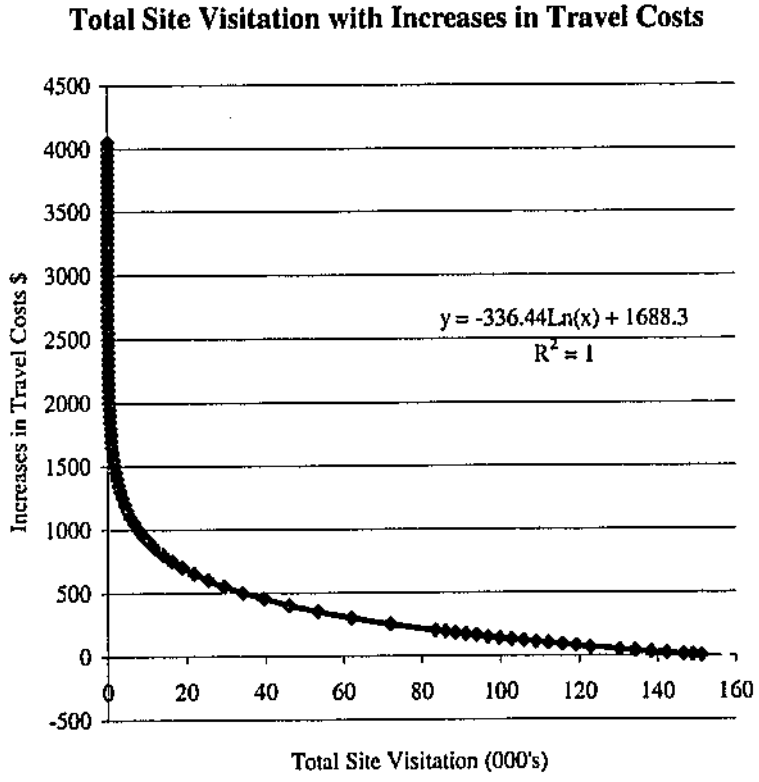


Figure 16: Total Site Visitation at Increases in Travel Costs

Figure 16 depicts the graphical representation of site visitation at the various increases in travel costs. The consumer surplus is calculated as the area above the present park fee or substitute travel cost and below the estimated function.

For the demand estimation equation TC = -336.44 * Ln (site visitation) + 1688.3, the integral is: $F(x) = -336.44*x*\ln(x) + 2024.74*x$

Therefore the consumer surplus, or area under the function is:

$F(150.2) = -336.44 * (150.2) * \ln(150.2) + 2024.74 * 150.2$

$F(0.001) = -336.44 * (0.001) * \ln(0.001) + 2024.74 * 0.001$

= $50.84 million.

6. LIMITATIONS

6.1 Meta analysis

The order of magnitude estimates of the market value of tourism and recreation in forested areas of the South West region, outlined in section 5.1 of the thesis, provide best-estimates only and are subject to a number of limitations. While it is possible to use and adapt the existing studies, there are a number of limitations that occur: firstly, the data was not collected specifically for the purpose of the research and secondly, there are numerous technical limitations with using previous studies, such as inconsistent temporal, boundary and sampling frames (Carlsen, 1997, p. 237).

Despite these limitations, the benefits of this style of research is that it allows the accumulation of knowledge of several different studies and, in the process, provides a clear direction of where the research gaps are.

6.2 Geographic Boundaries

The South West region as defined by the Department of Conservation and Land Management covers a different area to the South West region made up of the 12 Local Government Areas. The Department defined 'South West region' encompasses the Central Forest, Southern Forest and Swan Regions which encompass the Perth region. However most of the forested areas reported are found in the South West region as defined by the Government administrative zones. For this reason the Central and Southern Forest regions were researched as the coincided most closely with the borders of the local government areas. In addition, the data collected by the Western Australian Tourism Commission and the Bureau of Tourism Research for the South West region correlated most closely with this area.

6.3 Visitor Counts

Problems were inherent in interpreting the data from the CALM VISTAT database system as this data reports site 'visits' which then must be converted into visitors or visitor days for analysis to avoid double counting. Firstly the sites only include those that are measured by CALM. In addition, sites that are in close proximity are likely to receive the same visitors in the same day. The conversion of visits into individual visitors or visitor days relied on separate visitor information. For the Valley of the Giants case study site, this did not pose a problem as the site is monitored through gate entry fees. Where possible at other sites, consultation with CALM staff allowed for adjustments to be made for visit count estimates. This was also conducted where sites were likely to have other significant reasons for visit such as Leeuwin-Naturaliste National Park and Wellington National Park.

6.4 Temporal Discontinuities

Data is collected by different agencies over different time periods which makes correlation and comparison of data difficult. For example, the BTR report over a calendar year, whereas the Department of CALM report over the financial year period. In addition, measurement of tourism numbers may be influenced by seasonal effects, which are difficult to capture in cross-sectional studies.

6.5 Data Quality

Generally, there is a low standard for the collection and reporting of visitation to parks. It is apparent by the quality of the data held by the Department of CALM that it is awarded a low priority by park managers to record visitation patterns and visitor profiles.

In addition, the BTR, being nationally focused, provides research of limited value to Western Australia due to the low sample sizes. The data captured by BTR and the ABS is also fraught with limitations as most accommodation establishments in the South West are not captured in BTR or ABS surveys as they are considered too small. In reality accommodation for visitors to the South West region is predominantly in small

accommodation establishments such as bed and breakfasts, farmstays, chalets and guest houses.

> "The unique nature of tourism in the South West means that the traditional measures of tourism that centre on large accommodation establishments fail to capture the full impact of the industry. This is of particular concern given recent changes to official statistics collected by the ABS that now miss a major, and growing part of South West tourism" (South West Development Commission, 2001).

6.6 Limitations of the Travel Cost Study Application

Most of the limitations of the travel cost technique were outlined in section 4.3.3 of the thesis. However, the limitations specific to this study are outlined below:

6.6.1 Sampling Error

As the researcher was unable to capture all visitors to the site, the data for this study only represents a small sample of the total population of visitors. A sampling error is therefore inherent in the results reported from this study. Using other travel cost studies as a benchmark, the decision was to leave out visitor origin regions that recorded no survey responses. Due to the low sample size, the findings must be treated cautiously as a larger sample size would have undoubtedly received responses from people in alternative regions to those presented in the findings.

6.6.2 Coverage Error

Visitation to the site is subject to fluctuations according to season, day of the week and time of the day. Surveys were conducted on both weekend and mid-week days to reduce this error, however budget constraints only allowed the research to undertake one survey period. As visitation is measured accurately for the entire year, coverage is less of an issue, however the time of year that the surveys were completed may have effected expenditure results. During the survey period it was the Singaporean school holiday season. In addition, two of the survey days fell on the June long weekend, celebrated in Western Australia. There was therefore a number of West Australian on

'short-break' style holidays to the region. As visitation to the region is predominantly undertaken by intrastate visitors (79%), this factor was not considered as of great significance. The reason for the surveys being undertaken on the June long weekend, was for practical reasons, to take advantage of a high visitation period.

6.6.3 Non-response Error

The survey was administered in an interview style by the researcher to reduce the amount of non-response errors. There were a few refusals to participate in the survey which potentially biased results. In addition there were some respondents who chose not to respond to some questions on the survey, for example, income related questions. This was a minimal factor however.

6.6.4 Measurement Error

The interview style of questionnaire reduced the propensity for measurement error, which usually arises when respondents provide answers that can not be compared to others in the population sample. However the nature of travel cost studies, which ask respondents to estimate past and future travel related expenditure is difficult. In addition, questions relating to respondents intended actions given a hypothetical scenario also proves difficult. For example respondents were asked to respond to the following hypothetical scenario: Had you known that the Valley of the Giants site was closed prior to embarking on your trip would you have still visited the Manjimup/ Walpole/ Denmark region?

6.6.5 Multi Purpose and Multi Destination Visits

"It is not only the large trees and high forest which make this region such a drawcard for recreationists. There are several other forest types and features which combine to form a diverse landscape and it is not possible to consider recreation sections of forest without considering the other features." (Underwood et al., 1991, p. 30).

The attribution of travel costs to the region and to the forests particularly is extremely difficult. Despite employing a range of techniques in the survey to ascertain this attribution factor, it is impossible to ascertain a definitive attribution value.

7. CONCLUSION, DISCUSSION AND RECOMMENDATIONS

Forests provide a multitude of values to society and are under ever-increasing pressure to service a growing population with their diverse needs. Due to the common good attributes of environmental resources, unrestricted access to forests causes exploitation resulting in forest destruction or diminishing forest values (Mak & Moncur, 1995). In recent times, the pressures on land management agencies, such as CALM, have been exacerbated as they strive to manage demand in a climate of economic growth coupled with environmental concern. "It's increasingly difficult for foresters to satisfy society's diverse needs, especially when the same forests must supply amenities such as recreation or scenery as well as logs and other commodities." (Brunson, 1996, p. 90)

The greatest threats to forests are the conversion to other forms of land use and the fragmentation caused by agriculture, logging and road construction (United Nations Development Programme et al., 2000, p. 90). The South West of Western Australia has an alarming history of land clearing for agriculture and logging for timber production. The clearing of CALM lands, primarily State Forest for public utilities and access corridors is an ever-present demand. On average, it is estimated that 200 hectares of forests per year are cleared for transport, communications infrastructure, public utilities, waste sites and cemeteries (Department of Conservation and Land Management, 1992, p. 64). In addition to demands for public utilities, are the demands from the private sector for forested lands for infrastructure development. The encroachment of residential and industrial development on forested land is apparent in the major rural population centres such as Bunbury and Collie. The most significant impact of any style of development is not the net 'loss' of forest land but other associated impacts, such as the introduction and spread of diseases, fragmentation of the forest estate, barriers to wildlife movement and deterioration of aesthetic values (Department of Conservation and Land Management, 1992, p. 64).

Prior research in the South West region has demonstrated that tourist motivations to travel to the forested regions are largely due to the large tracts of undisturbed forest areas that exhibit wilderness qualities, provide a sense of remoteness and provide a sense of peace and solitude. In addition, as explored in the thesis, the forests of the South West house many unique attractions popular with tourists to the region including large visually spectacular trees and rare flora and fauna.

"The National Forest Policy Statement (Commonwealth of Australia 1992b in Ward, 2001) states that within a sustainable framework, forests are to be managed to maximise the economic benefits to society." This requires the measurement and evaluation of all forest values so that informed decisions can be made using a common unit measure that be compared across industries.

Since the commencement of large-scale logging operations in Western Australia, the economic value of timber outputs from the South West forests has been closely measured and well documented. Until now, however there has been little research conducted into the value of the forests in terms of tourism and recreation.

> "Proper planning is hindered by the paucity of quantitative and qualitative information on a number of important aspects....Analytical rigour and insights are required on the value of natural assets, demand estimates, carrying capacity, and models of preservation and management and other decision making tools." (Herath, 2002, , p. 78)

The following short summary of findings from research contained in this thesis provides a valuable contribution to addressing the gap of knowledge surrounding the economic value of the South West forests in terms of tourism and recreation :

- It is estimated that in 2000-2001 forest tourism and recreation in the South West of Western Australia amounted to a gross market value of between $122 to $160 million. Three different methods were used to calculate the gross market value including measured forest site activity data, regional visitation estimates from the Bureau of Tourism research and more localised studies including a South West regional tourism study published in 1999. The findings which are outlined in detail in section 5.1.6 on

page 98 do not include non-market values of the forest tourism and recreation sites.

- The case study forest site, the Valley of the Giants, Walpole, Western Australia is estimated to have an annual gross market value at between $27.8 million (intrastate market only) and $28.9 million (entire market) using an attribution factor of 70%. This calculation is based on all visitors to the site, with 70% of their visitor expenditure in the region (Manjimup/ Walpole/ Denmark) being attributable to the Valley of the Giants site. With the inclusion of the opportunity cost of travel time, the estimate increases to $33.16 million (based on the intrastate market only and an attribution factor of 70%).
- The consumer surplus value of the Valley of the Giants site, without accounting for the money spent on park entry fees to the site, is estimated at $50.84 million (measure based on the intrastate market only who account for 79% of the market and without the inclusion of the opportunity costs of travel time). With an attribution factor of 70% the consumer surplus value is $35.58 million. Intrastate visitors to the Valley of the Giants spent approximately $760,000 on park entry fees to the Valley of the Giants site in 2000-2001. Therefore with the attribution factor applied, the consumer surplus value, net the park entry fees is approximately $35 million . With a visitation rate of approximately 151,200 intrastate visitors in 2000-2001, the benefits accruing to each individual are $231.48 per person or $83 per person per day spent in the Manjimup/ Walpole/ Denmark region (average length of stay 2.8 days).

The research findings in this thesis will be provided to the land management agencies and stakeholders of the forest estate to ensure that full consideration is given to the economic values of tourism and recreation in planning for the future management of forested areas in the South West of Western Australia.

It has been noted previously that the key to sustainability is maintaining the capital stock of resources, in this case the forest resources of the South West (Garrod and Fyall 1998; Russell 2001). The economic values determined for these resources provides valuable information that can be used in conjunction with other forest values to inform zoning decisions and multiple-use management strategies. For natural resource agencies this is a progression towards the sustainable management of forests across the totality of values they provide.

In addition, for agencies that manage the lands for tourism and recreation interests specifically, the research findings may be utilized to secure resource and investment commitment that support tourism to these areas ensuring a sustainable future both economically and environmentally for the sector.

Several recommendations are made in order to enhance the accuracy and reliability of the economic estimates provided in this thesis:

- Further primary research allowing for greater survey samples and an expanded methodology would certainly provide a more reliable and accurate economic estimate of tourism and recreation values in the region.
- Greater communication on current research processes and outcomes between the two lead agencies for tourism and recreation in the regions (CALM and the WATC) would facilitate more comprehensive research information to be used as a basis for decision making.
- Changes to the methods and data collected by the lead agencies (CALM and the WATC), will provide for more accurate estimates of tourism numbers and associated impacts at a site and regional level. In particular the visitor estimating techniques for the regions.
- Lastly, the national standardisation of natural area tourism data collection and reporting, as is occurring in the United States of America, should become a goal of all national park agencies in Australia. Although a database of environmental valuation studies are collated nationally by Environment Australia, the standardisation of research methods and

procedures through national parks agencies, has the potential to provide for comparative studies across regions and the compilation of longitudinal research results based on homogeneous methodologies. Ultimately this would allow national benchmarks to be set and greater continuity in decision-making.

8. LIST OF REFERENCES

Ashford, G. (2002). Personal Communication, Research Assistant, Western Australian Tourism Commission. Perth.

Beal, D. (1995). Sources of variation estimates of cost reported by respondents in travel cost surveys. Australian Journal of Leisure and Recreation, 5(1).

Beggs, B. (Ed.). (1971). Forestry in Western Australia. Perth, Western Australia: William C. Brown, Government Printer.

Bengston, D. (1994). Changing forest values and ecosystem management. Society and Natural Resources, 7(6), 515-533.

Bennett, J. (1995). Economic value of recreational use: Gibraltar Range and Dorrigo National Parks. Sydney: New South Wales National Parks and Wildlife Service.

Bennett, J., Gillespie, R., Powell, R., & Chalmers, L. (1996). The Economic Value and Regional Economic Impact of National Parks. Australian Journal of Environmental Management, 3(December), 229-239.

Blamey, R. (1995). Occasional Paper No. 21:The Nature of Ecotourism. Canberra: Bureau of Tourism Research.

Bradshaw, D. (2001). Terras Australe - The Squandering of a Legacy. Perth: Department of Zoology, University of Western Australia.

Bradshaw, F., Adams, R., Sneeuwjagt, R., Low, K., Havel, J., Bartle, J., & Stoneman, G. (1991). The Jarrah Forest: A case study in multiple use. In J. Fox (Ed.), Forest Management in Australia. New South Wales, Australia: Surrey Beatty & Sons Pty Ltd.

Brunson, M. (1996). Human Dimensions in Silviculture. In A. Ewert (Ed.), Natural Resource Management - The Human Dimension (pp. 91-108). Colorado, United States: Westview Press Inc.

Buckley, R. (1994). A Framework for Ecotourism. Annals of Tourism Research, 21(3), 661-663.

Buckley, R. (2000). Wilderness in Australia: What's Happening in a World Context. USDA Forest Service Proceedings RMRS-P, 2(15), 190-193.

Bureau of Tourism Research. (1999). 1999 National Visitor Survey. Canberra: Bureau of Tourism Research.

Bureau of Tourism Research. (2002). Travel by Australians March 2002 - Quarterly Results of the National Visitor Survey. Canberra: Bureau of Tourism Research.

Burr, S. (1995). What research says about sustainable tourism development. Parks & Recreation, 30(9), 12-.

Bushell, R., Prosser, G. M., Faulkner, H. W., & Jafari, J. (2001). Tourism Research in Australia. Journal of Travel Research(39), 323-326.

Campbell, A. (2001). Foreword. In N. Taylor (Ed.), Social Assessment in Natural Resource Management Institutions. Melbourne, Australia: CSIRO Publishing 2001.

Carlsen, J. (1997). Economic Evaluation of recreation and tourism in natural areas: a case study in New South Wales, Australia. Tourism Economics, 3(3), 20-29.

Cater, E. (1995). Environmental contradictions in sustainable tourism. The Geographical Journal, 161(1), 21.

Chapman, D. (1995). Ecotourism in State Forests of New South Wales: Who Visits and Why? Sydney: State Forests of New South Wales & University of Sydney.

Christensen, P. (1992). The Karri Forest. Perth: Department of Conservation and Land Management.

Chua, P. (2001). Profile of the Outdoor/Ecotourism International Visitor to Western Australia. Touristics, 17(1), 2-6.

Clawson, M. (1975). Forests For Whom and for What? Baltimore, United States of America: John Hopkins University Press.

Coakes Consulting. (2002). Socio-Economic Assessment of the Forest Management Plan. Perth: Conservation Commission of Western Australia & Forest Products Commission.

Common, M. (1995). Sustainability and Policy: Limits to Economics. Cambridge: Cambridge University Press.

Common, M. (1996). Environmental and Resource Economics: An Introduction (2nd edn ed.). New York, United States of America: Addison Wesley Longman.

Common, M., Bull, T., & Stoeckl, N. (1999). The Travel Cost Method: an empirical investigation of Randall's Difficulty. The Australian Journal of Agricultural and Resource Economics, 43(4), 457-477.

Commonwealth of Australia and the Western Australian Regional Forest Agreement (RFA) Steering Committee. (1998). Economic Profile of the Tourism and Recreation Industries in the Regional Forest Agreement Area. Perth: Commonwealth of Australia and Western Australian Government.

Commonwealth of Australia and the Western Australian Regional Forest Agreement (RFA) Steering Committee. (n.d.). Regional Forest Agreement Information Kit. Perth: Commonwealth of Australia and Western Australian Government.

Conservation Commission of Western Australia. (2002a). Draft Forest Management Plan - July 2002. Perth: Conservation Commission of Western Australia.

Conservation Commission of Western Australia. (2002b). A New Forest Management Plan for WA, January 2002 Discussion Paper. Perth: Conservation Commission of Western Australia.

Costanza, R., & Patten, B. (1995). Defining and predicting sustainability. Ecological Economics, 15, 193-196.

Dargravel, J., Proctor, W., & Kanowski, P. (2000). Conflict and Agreement in Australian Forests. In L. Tacconi (Ed.), Biodiversity and Ecological Economics. London, UK.: Earthscan Publications Pty Ltd.

Davis, D., & Tisdell, C. (1988). Tourist levies and willingness to pay for a whale shark experience. Tourism Economics, 161-174.

Department of Agriculture Fisheries and Forestry - Australia. (2002). Department of Agriculture, Fisheries and Forestry - Australia. Retrieved November 5, 2002, from the World Wide Web: www.affa.gov.au

Department of Conservation and Land Management. (1992). Management Strategies for the South-West Forests of Western Australia: A Review - Draft for Public Comment. Perth, Western Australia: Department of Conservation and Land Management.

Department of Conservation and Land Management. (1999). Living Windows Survey.

Department of Conservation and Land Management. (2001a). Annual Report 2000-2001: Department of Conservation and Land Management.

Department of Conservation and Land Management. (2001b). Total Annual Visits to National Parks, State Forests and other Reserves 1994-2001. Perth.

Department of Conservation and Land Management. (2001c). Visitor Survey Program 2000. Perth.

Department of Conservation and Land Management. (2002a). Annual Report 2001-2002: Department of Conservation and Land Management.

Department of Conservation and Land Management. (2002b). The Perup Forest Ecology Centre. Department of Conservation and Land Management. Retrieved 5 November, 2002, from the World Wide Web: www.calm.wa.gov.au

Department of the Environment Sport and Territories. (1996). Estimating Values for Australia's Native Forests, Environmental Economics Research Paper No. 4. Canberra, Australia: Commonwealth of Australia.

Dowling, R. (2001). Environmental Tourism. In R. Derrett (Ed.), Special Interest Tourism - Context and Cases (pp. 283-306). Brisbane: John Wiley and Sons.

Dowling, R., & Charters, T. (2000). The Planning and Development of Ecotourism in Queensland. In K. Law (Ed.), Best Practice Ecotourism in Queensland (pp. 1-16). Brisbane: Tourism Queensland.

Driml, S. (1994). Protection for Profit (Research Publication No. 35). Townsville, Australia: Great Barrier Reef Marine Park Authority.

Driml, S. (1997). Bringing ecological economics out of the wilderness. Ecological Economics, 23, 145-153.

Driml, S. (1998). The Value of Protected Areas to Queensland. Brisbane: Queensland Department of Environment.

Driml, S. (1999). Dollar Values and Trends of Major Direct Uses of the Great Barrier Reef Marine Park. Townsville: Great Barrier Reef Marine Park Authority.

Driml, S. (2001). Travel Cost Analysis of Recreation Value in the Wet Tropics World Heritage Area. Unpublished Draft Unpublished Paper, Australian National University, Canberra.

Driml, S., & Common, M. (1995). Economic and Financial Benefits of Tourism in Major Protected Areas. Australian Journal of Environmental Management, 2(March 1995), 19-29.

Dutton, I., Carlsen, J., Pickin, J., Taylor, D., & Davis, D. (1995). The Recreation and Tourism Values of the Upper North East Region of New South Wales. Sydney: Centre for Tourism, Faculty of Resource Science and Management, Southern Cross University for the New South Wales Natural Resource Audit Council Secretariat.

Eagles, P. (2002). Trends in Park Tourism: Economics, Finance and Management. Journal of Sustainable Tourism, 10(2), 132-153.

Eagles, P., MacLean, D., & Stabler, M. (2000). Estimating the Tourism Volume and Value in Parks and Protected Areas in Canada and the USA. The George Wright Forum, 17(3), 62-82.

Economics Consulting Services Pty Ltd. (1999). South West Region Tourism Study. Perth: Western Australian Tourism Commission & South West Development Commission.

Econsult Pty Ltd. (1995). National Ecotourism Strategy Business Development Program Report. Melbourne, Australia: Commonwealth Department of Tourism.

Engin, J., & Shonkwiler, J. (1995). Modelling Recreational Demand in the Presence of Unobservable Travel Costs: Towards a Travel Price Model. Journal of Environmental Economics and Management, 29, 368-377.

Environment and Behaviour Consultants Townsville. (1997). Social and Forest Values of the Community within the WA Regional Forest Agreement Region. Canberra, Australia: Social Assessment Unit, Forest Branch, Department of Primary Industry and Energy.

Finucane, S. J. (1993). The Environmental Impacts of Ecotourism in Western Australia. Report prepared from results of a survey undertaken for N422 Environmental Impact Assessment Project. Perth: Murdoch University.

Fix, P., & Loomis, J. (1997). The economic benefits of mountain biking at one of its meccas: an application of the travel cost method to mountain biking in Moab, Utah. Journal of Leisure Research, 29(3), 342-353.

Fix, P., Loomis, J., & Eichorn, R. (2000). Endogenously chosen travel costs and the travel cost method: an application to mountain biking in Moab, Utah. Applied Economics, 32, 1227-1231.

Folmer, H., & Thijssen, G. (1996). Interaction between the Agricultural Economy and the Environment: An Overview of Dutch Problems, Policies and Models. In A. Bruun Christensen (Ed.), Modelling the Economy and the Environment (pp. 12-36). Berlin, Germany: Springer-Verlag.

Font, A. (2000). Mass tourism and the demand for protected natural areas: A travel cost approach. Journal of Environmental Economics and Management, 39, 97-116.

Font, X., & Tribe, J. (Eds.). (2000). Forest Tourism and Recreation - case studies in environmental management. Oxford, UK.: CABI Publishing.

Forsyth, T. (1997). Environmental responsibility and business regulation: The case of sustainable tourism. The Geographical Journal, 163(3), 270-280.

Garrod, B., & Fyall, A. (1998). Beyond the Rhetoric of Sustainable Tourism. Tourism Management, 19, 199-212.

Garrod, G., & Willis, K. (1992). The Amenity Value of Woodland in Great Britain: A Comparison of Economic Estimates. Environmental and Resource Economics, 2(4), 415-434.

Garrod, G., & Willis, K. (1997). The non-use benefits of enhancing forest biodiversity: A contingent ranking study. Ecological Economics, 21, 45-61.

Gillespie, R. (1997). Economic Value and Regional Impact of Minnamurra Rainforest Centre, Budderoo National Park. Sydney: NSW National Parks and Wildlife Service.

Glass, G. V. (1976). Primary, secondary and meta-analysis of research. Educational Researcher, 5(10), 3-8.

Godoy, R., & Contreras, M. (2001). A comparative study of education and tropical deforestation among lowland Bolivian Amerindians: Forest Values, environmental externality, and school subsidies. Economic Development and Cultural Change, 49(3), 555-574.

Gowdy, J., & McDaniel, C. (1995). One world, one experiment: addressing the biodiversity-economics conflict. Ecological Economics, 15, 181-192.

Green, C. H., & Tunstall, S. M. (1991). Is the Economic Evaluation of Environmental Resources Possible? Journal of Environmental Management(33), 123-141.

Haab, T., & Hicks, R. (1997). Accounting for Choice Set Endogeneity in Random Utility Models of Recreation Demand. Journal of Environmental Economics and Management, 34, 127-147.

Harrington, P., & Oakley, R. (1992). Recent Developments in Resource Pricing and Allocation Policy. A discussion paper submitted to the Economic Planning Advisory Council. Canberra: Australian Government Publishing Service.

Harris, R., & Leiper, N. (Eds.). (1995). Sustainable Tourism - an Australian perspective. Sydney: Butterworth-Heinemann.

Herath, G. (2002). Research methodologies for planning ecotourism and nature conservation. Tourism Economics, 8(1), 77-101.

Holgen, P., Mattsson, L., & Li, C. (2000). Recreation values of boreal forest stand types and landscapes resulting from different silvicultural systems: An economic analysis. Journal of Environmental Management, 60, 173-180.

Hudson, B. (1998). Waterfalls Resources for Tourism. Annals of Tourism Research, 958-

Hufschmidt, M., James, D., Meister, A., Bower, B., & Dixon, J. (1983). Environment, Natural Systems and Development -An Economic Valuation Guide. Baltimore: John Hopkins University Press.

Hunter, J., & Schmidt, F. (1990). Methods of meta-analysis. London: Sage Publications.

Hutte, G. (2000). Perceived images of various actors engaged in sustainability discussions. In M. Tome (Ed.), Sustainable Forest Management (pp. 193-216). Netherlands: Kluwer Academic Publishers.

Johnson, L., Foo, L. M., Buchanan, I., & Henrick, B. (2001). BTR Occasional Paper Number 33, Regional Tourism Employment - A Case Study Approach. Canberra: Bureau of Tourism Research.

Knapman, B., & Stanley, O. (1993). A Travel Cost Analysis of Kakadu National Park. Paper presented at the Building a Research Base in Tourism - Proceedings of the National Conference on Tourism Research, University of Sydney.

Lindberg, K. (2001). Economic Impacts. In D. Weaver (Ed.), Encyclopedia of Ecotourism (pp. 363-377).

Loomis, J., & Walsh, R. (1997). Recreation Economic Decisions: Comparing Costs and Benefits. Pennsylvania, United States of America.: Venture Publishing Incorporated.

Madden, J., Groenewold, N., & Thapa, P. (2002). Estimating the value of Tasmainian National Parks to Park Visitors. Queensland: CRC for Sustainable Tourism.

Mak, J., & Moncur, J. (1995). Sustainable Tourism Development: Managing Hawaii's 'unique'. Journal of Travel Research, 33(4), 51.

Marcouiller, D. (1998). Environmental resources as latent primary factors of production in tourism: the case of forest-based commercial recreation. Tourism Economics, 4(2), 131-145.

McKercher, B., & Robbins, B. (1998). Business Development Issues Affecting Nature-Based tourism operators in Australia. Journal of Sustainable Tourism, 6(2), 173-188.

Meadows, D., Meadows, D., Randers, J., & Behrens, W. (1972). Limits to Growth. New York: New American Library.

Mercer, D. (2000). A Question of Balance (3rd Edition ed.). Riverwood, New South Wales: The Federation Press.

Munasighe, M. (1993). Environmental Economics and Sustainable Development. Washington, USA: World Bank.

Nature Based Tourism Strategy for Western Australia. (1997). Perth: Department of Conservation and Land Management & Western Australian Tourism Commission.

Nayak, B. (2001). Economic-ecologic values of an Indian Forest: A case study. Indian Journal of Agricultural Economics, 56(3), 325.

Newman, P. (2001). Sustainability and Planning: A Whole of Government Approach. Perth, Western Australia.: Institute for Sustainability and Technology Policy, Murdoch University & Department of the Premier and Cabinet, Western Australia.

Parsonson, R., Wearing, S., Anderson, K., Robertson, B., & Veal, T. (1989). The New England-Dorrigo Rainforest Tourism Study. Sydney: Kuring-Gai College for Advanced Education (University of Technology Sydney) - Report prepared for NSW Parks and Wildlife.

Pearce, D. (1998). Global environmental value and the tropical forests, Economics and the Environment: Essays on Ecological Economics and Sustainable Development. Cheltenham, UK.: Edward Elgar Publishing Limited.

Pearce, D., & Moran, D. (1994). The Economic Value of Biodiversity. IUCN - The World Conservation Union. Retrieved 16/07/01, 2001, from the World Wide Web: biodiversityeconomics.org/pdf/topics-608-00.pdf

Pearson, L., Russell, I., & Woodford, K. (2000). Economic Impact of Noosa National Park on the Sunshine Coast and Noosa Economies. Unpublished Occasional Paper 2000, The University of Queensland.

Price, M. (1988). Mountain Forests as Common Property Resources: Management Policies and their outcomes in the Colorado Rockies and the Swiss Alps. Unpublished PhD, University of Colorado, Boulder.

Pritchard, P., & Donaldson, J. (2000). Farm Forestry Policy in Australia - a working paper. Paper presented at the Developing Policies to Encourage Small-Scale Forestry. Proceedings from an International Symposium 9-13 January 2000, Kuranda, Australia.

Randall, A. (1987). Resource Economics - An Economic Approach to Natural Resource and Environmental Policy (2 ed.). United States of America: John Wiley and Sons Inc.

Randall, A. (1994). A difficulty with the travel cost method. Land Economics, 70(1), 88-97.

Robertson, G. (2001). Visitors to National Parks. Journal of the Bureau of Tourism Research, 3(1), 51-58.

Robinson, F. (1998). Submission to Forests Task Force (WA) by Tourism South West July 1998. Bunbury, Western Australia: Tourism South West.

Russell, C. (2001). Applying Economics to the Environment. New York, United States of America: Oxford University Press.

Schmidt, W. (1980). Forest Visitors Survey. Perth: Forests Department.

Siderelis, C., Moore, R., & Lee, J.-H. (2000). Incorporating users' perceptions of site quality in a recreation travel cost model. Journal of Leisure Research, 32(4), 406-414.

Smith, S. (1994). The Tourism Product. Annals of Tourism Research, 21(3), 582-595.

Smith, V. (1989). Taking stock of progress with travel cost recreatiojnd demand methods: theory and implementation. Marine Resource Economics, 6, 279-310.

Smith, V., & Kaoru, Y. (1990). Signals or noise? Explaining the variation in recreation benefit estimates. American Journal of Agricultural Economics, May, 419-433.

South West Development Commission. (2001, 10/01/2001). South West Region Tourism Study 1999. South West Development Commission. Retrieved (09/04/2001), 2001, from the World Wide Web: http://www.swdc.wa.gov.au/news/tourism_study.asp

South West Development Commission. (2002). South West 2002-2003 Budget. South West Development Commission. Retrieved 10/09/2002, 2002, from the World Wide Web: www.premier.wa.gov.au/treasury/southwest.pdf

Tacconi, L. (Ed.). (2000). Biodiversity and Ecological Economics. London, UK.: Earthscan Publications Pty Ltd.

The Boshe Group. (2001). CALM Regional Parks Usage Survey 2001. Perth, Western Australia: Department of Conservation and Land Management.

The Hon R.J.L. Hawke, A. C., Prime Minister of Australia - Department of Prime Minister and Cabinet,. (1989). Our Country, Our Future, Statement on the Environment, . Canberra: Australian Government Printing Service.

Tietenberg, T. (1996). Environmental and Natural Resource Economics (4 ed.). New York: Harper Collins College Publisher.

Tourism South West. (2000). Tourism South West Marketing Plan Financial Year 2000/ 2001. Bunbury: Tourism South West.

Underwood, R., Walker, A., Schuster, C., Sands, A., & Lush, A. (1991). The Karri Forest, Western Australia. In J. Fox (Ed.), Forest Management in Australia. New South Wales, Australia: Surrey Beatty & Sons Pty Ltd.

United Nations Development Programme, United Nations Environment Programme, World Bank, & World Resources Institute. (2000). World Resources 2000-2001: People and Ecosystems The Fraying Web of Life. Oxford, UK.: Elsevier Science.

Verstegen, P. (2002). Sustainability and Biodiversity Conservation: Opportunities and Challenges for Western Australia: Integrated Sustainability Management & Institute of Science and Technology Policy, Murdoch University.

Walsh, R., Johnson, D., & McKean, J. (1992). Benefit Transfer of Outdoor Recreation Demand Studies 1968-1988. Water Resources Research, 28(3 (March)), 707-713.

Ward, F., & Beal, D. (2000). Valuing Nature with Travel Cost Models. Cheltenham: Edward Elgar Publishing Ltd.

Ward, J. (1999). Measuring the Economic Value of Recreation and Tourism on Fraser Island. Paper presented at the Australia - the World's Natural Theme Park - Proceedings of the Ecotourism Association of Australia National Conference, Fraser Island, Queensland.

Ward, J. (2001). The net economic benefits of recreation and timber production in selected New South Wales native forests. Unpublished PhD, Griffith University, Queensland.

Weaver, D. (2001). Sustainable Tourism: Is it sustainable? In E. Laws (Ed.), Tourism in the 21st century : reflections on experience (pp. Chapter 16). London: Continuum.

Weaver, D., & Oppermann, M. (2000). Tourism Management. Queensland, Australia: John Wiley and Sons.

Western Australian Tourism Commission. (1998). Tourism Research Brief on South West - Summary of Key Findings. Perth: Western Australian Tourism Commission.

Western Australian Tourism Commission. (2000a). Tourism Development Register. Perth: Western Australian Tourism Commission.

Western Australian Tourism Commission. (2000b). Visitor Arrivals to South West Tourist Bureaux. Perth: Western Australian Tourism Commission.

Western Australian Tourism Commission. (2002). Environmental Tourism Packages. Perth: Western Australian Tourism Commission.

Wight, P. (1993). Ecotourism: Ethics or Eco-Sell? Journal of Travel Research, 31(3), 3-9.

Wills, A., & Tonkin, C. (1998). Timber in Context - a guide to sustainable use. New South Wales, Australia: Construction Information Systems Australia Pty Ltd.

Xue, D., Cook, A., & Tisdell, C. (2000). Biodiversity and the tourism value of Changbai Mountain Biosphere Reserve, China: a Travel Cost approach. Tourism Economics, 6(4), 335-357.

Yencken, D., & Wilkinson, D. (2001). Resetting the Compass - Australia's Journey Towards Sustainability. Collingwood, Victoria: CSIRO Publishing.

9. APPENDICES

Appendix 1: Recreation Opportunity Spectrum Classification Scheme

Appendix 2 : Secondary data sources for tourism information on the South West region of Western Australia

Appendix 3: Bureau of Tourism Research Expenditure Categories

Appendix 4: Bureau of Tourism Research Regions

Appendix 5: Valley of the Giants, Walpole-Nornalup National Park, Western Australia

Appendix 6: Survey

Appendix 1: Recreation Opportunity Spectrum Classification Scheme (CALM, 2001)

ROS CLASSIFICATION FACTORS

Factor	ROS Class		
	Primitive	Intermediate	Developed
ACCESS			
Distance from nearest town	Over 80kms.	50-80kms.	Less than 50kms.
Access	Foot/Bicycle/4WD /limited 2WD.	2WD gravel.	2WD bitumen/public transport/bus & caravan access.
Parking Capacity	Up to 3 cars (non designated parking area).	4-10 cars and 2 buses (designated parking area).	Over 10 cars and 2 buses.
VISITATION			
No. of recorded visits per year	Less than 20,000 visits.	Between 20,000-80,000 visits.	Over 80,000 visits.
ON-SITE MODIFICATION			
Visual Impact/Facilities	Minimal, only those for conservation purposes.	Basic facilities eg. barbecues, pit toilet, picnic tables.	Modified site with large scale developments and/or substantial facilities.
Disabled access	Unsuitable for disabled.	Site accessible with assistance to a degree.	Disabled facilities provided.
Information/ interpretation	Minimal, possibly site orientation.	Site/park brochure or information, panels.	Visitor centre, organised activities, display/information shelters.
Appropriate Use	Activities requiring little or no equipment eg. birdwatching, bushwalking, swimming, fishing.	Activities requiring equipment and/or vehicle access eg. vehicle based camping.	A range of activities.
MANAGEMENT			
Management presence	Irregular, as required (approx. once a month).	Regular (daily at certain times of the year, and at other times, once a week).	All year round, daily.
Visitor management	Subtle guidance eg. tracks.	Definition of use areas by provision of facilities eg. bollards to guide vehicles.	Provision of different access routes eg. vehicle, foot, bicycle and/or parking areas for different vehicles provided.

Note: The ROS class (primitive, intermediate or developed) for each survey site was determined where the majority of the factors were applicable for the site.

Source	Subject	Year	Subject Material Covered
AGB McNair and Market Equity	Consumer Surveys	1994	profiles of tourists to the south west region – interviewed Perth residents and visitors in the regions. interviewers stationed in Bridgetown, Bunbury, Margaret River and Pemberton in November 1994. approached local respondents to determine if they were visiting or lived in the shire. 267 interviews – basic demographics, length of stay, on tour or independent, location of overnight stays, purpose of visit, activities undertaken, mode of travel, travel distances, travel expenditure and other expenditure detailed. Looked at facilities and impressions of region, information sources etc.
Bibbulmun Track Project - Jenny Nichol Becky Shrimpton	Economic Impact of the Bibbulmun Track Project	2001	
Bourner, R. (Murdoch University)	Economic Survey of Farmstays in the Central South Region of WA	1995	
Bureau of Tourism Research - Johnson & Foo	Regional Tourism Employment – A Case Study Approach (Based on BTR data from the National Visitors Survey and International Visitors Survey)	2001	Focused predominantly on Perth region. Has details of domestic tourism activity and international tourism activity in South West region.
Bureau of Tourism Research - Robertson	Visitors to National Parks (Based on BTR data from the National Visitors Survey and International Visitors Survey)	2001	Visitation Ranking of parks No expenditure data Activities Information specifically relating to the South West
Bureau of Tourism Research - Chua	Profile of the Outdoor/ Ecotourism International Visitor to Western Australia (Based on BTR data from the International Visitors Survey)	2002	Only represents 5%of visitors to the South West region so not so relevant.

Source	Subject	Year	Subject Material Covered
Clements, K. and Qiang, Ye Economics Research Centre, UWA Dept of Economics.	A New Input-Output Table for WA,	1994	Used the 1994 ABS statistics
Commonwealth and Western Australian Regional Forest Agreement Steering Committee	Economic Profile of Tourism and Recreation in the Regional Forest Agreement Area	1998	Reported case study on Pemberton conducted in 1997 and found that employment in the industry included 87 owner operators, 83 full-time employees and 148 part-time and casual employees, totalling 318 people or the equivalent of 233 full time employees.
Commonwealth and Western Australian Regional Forest Agreement Steering Committee	Social and Forest Values of the Community within the WA RFA Region	Nov 1997	1,100 surveyed in the 5 regional sectors (including 'urban' which incorporated Kalumunda and Lesmurdie) social/ forest values – no expenditure
Conservation Commission of Western Australia (Coakes Consulting)	Social and economic impacts associated with the draft Forest Management Plan	2002	Reports the estimated effects of the close down of the timber industry given different scenarios laid out in the Forest Management Plan. Interviews with key stakeholder groups – used Manjimup as a focus.
Country Tourism Association	Economic Value of Hawke Block for Tourism	1987	
CRC Project – Jan Pedersen	Tapestry Project	2000-	Limited economic information as at April 2001 on project
Department of Conservation and Land Management	Visitor Surveys Report	2000	Mainly satisfaction ratings. Limited demographic information.
Department of Conservation and Land Management (Boshe Group)	CALM Regional Parks Usage Survey	2001	Regional Parks Survey – did include John Forest National Park Usage and activities data
Department of Conservation and Land Management.	Westrek LEAP Program. Swan Social Survey Final Report Perth	October 1994 - March 1995	Covers more social values and motivations/ activities of visitors
Department of Conservation and Land Management.	Walpole Nornalup National Park – Draft Management Plan	1990	Conducted visitor surveys in July 1988, October 1988, January 1989 Also used MRD, ABS, CALM, Coalmine Beach, Nuyts Logbook, Walpole Tourist Bureau, Visitation figures and Coach figures.
Environment Forests Taskforce	Indigenous Values of the Central and Southern Forest Region		Looked at indigenous values as part of the WA National Estate Indigenous Values

Source	Subject	Year	Subject Material Covered
Finucane (Murdoch University)	The Environmental Impacts of Ecotourism in Western Australia	1993	Surveyed 19 natured based tourism operators listed with the WATC to establish a profile of ecotourism in WA
Forests Department Wayne Schmidt	Forest Visitors Survey	August 1980	2000 Questionnaires – main visitor motivations, activities – no expenditure data.
Forests Department	A Report on Forest Recreation Use Levels and Visitor Preferences in Collie Division	1979	
Margaret River Tourism Survey	Visitor Expenditure Surveys	1999	Small sample size in a limited amount of accommodation establishments. Report economic expenditure.
Moncreiff, D.	Dryandra Woodlands Case Study	1998	89 visitor surveys completed; 58 overnight visitors and 31 by day visitors to Dryandra Woodland. Most conducted in April – easter holidays. Direct expenditure detailed in copy – expenditure on all items is almost certainly underestimated eg. Did not cover fuel costs in most cases. Details visitation rates and CALM fees collected
South West Development Commission (Economics Consulting Services Pty Ltd)	South West Region Tourism Study	1998	utilized WATS survey 1996-1997 and survey (1998) directed at 651 tourist operators (predominantly accommodation establishments) registered in the WATC database. 30% response rate with half providing economic data. (216 respondents) Includes running costs, capital expenditure, gross business income dependant on tourism, gross business income, employment figures, visitor origin, sector (eg. Food and beverage, tour guides) Also qualitative info for development purposes – eg. Operators workshops in regions.

Source	Subject	Year	Subject Material Covered
South West Development Commission	South West Regional Tourism Strategy	1995	Covers 12 shires South West Tourist Commission – Tourist Bureau Workshops – contained in the tourism strategy – remember two volumes. Community workshops – 1,000 people invited. Surveys – local residents, tour operators, school children (287 in total) Interviews Newsletters
South West Development Commission	Living Windows – Business Development Plan 1999-2004	1999	Visitor surveys – how much did you spend? Operator surveys – visitor numbers and staffing, admission prices, site profiles Low response rates for visitor surveys – limited sample size.
South West Development Commission	Investment Highlights 2002-2003	2002	Outlines government investment for 2002-2003 – can extract tourism infrastructure investment
Sport and Recreation WA (Boshe Group)	Attitudes of Users Towards the Mundaring Recreation Trails	2001	Usage of trails in Mundaring shire Attitudes of users Activities
(Robinson, 1998)	Submission to Forests Task Force (WA) by Tourism South West July 1998	1998	Survey of 37 operators in forest areas of the south west "to identify what parts of the forests were used, what additional forest areas tour operators may use in the future and who visits the forest areas." (Robinson, 1998)
UWA – John Taplin	Regional Tourism Impact Model for Decision Support	2001	More looking at site attributes and destination choice includes south west main destinations
West Australian Tourism Commission	WA Travel Survey	1996	Last survey conducted in WA by WATC on tourism expenditure
Coakes Consulting	Socio-Economic Assessment of the Forest Management Plan	2002	Tourism and Recreation – operators surveyed - 146 sent/ 7 responded = 5% response rate

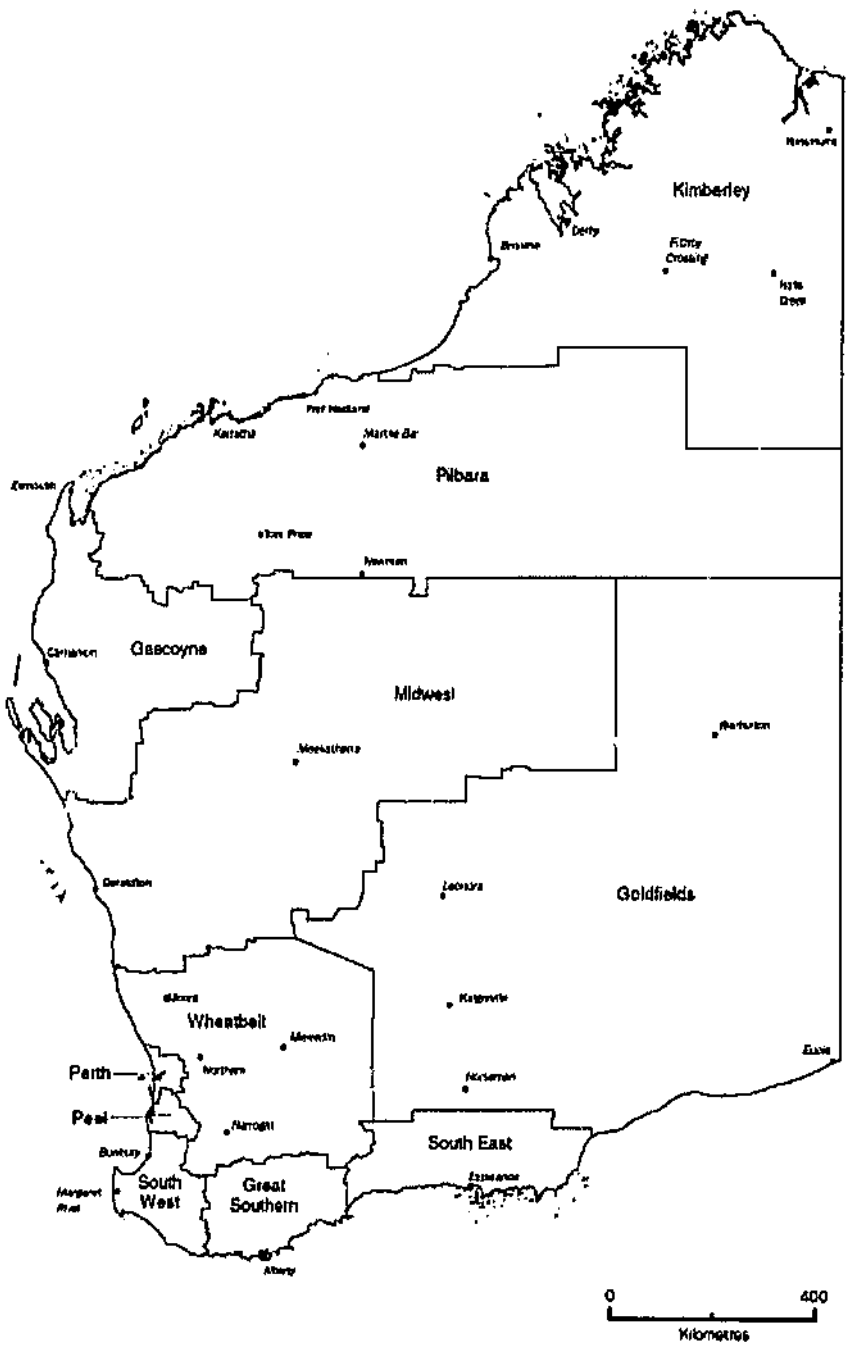
Source	Subject	Year	Subject Material Covered
Other Sources of Tourism Data			
Australian Bureau of Statistics	Regional Profiles		
Australian Bureau of Statistics	Business Register Tables		
Australian Bureau of Statistics	Tourist Accommodation Small Area Data		
Australian Bureau of Statistics	Tourism Indicators		
Bureau of Tourism Research	National and International Visitor Surveys		
Department of Conservation and Land Management	RATIS and VISTAT Systems		Record field data on person visits to national parks – some traffic counter, some ranger collected
Department of Conservation and Land Management	Operator Licenses issued		
Western Australian Tourism Commission	Visitor Arrivals to Tourist Bureaux		
Western Australian Tourism Commission	Tourism Operators Database		
Western Australian Tourism Commission	Tourism Development Register		

Appendix 3: Bureau of Tourism Research Expenditure Categories

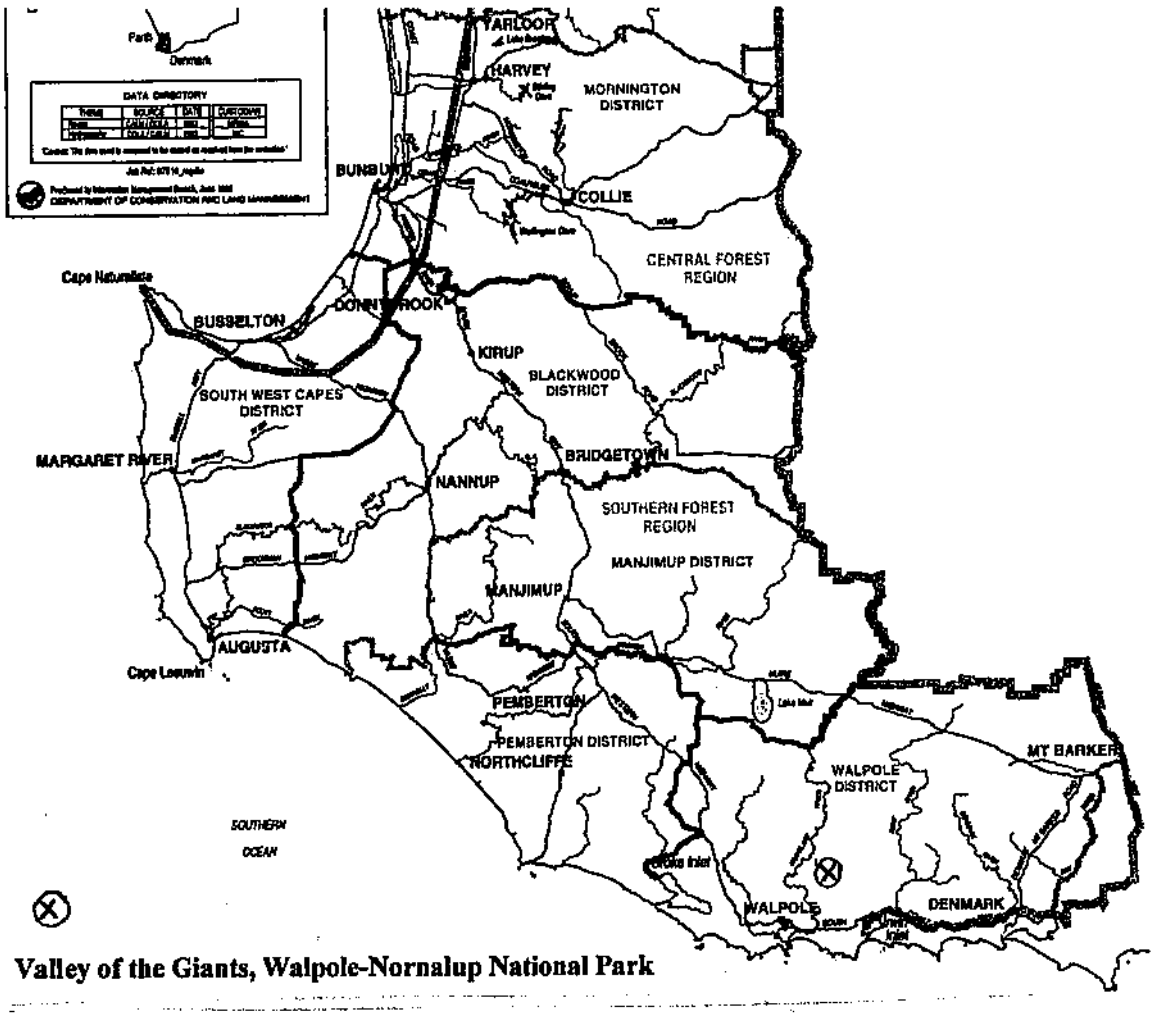
Organised tours
Domestic airfares
International airfares bought in Australia
Other transport fares
Rental and leasing fees for self-drive cars, rent-a-cars, camper vans, and petrol
Shopping
Food, drink and accommodation
Horse racing and gambling
Entertainment
Purchase of motor vehicles
Education fees
Phone, fax and or postage

Ashford, G. (2002). Personal Communication, Research Assistant, Western Australian Tourism Commission. Perth.

Appendix 4: Bureau of Tourism Research Regions (Bureau of Tourism Research, 2002)



Appendix 5: Valley of the Giants, Walpole-Nornalup National Park, Western Australia (Map adapted from Commonwealth of Australia and the Western Australian Regional Forest Agreement (RFA) Steering Committee, 1998, p.2)



Valley of the Giants, Walpole-Nornalup National Park

Appendix 6: Survey

[printed on Edith Cowan University letterhead]

CONFIDENTIAL VISITOR SURVEY
Edith Cowan University

This questionnaire has been prepared by Rachel Goff, a Masters research student, on behalf of Edith Cowan University, the Department of Conservation and Land Management and the Co-operative Research Centre for Sustainable Tourism. The research is aimed at determining the value of our forests in terms of tourism and recreation. This information will aid Government decision making on appropriate land use strategies and in the provision of National Park services that meet the current and future needs of the community. I hope that you can spare a few minutes to answer the questions in this survey.

All your answers are for research purposes only and will be kept strictly confidential.

How to fill out this questionnaire

- **Select one member of your group to answer the following questions.**
- **Simply circle the appropriate answer or write your answer in the space provided.**

If you have any problems with answering the questions or any queries in relation to the research, please contact:

Rachel Goff
Edith Cowan University
Joondalup Campus
100 Joondalup Drive
Joondalup 6062
Ph. 08 9400 5438
Email: r.goff@ecu.edu.au

Thank you for allocating some of your holiday time to complete the survey. Your contribution is important. Enjoy your stay in the region.

1. **How many people are there in your group currently visiting the Valley of the Giants?**

Adults (18 and over) _____ Children _____

2. **What is your usual place of residence?**

Country _____ Town/City _____

State _____ Postcode _____

3. **How important would you rate the forests to your visit to this region?**

A Very important B Moderately important C Not important

4. **How many days/ hours is your whole trip?** _____

5. **Name the main places you have visited/ aim to visit on your entire trip?**

_____

6. **If you did not travel from your usual place of residence today, which town did you spend last night?** _____

7. **How long will you spend in the Manjimup/ Walpole/ Denmark region?**

(use hours and days) _____

8. **What is the main reason for visiting this region?**

_____

9. **Please provide an estimate of how many kilometres your entire return trip will take?**

_____

10. **What mode of transport did you use to travel to the national park?**

A private vehicle **B hire vehicle**

C tour coach **D other?** _____

11. **Had you known that the Valley of the Giants site was closed prior to embarking on your trip would you have still visited the Manjimup/ Walpole/ Denmark region?**

A Yes **B No**

Why or why not? _____

Thank you for answering the questions to date. To ensure that our sample is representative, we ask that you and your group also answer the following questions on the next page. The information you provide will help in determining future park management strategies and economic benefits to the local community.

12. For each member of your group, please indicate age, gender and before tax, gross income (adult members only).

Income scale (please use number to identify income level – this is anonymous)
1 < 15,000
2 15,000 – 30,000
3 30,000 – 45,000
4 45,000 – 60,000
5 60,000+

Group Member	Age	Gender (M/F)	Income (1-5 above)
Self			
2			
3			
4			
5			
6			
7			
8			

13. Thank you for your cooperation. If you have time, the following information will assist greatly in determining the economic benefits to the local community. Please estimate the amount your group has spent (or will spend) on the following items where those purchases were (or will be) made for the full trip from your usual place of residence and return.

Expenditure	Manjimup/ Walpole/ Denmark Region	Rest of WA	Interstate	Overseas
Accommodation				
Meals in restaurants/ cafes				
Fares, car rentals, tour costs				
Petrol, oil, repairs				
Airfares				
Camping gear, specialised equipment				
Park Fees				
Other				

Thank you.