

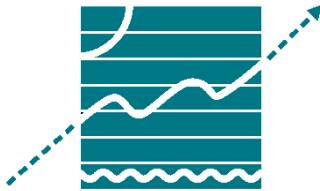
Impacts of Protected Areas on the Regional Economy of North-East NSW

A STUDY PREPARED

FOR

NSW DEPARTMENT OF ENVIRONMENT AND CONSERVATION

BY



GILLESPIE ECONOMICS

August 2006

Department of **Environment and Conservation** NSW



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Executive Summary

Protected areas can provide a range of economic values to society including those associated with recreation and conservation. Visitation to, and management of protected areas, also provides stimulation to regional economies from the expenditures that occur within the region.

Gillespie Economics (2004) estimated the regional economic impacts of the following seven national parks using data collected by Buultjens and Luckie (2002):

- Yuraygir;
- Nightcap;
- Border Ranges;
- Boonoo Boonoo;
- Bald Rock;
- Gibraltar Range; and
- Washpool.

This study extends the Gillespie Economics (2004) analysis to include all protected areas in the north-east region of NSW. Newly collected Department of Environment and Conservation (DEC) park management expenditure data for the region is used to assess the regional economic impacts of all DEC management in the region. The results of Gillespie Economics (2004) for visitation to the seven national parks are extrapolated to other reserves in the region that have over 1,500 visitors per annum.

While the Buultjens and Luckie survey data was suitable for regional economic impact assessment, it also included the basic information requirements identified by Bennett (1995) for application of the zonal travel cost method (TCM) for estimating recreation values.

This study therefore also reports on the results of applying the TCM to the seven national parks that were the subject of the Buultjens and Luckie study. The TCM results were extrapolated to other reserves in the region that have over 1,500 visitors per annum.

The reported 5,891,684 visitors per year to protected areas in the north-east of NSW and park management expenditure were estimated to make the following total contribution to the regional economy.

Table ES1 – Regional Economic Impact of Protected Areas in North East NSW

	Visitor Expenditure	Park Management Expenditure	TOTAL
Total output	\$225M	\$29M	\$254M
Total value-added	\$107M	\$17M	\$124M
Total income	\$59M	\$13M	\$72M
Total jobs	1,651	265	1,916

The economic value (consumer surplus) of visits to seven national parks was estimated using the TCM at between \$25 and \$50 per person, which equates to an annual value of \$188M when extrapolated to all protected area visitation in the region.

1.0 Introduction

Protected areas can provide a range of economic values to society including those associated with recreation and conservation. Visitation to, and management of protected areas, also provides stimulation to regional economies from the expenditures that occur within the region.

Buultjens and Luckie (2002) estimated the regional economic impact of seven national parks in north-eastern NSW using primary visitor and national park expenditure data and output multipliers and employment/output ratios obtained from other studies. The parks assessed were:

- Yuraygir;
- Nightcap;
- Border Ranges;
- Boonoo Boonoo;
- Bald Rock;
- Gibraltar Range; and
- Washpool.

Gillespie Economics (2004) re-estimated the regional economic impacts for the same seven national parks using the data collected by Buultjens and Luckie together with input-output analysis techniques to estimate multiplier effects.

This study extends the Gillespie Economics (2004) analysis to include all protected areas in the north-east region of NSW. Newly collected Department of Environment and Conservation (DEC) park management expenditure data for the whole region is used to assess the regional economic impacts of all DEC management in the region. Gillespie Economics' (2004) assessment of Buultjens and Luckie's visitor expenditure data is extrapolated to other reserves in the region to enable the regional impacts of visitation to these reserves to be estimated.

While the Buultjens and Luckie survey data was suitable for regional economic impact assessment, it also included the basic information requirements identified by Bennett (1995) for application of the zonal travel cost method (TCM) for estimating recreation values i.e.:

- Group size
- Postcode of normal place of residence;
- Whether the visit to the park was the sole purpose of the trip from home, and if not, the proportion of total enjoyment of the trip attributable to the NP visit.

This study therefore also reports on the results of undertaking the TCM for the seven national parks that were the subject of the Buultjens and Luckie study and extrapolating the results to all protected areas in the region.

2.0 Regional Economic Impact Assessment

2.1 Introduction

Regional economic impact assessment is primarily concerned with the effect of an impacting agent on an economy in terms of a number of specific indicators, such as employment, income, gross regional product and gross regional output.

These indicators can be defined as follows:

- **Gross regional output** - is the gross value of business turnover;
- **Value-added** – is the difference between the gross value of business turnover and the costs of the inputs of raw materials, purchased to produce the gross regional output;
- **Income** – is the wages paid to employees including imputed wages for self employed and business owners; and
- **Employment** – is the number of people employed (including full-time and part-time).

An impacting agent may be a change to a regional economy or may be an existing activity within an economy (Powell *et al.*, 1985; Jensen and West 1986). This assessment is concerned with the likely impact of an existing activity i.e. visitation to, and operation of, all protected areas in the north-east of NSW.

This study uses regional input-output analysis, which involves the:

- construction of an appropriate input-output table (or regional transaction table) that can be used to identify the economic structure of the region and multipliers (output, value-added, income and employment) for each sector of the economy; and
- identification of the initial impact or stimulus of visitors to the protected areas and management of the reserves in a form that is compatible with the input-output equations, so that the input-output multipliers and flow-on effects can then be estimated (West 1993).

2.2 Input Output Table

Consistent with the earlier Gillespie Economics study, the north-east region of NSW comprises the Richmond Tweed Statistical Division together with Copmanhurst, Maclean, Grafton, Pristine Waters, Glen Innes, Severn and Tenterfield Statistical Local Areas. The visitor data was defined over a slightly larger area, taking in Coffs Harbour and Dorrigo in the south, and the Shires of Guyra and Inverell in the west.

A 2001 input-output table of this regional economy was developed by Gillespie Economics (2004) using the Generation of Regional Input-output Tables (GRIT) procedure, developed by the University of Queensland and recognised internationally (refer to Appendix 1 for an overview of the GRIT procedure). This table is used again in this report and indexed to 2005 for the purpose of the initial analysis.

Table 2.1 - Aggregated Transactions Table: North-East NSW 2001 (\$000)

	Ag/Forest/ Fish	Mining	Manufact- uring	Utilities	Building	Services	TOTAL	H-hold Exp	O.F.D	Exports	Total
Ag/Forest/Fish	77,639	20	196,352	29	1,109	26,418	301,566	42,754	119,470	326,544	790,334
Mining	398	273	11,845	999	4,361	3,957	21,835	0	1,801	21,815	45,451
Manufacturing	49,107	1,977	202,217	4,678	129,975	229,529	617,484	324,005	-1,060,465	1,954,332	1,835,356
Utilities	5,890	347	25,314	19,460	1,234	67,428	119,673	67,381	51,231	6,299	244,585
Building	1,735	121	318	178	492	19,362	22,206	25,394	680,382	845	728,828
Services	105,897	7,813	297,821	24,127	114,374	1,587,380	2,137,412	1,507,315	2,327,854	1,052,939	7,025,521
Total Industry Purchase	240,666	10,550	733,868	49,471	251,546	1,934,075	3,220,176	1,966,849	2,120,274	3,362,776	10,670,075
H-hold Income	174,442	4,554	265,227	23,953	151,134	2,196,314	2,815,623	0	0	0	2,815,623
O.V.A.	229,861	19,467	312,683	114,470	183,723	1,891,300	2,751,505	205,005	0	0	2,956,509
Imports	145,365	10,879	523,578	56,692	142,425	1,003,832	1,882,771	744,318	0	0	2,627,089
Gross Output	790,334	45,451	1,835,356	244,585	728,828	7,025,521	10,670,075	2,916,172	2,120,274	3,362,776	19,069,297
Employment living inside region	7,512	91	6,696	444	3,842	60,159	78,743				
Employment living outside region	1,677	22	1,966	156	1,020	15,036	19,878				

Notes: Columns represent an industry or sector's purchases from other sectors, households, OVA and imports.

Rows represent an industry or sector's sales to other sectors, households, OFD and exports.

The household income row represents incomes received by employees who live and work in the region.

The OVA (other value-added) row includes gross operating surplus, depreciation net indirect taxes and subsidies and wages paid to employees who reside outside the region.

The household expenditure column represents final demand purchase by households in the region.

The OFD (other final demand) column which includes stock changes, capital expenditure and government expenditure.

3.0 Expenditure Associated with Protected Areas in North-east NSW

The economic stimulus provided to regional economies by protected areas arises from two sources:

- expenditure in the region by visitors to the protected areas; and.
- expenditure in the region that is associated with the management of reserves.

3.1 Visitor Expenditure

NSW DEC identified that it manages in the order of 167 protected areas in this region, comprising over 445,000ha.

Gillespie Economics (2004) reported the regional economic impacts of visitation to seven national parks based on detailed visitor expenditure data collected by Bultjens and Luckie (2002). To extrapolate these results to all the protected areas in the north-east of NSW, visitor estimates for each reserve in the region were collated. For the purpose of the analysis only the 51 reserves with visitation estimated at above 1,500pa were included (refer to Appendix 3 for a description of each of the protected areas included).

Each reserve was then categorised for its similarity to one of the seven original national parks studied, with an implied assumption that visitation pattern and expenditure pattern in the region would be similar. Visitation estimates and categorisation of reserves is provided in Table 3.1.

The total visitation associated with each category of reserve was then calculated. The original economic impacts for each national park, estimated by Gillespie Economics (2004) were then adjusted pro-rata to the region-wide visitation levels for that type of reserve (including a CPI adjustment to 2005).

Table 3.2 shows the original visitation estimates for each of the seven national parks and the estimated total visitation levels to the same type of reserve in the region.

Table 3.2 – Annual Park Visitation

National Park	Annual No. Visitors	Annual Visitation to Similar Types of Reserves in the Region
Yuraygir	450,000	2,940,000
Nightcap	87,289	1,795,000
Border Ranges	37,691	592,500
Boonoo Boonoo	15,993	139,000
Bald Rock	17,770	85,000
Gibraltar	19,220	253,022
Washpool	7,688	87,162
Total		5,891,684

Source: Adapted from Bultjens and Luckie (2002)

Table 3.1 – Reserves in the North East of NSW

Reserve Name	LGA	Visitor Numbers	Area (ha)	Similarity to Surveyed Parks
Nymboida National Park	Pristine Waters, Severn	1,500	38,119	Gibraltar Range
Warra National Park	Severn	1,500	2,031	Border Ranges
Boatharbour Nature Reserve	Lismore	2,000	24	Border Ranges
Couchy Creek Nature Reserve	Tweed	2,000	218	Border Ranges
Mount Hyland Nature Reserve	Pristine Waters	2,000	2,519	Border Ranges
Muckleewee Mountain Nature Reserve	Lismore	2,000	355	Border Ranges
Limpinwood Nature Reserve	Tweed	3,000	2,647	Border Ranges
Bindarri National Park	Bellingen, Coffs Harbour	5,000	5,499	Border Ranges
Bongil Bongil National Park	Bellingen, Coffs Harbour	5,000	4,143	Border Ranges
Cascade National Park	Bellingen	5,000	3,605	Border Ranges
Coramba Nature Reserve	Coffs Harbour	5,000	9	Border Ranges
Iluka Nature Reserve	Maclean	5,000	136	Border Ranges
Mebbin National Park	Tweed	5,000	3,792	Border Ranges
Nymboi-Binderay National Park	Bellingen, Clarence Valley	5,000	16,874	Gibraltar Range
Richmond Range National Park	Kyogle	5,000	15,766	Boonoo Boonoo
Toonumbar National Park	Kyogle	5,000	15,003	Bald Rock
Tyagarah Nature Reserve	Byron	5,000	875	Border Ranges
Wooyung Nature Reserve	Tweed	5,000	87	Border Ranges
Basket Swamp National Park	Tenterfield	10,000	2,811	Boonoo Boonoo
Broken Head Nature Reserve	Byron	10,000	101	Border Ranges
Kwiambal National Park	Inverell	10,000	1,362	Boonoo Boonoo
Mann River Nature Reserve	Severn	10,000	7,222	Gibraltar Range
Sherwood Nature Reserve	Pristine Waters	10,000	4,876	Border Ranges
Ukerebagh Island Nature Reserve	Tweed	10,000	120	Border Ranges
Arakwal National Park	Byron	20,000	186	Yuraygir
Cathedral Rock National Park	Armidale, Dumaresq, Guyra	20,000	10,800	Bald Rock
Victoria Park Nature Reserve	Lismore	20,000	17	Border Ranges
Boonoo Boonoo National Park	Tenterfield	24,000	4,421	Boonoo Boonoo
Washpool National Park	Copmanhurst, Severn, Tenterfield	29,054	66,186	Washpool
Guy Fawkes River National Park	Pristine Waters, Severn	30,000	53,349	Boonoo Boonoo
New England National Park	Pristine Waters	30,000	23,691	Boonoo Boonoo
Broadwater National Park	Richmond Valley	35,600	4,066	Gibraltar Range
Bald Rock National Park	Tenterfield	40,000	8,932	Bald Rock
Gibraltar Range National Park	Pristine Waters, Severn	47,211	25,423	Gibraltar Range
Billinudgel Nature Reserve	Byron, Tweed	50,000	740	Border Ranges
Border Ranges National Park	Kyogle, Tweed	50,000	31,993	Border Ranges
Marshalls Creek Nature Reserve	Byron	50,000	113	Border Ranges
Mount Jerusalem National Park	Byron, Tweed	50,000	5,142	Gibraltar Range
Bundjalung National Park	Maclean, Richmond Valley	60,000	20,918	Yuraygir
Richmond River Nature Reserve	Ballina	60,000	252	Border Ranges
Tweed Heads Historic Site	Tweed	60,000	8	Nightcap
Numinbah Nature Reserve	Tweed	70,000	895	Border Ranges
Whian Whian SCA	Lismore	80,000	2,269	Nightcap
Mount Warning National Park	Tweed	85,000	2,619	Nightcap
Brunswick Heads Nature Reserve	Byron	100,000	210	Border Ranges
Dorrigo National Park	Bellingen, Coffs Harbour	160,000	11,764	Nightcap
Nightcap National Park	Byron, Lismore, Tweed	250,000	8,042	Nightcap
Muttonbird Island Nature Reserve	Coffs Harbour	500,000	12	Nightcap
Yuraygir National Park	Maclean, Pristine Waters	500,000	36,271	Yuraygir
Cape Byron State Conservation Area	Byron	800,000	102	Yuraygir
Coffs Coast Regional Park	Coffs Harbour	1,000,000	369	Yuraygir

3.2 DEC Management Expenditure

To estimate regional economic impacts of DEC management expenditure, new data was collected from DEC for the 2004-05 financial year. This data was available on a management region and management area basis rather than a park-by-park basis. The raw data is provided in Table 3.3.

In order to assess the regional economic of this expenditure, the data was converted to a format consistent with the input-output table for the region:

- wages were allocated to the household row;
- direct employment was allocated to the employment row;
- intermediate expenditures were:
 - allocated to the relevant 106 intermediate sector;
 - adjusted for margins and taxes, with margins allocated to the appropriate sector, taxes allocated to the OVA and basic values (purchaser prices less margins and taxes) allocated to the appropriate intermediate sector;
 - location quotients were used to adjust basic values allocated to intermediate sectors to reflect the region's capacity to produce these goods.

For the purpose of determining the total impact of DEC management expenditure, the regional input-output table was manipulated by inserting the expenditures of a new sector and balancing this from the sector in which national parks would normally be located i.e. *Libraries, Museums and Arts*.

Table 3.3 – DEC Expenditure in North Eastern NSW

		North Coast Management region spent in study region	Northern Rivers Management region spent in study region	Northern Rivers				North Coast Region			Northern Tablelands Region	
		all areas	all areas	Byron Coast Exp in study region	Tweed Exp in study region	Kyogle Exp in study region	Richmond River Exp in study region	Clarence North Exp in study region	Clarence South Exp in study region	Dorrigo Exp in study region	Tenterfield Exp in study region	Glen Innes Exp in study region
Area management staff numbers (regional)		11	14	25	14	16	16	12	12	8	11	18
Employee Related	Salaries & Wages Total	\$1,233,511	\$766,559	\$848,776	\$751,487	\$900,190	\$915,980	\$574,607	\$568,504	\$164,880	\$880,577	\$885,930
	Fringe Benefits Tax	\$4,944	\$3,366	\$0	\$1,918	\$0	\$2,945	\$0	\$0	\$0	\$768	\$0
	Meal Allowances	\$199	\$82	\$432	\$0	\$21	\$41	\$0	\$109	\$36	\$1,089	\$82
Communication	Communication Total	\$32,670	\$0	\$0	\$0	\$0	\$0	\$9,495	\$7,005	\$711	\$8,217	\$8,556
Energy	Total Electricity	\$18,898	\$0	\$0	\$0	\$0	\$0	\$2,047	\$1,414	\$0	\$0	\$0
	Total Fuels	\$4,124	\$307	\$200	\$149	\$126	\$4,856	\$7,069	\$14,619	\$451	\$19,080	\$15,835
Fees & Services (includes contractors)	Fees for Services - General	\$31,775	\$38,030	\$54,582	\$11,679	\$21,124	\$64,740	\$47,094	\$28,078	\$30,343	\$12,002	\$8,582
	Fees - Board/Committee Members	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$693
	Fees -training	\$28,623	\$19,081	\$14,534	-\$231	\$553	\$4,821	\$704	\$144	\$7,927	\$4,065	\$3,084
	Fees - Conferences	\$842	\$621	\$0	\$0	\$270	\$0	\$0	\$180	\$0	\$0	\$0
	Corporate Membership Fees Only	\$0	\$0	\$0	\$0	\$0	\$0	\$59	\$0	\$0	\$0	\$0
	Valuer General Fees	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Fees - Licences	\$157	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$6	\$168
	Consultants (primarily for expert advice)	\$0	\$0	\$7,358	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Contractors (non-asset maintenance)	\$98,595	\$10,627	\$989	\$38,943	\$13,923	\$20,509	\$7,195	\$13,137	\$164	\$47,820	\$60,820
	Employment Agency (temporary staff)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$620	\$37
	Contractors -Waster Collection	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$989	\$1,057
	Plant and Equipment - Hire of	\$2,003	\$929	\$3,312	\$10,332	\$12,027	\$5,163	\$27,235	\$13,851	\$1,200	\$22,272	\$16,208
	Fees - Catering	\$5,673	\$10,564	\$11,814	\$612	\$3,555	\$4,389	\$777	\$373	\$6,290	\$3,074	\$2,144
	Media Monitoring	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Information Dissemination	Total Advertising	\$14,404	\$2,001	\$0	\$584	\$480	\$1,194	\$2,968	\$1,940	\$0	\$469	\$1,173
	Printing and Publishing	\$14,749	\$9,084	\$2,715	\$0	\$630	\$1,815	\$77	\$158	\$0	\$30	\$0
	Total Purchases	\$1,922	\$814	\$0	\$369	\$162	\$447	\$9	\$73	\$0	\$11	\$74
	Publicity and Education (Promotion)	\$360	\$500	\$3	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$477
Insurance Premiums	Insurance Total	\$4,876	\$0	\$0	\$0	\$0	\$0	\$1,593	\$1,479	\$1,155	\$0	\$0
Legal	Legal Costs Total	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Occupancy	Total cleaning	\$18,494	\$12,360	\$0	\$1,351	\$7,365	\$7	\$566	\$0	\$0	\$2,458	\$5,679
	Rates - Council	\$0	\$1,665	\$2,696	\$0	\$3,984	\$1,799	\$0	\$0	\$0	\$1,761	\$250
	Rates - water/sewerage	\$0	\$661	\$3,691	\$89	\$613	\$113	\$7	\$0	\$0	\$77	\$62
	Rates - Fire Brigade Levies	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Total Rent	\$149,541	\$155,023	\$0	\$71,643	\$65,480	\$55,026	\$0	\$375	\$0	\$227	\$88,563
	Occupancy Refurbishment Costs	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Stores & Minor Assets	Purchase of Stocks for Resale	\$233,948	\$7,838	\$55,048	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Stores & Stationary - Office Supplies	\$23,034	\$639	\$176	\$341	\$951	\$206	\$2,614	\$2,051	\$537	\$6,765	\$8,788
	Stores - Field Consumables	\$5,328	\$10,889	\$738	\$10,272	\$13,717	\$13,109	\$10,663	\$25,302	\$985	\$28,830	\$7,079
	Uniforms and Protective Clothing	\$12,907	\$0	\$0	\$0	\$0	\$0	\$3,438	\$2,381	\$431	\$5,567	\$4,309
	Motor Vehicles (<\$5000)	\$0	\$0	\$0	\$0	\$0	\$0	\$42	\$40	\$0	\$688	\$0
	Plant & Equipment (<\$5000)	\$16,109	\$26,338	\$2,276	\$5,991	\$26,054	\$14,830	\$15,806	\$19,098	\$1,085	\$10,922	\$10,551
	Computer Hardware (<\$5000)	\$452	\$0	\$0	\$0	\$0	\$0	\$315	\$0	\$0	\$0	\$0
	Computer Software(<\$5000)	\$1,345	\$0	\$0	\$0	\$0	\$0	\$139	\$0	\$0	\$0	\$0
	Furniture & Fittings (<\$5000)	\$4,709	\$0	\$8,341	\$1,079	\$0	\$8,223	\$2,770	\$1,050	\$45	\$0	\$1,586
Travel	Total Travel	\$16,643	\$10,018	\$2,050	\$1,511	\$3,926	\$2,697	\$4,860	\$2,915	\$2,929	\$4,022	\$1,237
	Motor Vehicle - Fuel & Oil	\$13,377	\$0	\$0	\$0	\$0	\$0	\$16,796	\$29,278	\$2,515	\$28,017	\$28,777
	Motor Vehicle - Lease	\$45,187	\$0	\$0	\$0	\$0	\$0	\$36,911	\$41,110	\$4,137	\$0	\$0
	Motor Vehicle - registration	\$6,633	\$0	\$0	\$0	\$0	\$0	\$1,642	\$563	\$0	\$0	\$0
	Aircraft - Hire - External	\$7,953	\$0	\$0	\$0	\$0	\$0	\$0	\$2,740	\$0	\$600	\$8,115
	Aircraft - Hire - Internal	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$13,970	\$0
Other (includes Audit, Bank, Bad Debts, cost of sales, Non-salary oncosts)	Bank	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Purchasing Card Expenditure - needing approval	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$87
	Bad Debts - written off (includes EOY doubtful)	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Miscellaneous Expenses	\$355	\$0	\$0	\$0	\$0	\$0	\$708	\$165	\$312	\$59	\$843
	On-costs - administrative (non-salary)	\$0	\$0	\$0	\$0	\$0	\$0	\$176	\$0	\$0	\$0	\$0
Asset maintenance	Asset Maintenance - Bulk stores	\$3,228	\$105	\$0	\$0	\$408	\$2,423	\$3,770	\$445	\$0	\$2,000	\$13,986
	Asset Maintenance - Buildings - Commercial - materials	\$856	\$5,157	\$13,660	\$1,472	\$1,220	\$7,336	\$2,963	\$396	\$9,228	\$0	\$3,459
	Asset Maintenance - Buildings - Commercial - contractors	\$10,523	\$3,539	\$76,285	\$492	\$227	\$3,052	\$3,761	\$53,624	\$3,452	\$116	\$116
	Asset Maintenance - Buildings - residential - materials	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
	Asset Maintenance - Road & Other Access - Materials	\$0	\$2,280	\$3,102	\$27,427	\$36,961	\$13,319	\$10,385	\$12,036	\$0	\$5,039	\$25,470
	Asset Maintenance - Road & Other Access - contractors	\$4,494	\$14,530	\$46,323	\$37,629	\$13,501	\$24,632	\$1,440	\$21,193	\$0	\$12,704	\$7,504
	Asset Maintenance -Utilities & Infrastructure - Materials	\$3,406	\$367	\$108,357	\$6,398	\$8,541	\$10,790	\$1,385	\$39,190	\$30,555	\$13,369	\$7,270
	Asset Maintenance -Utilities & Infrastructure - Contractors	\$613	\$874	\$41,611	\$7,785	\$7,020	\$20,225	\$5,650	\$3,664	\$20,993	\$6,977	\$933
	Asset Maintenance - Motor Vehicles - materials	\$1,412	\$264	\$292	\$227	\$600	\$937	\$606	\$5,595	\$677	\$471	\$382
	Asset Maintenance - Motor Vehicles - contractors	\$9,646	\$707	\$197	\$950	\$3,197	\$2,248	\$8,681	\$12,040	\$0	\$12,005	\$16,910

4.0 Regional Economic Impacts

4.1 Visitor Expenditure Impacts 2005

Based on the assumptions and procedures identified in Section 3.1, Tables 4.1 summarises the total impacts to the economy of north-east NSW from the expenditure of 5,891,684 visits to 51 protected areas. The associated multipliers are summarised in Table 4.2.

Table 4.1 – Regional Economic Impacts of Visitor Expenditure

Output (\$000)	Direct Effect	Production Induced	Consumpt. Induced	Total Flow-on	TOTAL EFFECT
Baldrock Like	754	377	383	760	1,514
Boonoo Like	848	419	415	834	1,683
Border Ranges Like	2,237	1,046	1,139	2,186	4,422
Gibraltar Range Like	2,694	1,228	1,413	2,641	5,335
Nightcap Like	23,432	11,465	12,057	23,522	46,954
Washpool Like	507	233	270	504	1,010
Yuraygir Like	81,036	38,731	43,834	82,565	163,602
Total	111,507	53,498	59,513	113,011	224,518
Value Added (\$000)					
Baldrock Like	354	176	188	363	717
Boonoo Like	397	195	203	398	795
Border Ranges Like	1,087	491	557	1,049	2,136
Gibraltar Range Like	1,313	581	691	1,272	2,585
Nightcap Like	11,128	5,357	5,898	11,255	22,384
Washpool Like	243	111	132	243	486
Yuraygir Like	38,263	18,377	21,442	39,819	78,082
Total	52,784	25,288	29,111	54,399	107,184
Income (\$000)					
Baldrock Like	195	85	103	187	382
Boonoo Like	210	94	111	205	414
Border Ranges Like	594	238	305	543	1,136
Gibraltar Range Like	748	283	378	661	1,409
Nightcap Like	6,212	2,587	3,226	5,814	12,026
Washpool Like	143	54	72	127	270
Yuraygir Like	23,058	8,934	11,730	20,664	43,722
Total	31,160	12,275	15,925	28,200	59,360
Employment (No.)					
Baldrock Like	6	2	2	4	11
Boonoo Like	7	2	3	5	12
Border Ranges Like	19	5	7	12	32
Gibraltar Range Like	24	6	9	15	38
Nightcap Like	203	52	77	129	332
Washpool Like	5	1	2	3	8
Yuraygir Like	762	178	280	457	1,219
Total	1,027	244	380	624	1,651
TOTAL					
Output (\$000)	111,507	53,498	59,513	113,011	224,518
Value-added (\$000)	52,784	25,288	29,111	54,399	107,184
Income (\$000)	31,160	12,275	15,925	28,200	59,360
Employment No.	1,027	244	380	624	1,651

Table 4.2 – Regional Multipliers

Output	Direct Effect	Production Induced	Consumpt. Induced	Total Flow-on	TOTAL EFFECT
Baldrock	1.00	0.50	0.51	1.01	2.01
Boonoo	1.00	0.49	0.49	0.98	1.98
Border Ranges	1.00	0.47	0.51	0.98	1.98
Gibraltar Range	1.00	0.46	0.52	0.98	1.98
Nightcap	1.00	0.49	0.51	1.00	2.00
Washpool	1.00	0.46	0.53	0.99	1.99
Yuraygir	1.00	0.48	0.54	1.02	2.02
Value Added					
Baldrock	1.00	0.50	0.53	1.03	2.03
Boonoo	1.00	0.49	0.51	1.00	2.00
Border Ranges	1.00	0.45	0.51	0.96	1.96
Gibraltar Range	1.00	0.44	0.53	0.97	1.97
Nightcap	1.00	0.48	0.53	1.01	2.01
Washpool	1.00	0.46	0.55	1.00	2.00
Yuraygir	1.00	0.48	0.56	1.04	2.04
Income					
Baldrock	1.00	0.43	0.53	0.96	1.96
Boonoo	1.00	0.45	0.53	0.98	1.98
Border Ranges	1.00	0.40	0.51	0.91	1.91
Gibraltar Range	1.00	0.38	0.51	0.88	1.88
Nightcap	1.00	0.42	0.52	0.94	1.94
Washpool	1.00	0.38	0.51	0.88	1.88
Yuraygir	1.00	0.39	0.51	0.90	1.90
Employment					
Baldrock	1.00	0.26	0.38	0.64	1.64
Boonoo	1.00	0.26	0.37	0.62	1.62
Border Ranges	1.00	0.24	0.37	0.61	1.62
Gibraltar Range	1.00	0.23	0.38	0.61	1.61
Nightcap	1.00	0.25	0.38	0.63	1.63
Washpool	1.00	0.21	0.36	0.60	1.60
Yuraygir	1.00	0.23	0.37	0.60	1.60

In total the annual regional economic impact of the expenditure of visitors to protected areas of the north-east of NSW are estimated at:

- \$225M in direct and indirect output or business turnover;
- \$107M in direct and indirect value-added;
- \$59M in direct and indirect income; and
- 1,651 direct and indirect jobs.

4.2 Impacts of Management Expenditure

Table 4.3 summarises the direct and indirect regional economic impacts associated with the management of protected areas in the north-east of NSW.

Table 4.3 - Regional Economic Impacts of Management of Protected Areas

	Direct Effect	Production Induced	Consumpt. Induced	Total flow-on	TOTAL EFFECT
Output (\$000)	12,453	3,855	12,980	16,835	29,288
<i>Type 11A Multiplier</i>	<i>1.00</i>	<i>0.31</i>	<i>1.04</i>	<i>1.35</i>	<i>2.35</i>
Value Added (\$000)	8,609	1,876	6,351	8,227	16,836
<i>Type 11A Multiplier</i>	<i>1.00</i>	<i>0.22</i>	<i>0.74</i>	<i>0.96</i>	<i>1.96</i>
Income (\$000)	8,493	988	3,472	4,460	12,953
<i>Type 11A Multiplier</i>	<i>1.00</i>	<i>0.12</i>	<i>0.41</i>	<i>0.53</i>	<i>1.53</i>
Employment (No.)	157	19	89	108	265
<i>Type 11A Multiplier</i>	<i>1.00</i>	<i>0.12</i>	<i>0.57</i>	<i>0.69</i>	<i>1.69</i>

In total the annual regional economic impact of management expenditure for protected areas in the north-east of NSW are estimated at:

- \$29M in direct and indirect output or business turnover;
- \$17M in direct and indirect value-added;
- \$13M in direct and indirect income; and
- 265 direct and indirect jobs.

5.0 Economic Value of Recreation

Examination of the Buultjens and Luckie survey data indicated that it included the basic information requirements identified by Bennett (1995) for application of the zonal TCM for estimating recreation values i.e.:

- Group size
- Postcode of normal place of residence;
- Whether the visit to the park was the sole purpose of the trip from home, and if not, the proportion of total enjoyment of the trip attributable to the NP visit;

The approach taken follows that used by Gillespie (1997) for Minnamurra Rainforest Centre, Budderoo National Park:

- Data was sorted by zones based on postcodes;
- The visitation rate to the national park per 1,000 head of population in each zone was estimated;
- The average marginal return travel cost from each zone to the national park was estimated based on return travel distance, an assumed average vehicle speed and Royal Automobile Club of Victoria estimates of marginal vehicle operating costs;
- An estimate of opportunity costs of travel time was made based on the literature. Refer to Gillespie (1997);
- Total travel costs (vehicle operating costs and opportunity costs of travel time) were apportioned for each zone based on whether the visit to the park was the sole purpose of the trip from home, and if not, the proportion of total enjoyment of the trip attributable to the national park visit.

Zone data for each national park is provided in Appendix 4. The visitation rate – travel cost relationship for each of the national parks is graphed in Appendix 5.

For all travel cost-visitation rate data a double log function form was used for the regression. The results are provided in Table 5.1.

Table 5.1 - Travel Cost-Visitation Rate Relationship

		Coefficients	P-value	R Squared
Boonoo Boonoo	Intercept	8.46	2.37E-05	0.87
	LN TC per person	-1.95	7.43E-05	
Yuraygir	Intercept	14.94	3.17E-07	0.82
	LN TC per person	-2.52	9.82E-06	
Gibraltar	Intercept	12.29	9.06E-08	0.90
	LN TC per person	-2.58	7.81E-07	
Washpool	Intercept	10.47	1.87E-04	0.83
	LN TC per person	-2.20	6.61E-04	
Nightcap	Intercept	8.65	1.45E-05	0.66
	LN TC per person	-1.53	7.67E-04	
Border Ranges	Intercept	10.12	2.26E-06	0.85
	LN TC per person	-2.12	1.76E-05	
Bald Rock	Intercept	9.10	1.01E-04	0.74
	LN TC per person	-1.99	6.32E-04	

In all cases the intercept and travel cost coefficient were highly significant and R-squared ranged from 0.66 to 0.90. These travel cost-visitation rate relationships reported in Table 5.1

were then used to establish the visitation pattern, if the fee associated with visiting the park were increased in \$5 increments (i.e. a demand curve).

These demand curves are graphed in Appendix 6 and the double log statistical relationship reported in Table 5.2.

Table 5.2 – Demand Curves

		Coefficients	P-value	R Square
Boonoo Boonoo	Intercept	18.51	2.79E-13	0.92
	LN Visits	-1.66	1.17E-11	
Yuraygir	Intercept	23.74	3.00E-13	0.92
	LN Visits	-1.71	5.22E-12	
Gibraltar	Intercept	16.04	5.35E-13	0.90
	LN Visits	-1.36	4.10E-11	
Washpool	Intercept	18.61	1.66E-11	0.87
	LN Visits	-1.57	5.93E-10	
Nightcap	Intercept	8.65	1.45E-05	0.66
	LN TC per person	-1.53	7.67E-04	
Border Ranges	Intercept	18.74	1.35E-11	0.88
	LN Visits	-1.60	4.72E-10	
Bald Rock	Intercept	19.14	3.93E-12	0.89
	LN Visits	-1.62	1.33E-10	

Again the intercept and visits coefficient were highly significant with R-squareds ranging from 0.66 to 0.92.

The demand curves reported in Table 5.2 were then used to estimate the area under the demand curve with cut-offs at \$100 additional entry fee and at current estimated visitation levels for all parks. Refer to Table 3.1.

The average consumer surplus per visit to the seven national parks was extrapolated to the estimated total visitation level to the same type of reserve in the region to obtain an estimate of the economic value of all visits to protected areas in the region. Refer to Table 5.3.

Table 5.3 – Economic Value of Visits to Protected Areas in North East NSW

Protected Area	Visitation pa	CS/Visit	Economic Value of Visits
Baldrock Like Reserves	85,000	\$41	\$3,485,000
Boonoo Like Reserves	139,000	\$36	\$5,004,000
Border Ranges Like	592,500	\$30	\$17,775,000
Gibraltar Range Like	253,022	\$25	\$6,325,550
Nightcap Like	1,795,000	\$35	\$62,825,000
Washpool Like	87,162	\$50	\$4,358,100
Yuraygir Like	2,940,000	\$30	\$88,200,000
Total	5,891,684		\$187,972,650

6.0 Conclusion

Protected areas in the north-east of NSW are significant recreation and tourism destinations and contribute to regional economic activity through the expenditures made by the DEC and those made by visitors to the reserves. Using input-output analysis techniques this study estimated the magnitude of these regional economic impacts.

The estimated 5,891,684 visitors to protected areas in the north-east of NSW were estimated to contribute:

- \$225M in direct and indirect output or business turnover;
- \$107M in direct and indirect value-added;
- \$59M in direct and indirect income; and
- 1,651 direct and indirect jobs.

Expenditure by the DEC was estimated to contribute:

- \$29M in direct and indirect output or business turnover;
- \$17M in direct and indirect value-added;
- \$13M in direct and indirect income; and
- 265 direct and indirect jobs.

The economic value (consumer surplus) of visits to seven national parks was estimated using the travel cost method at between \$25 and \$50 per person, which equates to an annual value of \$188M when extrapolated to all protected area visitation in the region.

7.0 References

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APPENDICES

Appendix 1 – Generation of Regional Economic Impact Tables

“The GRIT system was designed to:

- combine the benefits of survey based tables (accuracy and understanding of the economic structure) with those of non-survey tables (speed and low cost);
- enable the tables to be compiled from other recently compiled tables;
- allow tables to be constructed for any region for which certain minimum amounts of data were available;
- develop regional tables from national tables using available region-specific data;
- produce tables consistent with the national tables in terms of sector classification and accounting conventions;
- proceed in a number of clearly defined stages; and
- provide for the possibility of ready updates of the tables.

The resultant GRIT procedure has a number of well-defined steps. Of particular significance are those that involve the analyst incorporating region-specific data and information specific to the objectives of the study. The analyst has to be satisfied about the accuracy of the information used for the important sectors; in this case the national parks sectors. The method allows the analyst to allocate available research resources to improving the data for those sectors of the economy that are most important for the study. It also means that the method should be used by an analyst who is familiar with the economy being modelled, or at least someone with that familiarity should be consulted.

An important characteristic of GRIT-produced tables relates to their accuracy. In the past, survey-based tables involved gathering data for every cell in the table, thereby building up a table with considerable accuracy. A fundamental principle of the GRIT method is that not all cells in the table are equally important. Some are not important because they are of very small value and, therefore, have no possibility of having a significant effect on the estimates of multipliers and economic impacts. Others are not important because of the lack of linkages that relate to the particular sectors that are being studied. Therefore, the GRIT procedure involves determining those sectors and, in some cases, cells that are of particular significance for the analysis. These represent the main targets for the allocation of research resources in data gathering. For the remainder of the table, the aim is for it to be 'holistically' accurate (Jensen 1980). That means a generally accurate representation of the economy is provided by the table, but does not guarantee the accuracy of any particular cell. A summary of the steps involved in the GRIT process is shown in Table A1 (Powell and Chalmers 1995, p13-14)

Table A1 - The GRIT Method

Phase	Step	Action
PHASE I		ADJUSTMENTS TO NATIONAL TABLE
	1	Selection of national input-output table. (106 sector table with direct allocation of all imports, in basic values)
	2	Adjustment of national table for updating.
	3	Adjustment for international trade.
PHASE II		ADJUSTMENTS FOR REGIONAL IMPORTS
		<i>(Steps 4-14 apply to each region for which input-output tables are required)</i>
	4	Calculation of 'non-existent' sectors.
	5	Calculation of remaining imports.
PHASE III		DEFINITION OF REGIONAL SECTORS
	6	Insertion of disaggregated superior data.
	7	Aggregation of sectors.
	8	Insertion of aggregated superior data.
PHASE IV		DERIVATION OF PROTOTYPE TRANSACTIONS TABLES
	9	Derivation of transactions values.
	10	Adjustments to complete the prototype tables.
	11	Derivation of inverses and multipliers for prototype tables.
PHASE V		DERIVATION OF FINAL TRANSACTIONS TABLES
	12	Final superior data insertions and other adjustments.
	13	Derivation of final transactions tables.
	14	Derivation of inverses and multipliers for final tables.

Source: Table 2 in Bayne and West (1988)

Appendix 2 – Multiplier Explanation

The calculation of multipliers from the input-output table is based on the following underlying assumptions:

- “there is a fixed input structure in each industry, described by fixed technological coefficients...;
- all products of an industry are identical or are made in fixed proportions to each other;
- each industry exhibits constant returns to scale in production;
- unlimited labour and capital are available at fixed prices.....; and
- there are no other constraints, such as the balance of payments or the actions of government, on the response of each industry to a stimulus.” (ABS 1995, p 24).

Multipliers therefore do not take account of economies of scale, unused capacity or technological change since they describe average effects rather than marginal effects (ABS 1995).

Multipliers indicate the total impact of changes in demand for the output of any one industry on all industries in an economy (ABS 1995). Conventional gross regional output, employment, gross regional product and income multipliers show the gross regional output, employment, gross regional product and income responses to an initial gross regional output stimulus (Jensen and West 1986).

Components of the conventional gross regional output multiplier are as follows:

Initial Effect - which is the initial output stimulus, usually a \$1 change in output from a particular industry (Powell and Chalmers 1995; ABS 1995).

First round effects - the amount of output from all intermediate sectors of the economy required to produce the initial \$1 change in output from the particular industry (Powell and Chalmers 1995; ABS 1995).

Industrial support effects - the subsequent or induced extra output from intermediate sectors arising from the first round effects (Powell and Chalmers 1995; ABS 1995).

Production induced effects - the sum of the first round effects and industrial support effects i.e. the total amount of output from all industries in the economy required to produce the initial \$1 change in output (Powell and Chalmers 1995; ABS 1995).

Consumption induced effects - the spending by households of the extra income they derive from the production of the extra \$1 of output and production induced effects. This spending in turn generates further production by industries (Powell and Chalmers 1995; ABS 1995).

The *simple multiplier* is the initial effect plus the production-induced effects.

The *total multiplier* is the sum of the initial effect plus the production-induced effect and consumption induced effect.

Conventional employment, gross regional product and income multipliers have similar components to the gross regional output multiplier, however, through conversion using the respective coefficients show the employment, gross regional product and income responses to an initial gross regional output stimulus (Jensen and West 1986).

For employment, gross regional product and income it is also possible to derive relationships between the initial or own sector effect and flow-on effects. For example, the flow-on income effects from an initial income effect or the flow-on employment effects from an initial employment effect etc. These own sector relationships are referred to as ratio multipliers, although they are not technically multipliers because there is no direct line of causation between the elements of the multiplier. For instance, it is not the initial change in income that leads to income flow-on effects, both are the result of an output stimulus (Jensen and West 1986).

A description of the different ratio multipliers is given below.

$$\text{Type 1A Ratio Multiplier} = \frac{\text{Initial} + \text{First Round Effects}}{\text{Initial Effects}}$$

$$\text{Type 1B Ratio Multiplier} = \frac{\text{Initial} + \text{Production Induced Effects}}{\text{Initial Effects}}$$

$$\text{Type 11A Ratio Multiplier} = \frac{\text{Initial} + \text{Production Induced} + \text{Consumption Induced Effects}}{\text{Initial Effects}}$$

$$\text{Type 11B Ratio Multiplier} = \frac{\text{Flow-on Effects}}{\text{Initial Effects}}$$

(Centre for Farm Planning and Land Management 1989, p.207)

Appendix 3 – Protected Areas of North- east NSW

1. Arakwal National Park

Located 2km South West of Byron Bay, this is a walking access reserve only, principally to conserve important Aboriginal cultural sites. There are coastal walking and beach related recreational activities available. There are picnic and day use facilities in adjoining reserves (Cape Byron SCA). The Arakwal Cultural Centre is proposed for development adjoining the park to inform visitors of the local Aboriginal culture and is expected to be a major visitor destination.

2. Bald Rock National Park

Located adjacent to Boonoo Boonoo National Park, 6km off Mt Lindsay Highway. The park contains the largest exposed granite rock face in Australia. There are camping facilities at the base of the rock and walking trails leading to the rock where views are of the Queensland border and Tweed Valley. The park is 780km North of Sydney and 245km south west of Brisbane, and within 30km of Tenterfield. There are day-use facilities and camping facilities for caravans, trailers and tents. Three commercial adventure companies operate. It is believed increased visitation is due to its proximity to Brisbane, the Gold Coast, greater tourism visitation in North-East NSW and proximity to the more developed Girraween National Park. There is overcrowding in peak-periods. The majority of visitors are day use visitors. Unlikely to attract through traffic.

3. Basket Swamp

Located 15km North East of Tenterfield. It is near Boonoo Boonoo and Bald Rock National Parks in NSW and Girraween and Sundown National Parks across the Queensland border. 2WD access is less than 5 km off Woodenbong Rd (formerly the Mount Lindesay Highway). There are few visitors, mainly for remote recreational activities such as bushwalking, bird watching. There is also access to Basket Swamp Falls from the picnic area. It is unlikely to attract through traffic. No camping allowed.

4. Billinudgel Nature Reserve

Located 850km north of Sydney, 160km south of Brisbane and 35km north east of Lismore. It lies on the Pacific Ocean Coast, between Byron Bay and Kingscliff. The park has no camping or picnic facilities, although adjoining day-use facilities are available. There is increasing residential and day use visitation.

5. Bindarri National Park

Located on vehicular access road between Coffs Harbour (20mins) and Eastern Dorrigo Plateau with escarpment lookout points. There are rainforest walking trails and swimming areas. Neighbours the World Heritage Listed Dorrigo National Park. Few activities are accessible by 2WD leading to lower visitor numbers than surrounding parks. No picnic/visitor facilities currently exist and no camping areas, although pack camping is allowed. The park is seeking to complement the adjoining Dorrigo National Park, in terms of facilities, rather than replicate it.

6. Boatharbour Nature Reserve

Located 6km north east of Lismore. It is primarily a picnic area for local residents.

7. Bongil Bongil National Park

Located 10km south of Coffs Harbour. It is primarily used by local residents with knowledge of the park. There are day-use facilities with fishing, canoeing, boating, and bush and rainforest walking. Swimming is on an un-patrolled and dangerous beach. There is a range of accommodation nearby but none permitted in the park.

8. Boonoo Boonoo National Park

Located adjacent to Bald Rock NP, 24km from Tenterfield, with the main attraction, the Boonoo Boonoo Falls, located 13km from the Woodenbong Road. There are camping facilities for caravans, trailers and tents. It is unlikely to attract through traffic.

9. Border Ranges National Park

Part of the Tweed-Caldera group of parks (Mt Warning, Border Ranges, Mebbin, Nightcap, Mt Jerusalem and Goonengerry NP and Limpinwood, Numinbah and Snows Gully Nature Reserve). These constitute 20% of the World Heritage CERRA. The park is close to the main regional centres of Byron Bay, Lismore, Kyogle, Ballina and Murwillumbah. The park contains a 64km scenic drive considered one of the best rainforest drives in Australia. There are also a number of picnic day use areas with toilet facilities and camping and swimming. Bushwalking is popular, with extensive tracks in place. The majority of visitors are likely to be day use or short term camping due to proximity to the north coast tourist regions. However, it may also attract visitors passing through between Brisbane/Gold Coast and Kyogle.

10. Broadwater National Park

Located 750km north of Sydney, 300km south of Brisbane and 35km south east of Lismore. It incorporates 9km of coastline and is located adjacent to Bundjalung NP and Iluka Nature Reserve and nearby Yuraygir National Park in the South. There is no camping in this park, however a number of day use facilities exist. The park is easily accessible from the Pacific Highway.

11. Broken Head Nature Reserve

Located 5km south of Byron Bay. It is inaccessible by car but has foot access including established walking trails providing access to the beaches and a lookout.

12. Brunswick Heads Nature Reserves

Located 20km North of Byron Bay. Brunswick Heads Nature Reserve consists of two sections. The western section lies on the northern bank of the Brunswick River. The Pacific Highway passes through this section. The eastern section incorporates the North Head of the Brunswick River. There is one walking trail developed in the park. There is no camping allowed.

13. Bundjalong National Park

Located adjacent to Broadwater National Park and incorporates 35km of coastline, including the full length of 10 mile beach one of the largest in Australia, as well as the Esk river. The park is 50km south of Ballina and 60km north of Grafton, with access off the Pacific Highway on Iluka Rd. Camping and cabin accommodation are available.

14. Cape Byron State Conservation Area

Located 2km east of Byron Bay. No camping allowed, there are day use facilities and accommodation in nearby Byron Bay. This is the most easterly point of NSW with Cape Byron Lighthouse located on the point, both of which are tourist attractions. There is a high level of both local visitation and visitors from throughout NSW, South East Queensland, Interstate and International. Scenic drives, walking, jogging and cycling and whale watching are popular land based activities. While swimming, fishing, surfing and diving are popular water based activities located there. There is a visitor centre and refreshment shop located in the lighthouse. There are also a number of commercial recreation activities run, including hang gliding, surfing lessons and sea diving etc. There is also a popular commercial and private boat access ramp to the water located in the SCA.

15. Cascade National Park

Sub-tropical rainforest with the only access into the park via a walking trail. The park is 18km north of Dorrigo on an unpaved road. It is unlikely to receive through traffic visitation.

16. Cathedral Rock National Park

Located 60km west (unpaved road – 2WD and all-weather appropriate) of Dorrigo and 70km east of Armidale, this park has striking rock formations. It is located adjacent to Guy Fawkes River Nature Reserve, Serpentine Nature reserve and New England National Park, with numerous other parks in the surrounding area. There are walking trails, day use areas and car camping available. Unlikely to receive through traffic visitation, but may receive day-use or over night visitation from Coffs Harbour or Bellingen residents/visitors.

17. Coffs Coast Regional Park

26km of coastal dunes, heathland and rainforest linking a number of coastal towns surrounding Coffs Harbour within the Solitary Islands Marine Park. There are picnic facilities, a coastal walk and water sports opportunities.

18. Coramba Nature Reserve

Located 2.5km north of Coramba and 10km north-west of Coffs Harbour. Access is through a sport and recreation ground adjacent, run by the Department of Lands. There is only an unformed walking track and no visitor facilities. Visitors are likely to be local residents, including users of the sports ground. There is access to the Orara River from the park.

19. Couchy Creek Nature Reserve

Located 2km south of Numinbah NR, near Numinbah township. No details of facilities, unlike there are any.

20. Dorrigo National Park

A World Heritage listed park with well-known rainforest boardwalks to improve accessibility. The park is located 590 km from Sydney and 4km from Dorrigo and 25km from Bellingen. Coffs Harbour and Nambucca Heads are 1 hour's drive away. Dorrigo National Park is one of an important group of conservation areas on the New England Tableland which include New England, Guy Fawkes River, Cathedral Rocks and Oxley Wild Rivers National Parks and Mount Hyland and Guy Fawkes River

Nature Reserves. Dorrigo Rainforest Centre was located in Dorrigo National Park in preference to the other surrounding world heritage listed parks due to its easier accessibility and ability to cater for large numbers of visitors. There is a tourist shop and café operated at the centre and organised bushwalks and holiday nature education programs also operate. Bushwalking trails and day use facilities are available in the park although camping is not allowed. Likely to receive day and overnight visitors from surrounding areas.

21. Gibraltar Range National Park (Group of parks)

Part of the Gibraltar Range group of parks consisting of 5 national parks and 2 state conservation areas (**Barool National Park, Capoompeta National Park, Gibraltar Range National Park, Nymboida National Park, Washpool National Park, Nymboida SCA and Washpool SCA**). It is located on the Gwydir Highway midway between Glen Innes and Grafton. A large proportion is World Heritage listed. There are 5 sites with visitor facilities along the route, which is co-named the “World Heritage Way”, including camping and day-use facilities, swimming and extensive walking trails with lookout points. Likely to receive through traffic between Glen Innes (inland route) and Grafton (coastal route).

22. Guy Fawkes River National Park

Is a relatively inaccessible park, although recreational activities are allowed including camping, day use picnicking, canoeing, bushwalking, cycling and adventure recreation and horse riding. Unlikely to receive through traffic visitation due to location.

23. Iluka Nature Reserve

Located adjacent to Bundjalong NP and is predominately rainforest and coastline. No vehicular access, no camping and no picnic facilities. Swimming and walking are available. No through traffic visitation due to location, but day visitors from surrounding regions likely.

24. Kwiambal National Park

Located approximately 30 km north-west of Ashford and 90 km north of Inverell at the junction of the Macintyre and Severn Rivers. Nearby reserves include Arakoola, Taringa and Severn River Nature Reserve and Kings Plains National Park. The park is 15-20kms off the highway linking Texas and Inverell. Swimming, fishing and bushwalking are major activities and camping is allowed at Lemon Tree Flat. There are also Ashford Limestone Caves 2.5km away. There is the possibility that there may be through traffic visitation between Texas (QLD) and Inverell.

25. Limpinwood Nature Reserve

Part of the Tweed –Caldera group of parks (Mt Warning, Border Ranges, Mebbin, Nightcap, Mt Jerusalem and Goonengerry NP and Limpinwood, Numinbah and Snows Gully Nature Reserve). Located between Border Ranges NP and Numinbah NR. Facilities are not provided in this park due to proximity of other national parks in the vicinity with visitor facilities.

26. Mann River Nature Reserve

Located 12km off the scenic highway between Glen Innes (48kms) and Grafton, this park has camping, day-use, swimming, canoeing and fishing. Likely to receive through traffic between Glen Innes (inland route) and Grafton (coastal route).

27. Marshalls Creek Nature Reserve

Located near Billinudgel and Brunswick Heads on the north coast. Little information on facilities in this park. Easy access from coastal road.

28. Mebbin National Park

Located adjacent to Border Ranges National Park and Mt Warning National Park. It is located near the major centres of Byron Bay, Lismore, Kyogle, Ballina and Murwillumbah. Camping is located in the park next to a day-use area at the entrance to the park. Bushwalking trails exist. This park is likely to receive through traffic visitation between Kyogle and Murwillumbah as well as day/overnight visitation from surrounding areas.

29. Mount Hyland Nature Reserve

Located 50km north west of Dorrigo. There are picnic facilities and bushwalking trails.

30. Mount Jerusalem National Park

Part of the Tweed-Caldera group of parks (Mt Warning, Border Ranges, Mebbin, Nightcap, Mt Jerusalem and Goonengerry NP and Limpinwood, Numinbah and Snows Gully Nature Reserve). Hang gliding and abseiling are permitted at approved sites. No other information on facilities is known. This park may receive through traffic visitation between Kyogle and Murwillumbah.

31. Mount Warning National park

Part of the Tweed-Caldera group of parks (Mt Warning, Border Ranges, Mebbin, Nightcap, Mt Jerusalem and Goonengerry NP and Limpinwood, Numinbah and Snows Gully Nature Reserve). It is located closest to Murwillumbah. It is a popular walking area to reach the summit of the mountain. No camping is allowed, day use facilities are provided. This park is likely to receive through traffic visitation between Kyogle and Murwillumbah as well as day/overnight visitation from surrounding areas.

32. Mucklewee Mountain Nature Reserve

Located 10-15km west of Lismore. No details on facilities provided.

33. Muttonbird Island Nature Reserve

Located in Coffs Harbour connected to the land. Visitors must walk to the island and can view mutton-birds at appropriate times of the year. Easy access from popular tourist location.

34. New England National Park

Located 85km east of Armidale on the Waterfall Way with unpaved roads. There is camping and day use areas with walking trails and lookout points.

35. Nightcap National Park

Part of the Tweed-Caldera group of parks (Mt Warning, Border Ranges, Mebbin, Nightcap, Mt Jerusalem and Goonengerry NP and Limpinwood, Numinbah and Snows Gully Nature Reserve).

This park does not have camping, but you can camp at nearby Whian Whian SCA. It offers day use facilities, bushwalking, scenic views, lookout points, waterfalls and rainforest drives. This park is likely to receive through traffic visitation between Kyogle and Murwillumbah as well as day/overnight visitation from surrounding areas.

36. Numinbah Nature Reserve

Part of the Tweed-Caldera group of parks (Mt Warning, Border Ranges, Mebbin, Nightcap, Mt Jerusalem and Goonengerry NP and Limpinwood, Numinbah and Snows Gully Nature Reserve). There are a number of well-developed visitor areas which will be improved rather than developing new areas. Visitor use will not be encouraged in Limpinwood, Numinbah and Snows Gully NRs. May receive visitation from locals and through traffic.

37. Nymboi-Binderay National Park

Located midway between Dorrigo and Nymboida and east of Glenreagh. The park surrounds the gorges and banks of Nymboida River, well known for white-water rafting. There are a number of other recreational areas where adventure recreation and swimming are allowed. Camping and day use facilities are provided. May receive some visitation from through traffic between Grafton and Dorrigo or local visitation from Grafton.

38. Nymboida National Park

Is located adjacent to the Gibraltar Range National Park, west of Grafton. There are camping and picnic facilities but no formal walking tracks. The park is well known for its white water rafting opportunities.

39. Richmond Range National Park

Located 50km west of Lismore and east of Kyogle and Casino. The area is linked via state forest and private land to Border Ranges NP to the north, Yabbra NP to the west, Mt Pikapene NP and the other parks and reserves of the southern Richmond Range to the south. Part of the Northern Richmond Range group of parks (Richmond Range, Toonumbar and Mallanganee NP and Hogarth Range Nature Reserve). There are a number of scenic 2WD and 4WD drives. There are also both day use and camping areas with walking tracks to Eden Creek Falls and lookout points. The nearby Border Ranges NP provides complementary day use and camping areas. Toonumbar Dam, managed by the Department of Land and Water Conservation, also provides complementary recreation facilities such as cabin accommodation, picnic and

conference facilities and fresh water fishing. Privately owned visitor accommodation is also provided at other locations surrounding the park. Horse riding and cycling on designated roads is allowed. May receive day/overnight visitation from through traffic between Casino and Tenterfield as well as surrounding area.

40. Richmond River Nature Reserve

Located at South Ballina on the southern bank of the lower Richmond River, this park is cultural important to Bundjalong Aboriginal people. Popular activities including fishing, walking, surfing, swimming and bird watching. Camping is not permitted but is occasionally undertaken. Limited recreational infrastructure with one boat ramp, walking track access to the beach and a 4WD trail providing some vehicular access to the beach. Most likely local day visitation.

41. Sherwood Nature Reserve

Located 40 km south-east of Grafton, and 35km north west of Coffs Harbour, the reserve is accessed from the west through Glenreagh, east from the Pacific Highway and south from the township of Corindi. The northern part of the reserve receives the least visitation compared to the central section which has 4WD access and Middle Creek area is used for rock climbing, bushwalking and swimming. The Southern area, Woolgoolga Creek picnic area receives the highest visitation for day use, school and university groups, birdwatchers, with picnic facilities including toilets and a walking trail to the falls. Likely to receive high day/overnight visitation from surrounding area as well as possible through traffic seeking an alternative route to the Pacific Highway.

42. Toonumbar National Park

Located north west of Kyogle. Part of the Northern Richmond Range group of parks (Richmond Range, Toonumbar and Mallanganee NP and Hogarth Range Nature Reserve). Camping and day use facilities exist with bushwalking, swimming and adventure recreation opportunities. Likely to receive day/overnight visitation from surrounding area, particularly Kyogle, but unlikely to receive through traffic visitation.

43. Tweed Heads Historic Site

Located in Tweed Heads South. Here, you'll find a cultural centre, museum, library, conference centre, outdoor area for dance, art & craft displays and Minjungbal's ceremonial site, offering an insight into local Aboriginal culture. A boardwalk and walking track run along the Ukerebagh Passage estuary, overlooking the nearby Ukerebagh Nature Reserve, and the local Goori people conduct guided tours. Picnic facilities and fishing access exists.

44. Tyagarah Nature Reserves

Captures the sand plains and estuary between Byron Bay in the north and Brunswick Heads in the south. There are no camping facilities, but there are day use facilities and swimming. Likely to be high day visitation from locals.

45. Ukerebagh Nature Reserve

Tweed Heads Historic Site and Ukerebagh Nature Reserve is located in the rapidly developing urban area of South Tweed Heads in far northern NSW. It is within and

adjacent to the estuary of the Tweed River. The nature reserve is largely undeveloped. Use is principally from boats on the Tweed River.

46. Victoria Park Nature Reserve

Located 7 km south of Alstonville on the Wardell Road, 16 km south-east of Lismore near the village of Meerschaum Vale and approximately 20km inland from Ballina. It is part of the Big Scrub group of parks (Boatharbour, Victoria Park, Davis Scrub, Hayters Hill, Andrew Johnston Big Scrub and Wilson). Victoria Park, Boatharbour and Wilson Nature Reserves provide recreation, picnicking and bushwalking opportunities while the other two reserves have no formal recreational use. Unlikely to be through traffic visitation, primarily local day visitation.

47. Warra National Park

Located between Glen Innes and Guyra and is part of the Guy Fawkes River, Gibraltar Range and Washpool National Parks and Mann River Nature Reserve group of parks. There are no recreational facilities provided and only informal camping and no vehicular access.

48. Washpool National Park

Located 75km east of Glen Innes and 90km west of Grafton on the Gwydir Highway. The park is part of the Gibraltar Range group of parks consisting of 5 national parks and 2 state conservation areas (**Barool National Park, Capoompeta National Park, Gibraltar Range National Park, Nymboida National Park, Washpool National Park, Nymboida SCA and Washpool SCA**). There are a number of walking trails (both short and long) as well as opportunities for cycling and horse riding. There are a number of camping areas in the park as well as day use areas. Likely to receive through traffic between Glen Innes (inland route) and Grafton (coastal route).

49. Whian Whian SCA

Contains the predominant stretch of the Whian Whian Forest scenic drive, which also enters the Nightcap National Park. It is 30mins away from Byron Bay and 35 km north of Lismore via Whian Whian Forest Drive off the Lismore-Mullumbimby road. There are camping and day use facilities and walking and cycling trails. Likely to receive day/overnight visitation from surrounding area.

50. Wooyung Nature Reserve

Is located on the coast between Wooyung and Pottsville and is bisected by the Tweed Coast Road. It lies midway between Byron Bay and Tweed Heads. Mooball Beach is a popular swimming area, with picnic facilities.

51. Yuraygir National Park

Stretches over 60kms of coast between Red Rock and Yamba. It is part of an important conservation area together with Bundjalung and Broadwater NP and Iluka NR, which are readily accessible by vehicle. The park offers readily accessible public access roads, camping areas, walking tracks, day use and interpretive facilities for recreation and environmental education purposes. Recreational fishing and water sports are also allowed. The villages of Angourie, Brooms Head, Sandon, Minnie Water, Diggers Camp and Wooli are located on the Yuraygir coast between Yamba and Red Rock, providing a more upmarket range of accommodation. The recreational mix provided by this combination of villages and national parks provides

opportunities for shopping, boating, picnicking, camping, fishing, swimming, surfing and bushwalking on some of the best beaches in Australia. Vehicle based camping areas are maintained at Station Creek, Pebbly Beach, Sandon River, Boorkoom, Red Cliff, Illaroo and Lake Arragan Camping Areas in Yuraygir National Park. Likely to receive day/overnight visitation from surrounding area and some through traffic visitation due to proximity to Pacific Highway and coast.

Appendix 4 –Zone Data for Each National Park

Table A4.1 – Zone Data for Yuraygir National Park

Zone	No. of Groups	Sample Visits	Annual Visits	Popn.	Sample Visits per (000) Popn.	Annual Visits per (000) Popn.	Return Distance (km)
Central Coast/Newcastle	12	39	8,694	803,943	0.05	11	1,050
Coffs Harbour	47	351	78,243	48,013	7.31	1,630	200
Grafton	35	142	31,654	17,226	8.24	1,838	92
Hastings and Port Macquarie	8	28	6,242	142,367	0.20	44	514
Lismore	39	162	36,112	30,739	5.27	1,175	298
Moreton/Brisbane	79	427	95,185	2,510,518	0.17	38	770
Northern SD	16	98	21,846	179,607	0.55	122	798
Richmond Tweed Balance	76	361	80,473	140,809	2.56	572	368
South Eastern NSW/ACT/Illawarra	12	29	6,465	929,600	0.03	7	1,860
Sydney/Blue Mountains	39	198	44,137	3,895,935	0.05	11	1,328
Tweed Heads	19	138	30,762	49,846	2.77	617	570
Ulmara/Mclean	57	187	41,685	24,258	7.71	1,718	100
Victoria	12	50	11,146	4,911,425	0.01	2	3,080
Rest of Aust	13	33	7,356	6,188,360	0.01	1	5,060
Total	464	2243	500000	19,872,646			

Table A4.2 – Zone Data for Washpool National Park

Zone	No. of Groups	Sample Visits	Annual Visits	Popn.	Sample Visits per (000) Popn.	Annual Visits per (000) Popn.	Return Distance (km)
Brisbane, SS and GC	21	122	8,861	2,230,700	0.05	4	784
ACT and Bega	5	16	1,162	350,020	0.05	3	2,252
Lismore Byron Ballina	6	23	1,671	98,719	0.23	17	464
Coffs Harbour and Surrounds	5	19	1,380	74,480	0.26	19	308
Inverell and Glenn Innes	4	17	1,235	20,044	0.85	62	220
Rest of Aust	11	40	2,905	12,380,002	0.00	0	5,128
Sydney Central Coast Newcastle	16	80	5,811	4,620,821	0.02	1	1,396
Armidale Tamworth	4	19	1,380	63,386	0.30	22	502
Grafton Yamba	12	64	4,649	34,474	1.86	135	160
	84	400	29054	19,872,646			

Table A4.3 – Zone Data for Gibraltar Range National Park

Zone	No. of Groups	Sample Visits	Annual Visits	Popn.	Sample Visits per (000) Popn.	Annual Visits per (000) Popn.	Return Distance (km)
Brisbane	28	111	9,459	1,650,422	0.07	6	784
Toowoomba	6	18	1,534	109,449	0.16	14	734
Gold Coast	5	27	2,301	387,881	0.07	6	708
Ballina Byron Tweed	8	33	2,812	104,266	0.32	27	468
Coffs Harbour and Surrounds	18	85	7,244	74,480	1.14	97	308
Inverell and Glenn Innes	13	51	4,346	20,044	2.54	217	220
Rest of Aust	6	13	1,108	12,424,267	0.00	0	5,128
Kempsey and Pt Macquarie	3	6	511	65,504	0.09	8	622
Lismore and Casino and Kyogle	8	35	2,983	51,316	0.68	58	428
Sydney Central Coast Newcastle	19	62	5,284	4,620,821	0.01	1	1,396
Armidale Tamworth	5	20	1,704	63,386	0.32	27	502
Grafton and Yamba	20	82	6,988	34,477	2.38	203	160
Central West and Central Macquarie incl. Dubbo	3	11	937	266,333	0.04	4	1,440
	142	554	47211	19,872,646			

Table A4.4 – Zone Data for Nightcap National Park

Zone	No. of Groups	Sample Visits	Annual Visits	Popn.	Sample Visits per (000) Popn.	Annual Visits per (000) Popn.	Return Distance (km)
Ballina	15	79	27,092	38,159	2.07	710	92
Brisbane	29	104	35,665	1,650,422	0.06	22	348
Byron	29	127	43,553	29,689	4.28	1,467	48
Clarence and Coffs	5	30	10,288	142,736	0.21	72	508
Gold Coast	5	17	5,830	377,881	0.04	15	228
Lismore Casino	29	94	32,236	41,499	2.27	777	58
Melbourne	21	54	18,519	3,471,625	0.02	5	3,278
Moreton Balance	3	9	3,086	724,184	0.01	4	584
Newcastle	8	33	11,317	492,549	0.07	23	1,284
Rest of Aust	9	29	9,945	7,971,749	0.00	1	5,294
Sydney Central Coast	30	115	39,438	4,128,272	0.03	10	1,562
Tweed	5	25	8,573	84577	0.05	101	224
Illawarra and ACT	5	13	4,458	719,304	0.02	6	2,094
	193	729	250000	19,872,646			

Table A4.5 – Zone Data for Boonoo Boonoo National Park

Zone	No. of Groups	Sample Visits	Annual Visits	Popn.	Sample Visits per (000) Popn.	Annual Visits per (000) Popn.	Return Distance (km)
Brisbane and Sunshine Coast	74	242	10,335	1,842,819	0.13	6	542
Gold Coast	8	19	811	387,881	0.05	2	574
Lismore, Ballina and Byron Bay	18	60	2,562	98,719	0.61	26	342
Mid-North Coast	3	7	299	280,592	0.02	1	862
Moreton Balance and Toowoomba	11	46	1,964	263,355	0.17	7	436
Rest of Australia	12	31	1,324	11,641,901	0.00	0	5,248
South-eastern NSW/ACT, Illawarra	5	20	854	719,304	0.03	1	2,208
Stanthorpe	9	39	1,665	10,383	3.76	160	90
Sydney Central Coast, Newcastle	21	62	2,648	4,620,821	0.01	1	1,516
Tenterfield	7	36	1,537	6,871	5.24	224	44
	168	562	24000	19,872,646			

Table A4.6 – Zone Data for Border Ranges National Park

Zone	No. of Groups	Sample Visits	Annual Visits	Popn.	Sample Visits per (000) Popn.	Annual Visits per (000) Popn.	Return Distance (km)
Brisbane and SS Coast	64	210	16,204	1,842,819	0.11	9	452
Gold Coast	11	29	2,238	387,881	0.07	6	312
Ballina	13	41	3,164	38,159	1.07	83	214
Mid North Coast	6	21	1,620	280,592	0.07	6	604
Moreton Balance and Toowoomba	9	37	2,855	263,355	0.14	11	376
Rest of Aust	8	23	1,775	11,307,685	0.00	0	5,318
SE NSW, ACT and Illawarra	5	21	1,620	912,366	0.02	2	2,558
Lismore and Casino	21	60	4,630	41,499	1.45	112	144
Sydney Central Coast Newcastle	30	126	9,722	4,620,821	0.03	2	1,586
Armidale Tamworth	2	5	386	63,386	0.08	6	994
Kyogle	7	32	2,469	9,817	3.26	252	80
Byron Tweed	12	43	3,318	104,266	0.41	32	248
	188	648	50000	19,872,646			

Table A4.7 – Zone Data for Baldrock National Park

Zone	No. of Groups	Sample Visits	Annual Visits	Popn.	Sample Visits per (000) Popn.	Annual Visits per (000) Popn.	Return Distance (km)
Brisbane and SS Coast	88	363	15,513	1,842,819	0.20	8	542
Gold Coast	10	33	1,410	387,881	0.09	4	574
Richmond Tweed	27	116	4,957	216,334	0.54	23	342
Mid North Coast and Gt Lakes	14	62	2,650	312,793	0.20	8	862
Moreton Balance and Toowoomba	13	73	3,120	263,355	0.28	12	436
Rest of Aust	16	40	1,709	11,836,647	0.00	0	5,248
SE NSW, ACT and Tumut	14	47	2,009	319,317	0.15	6	2,208
Stanthorpe	8	38	1,624	10,383	3.66	156	90
Sydney Central Coast Newcastle	28	82	3,504	4,620,821	0.02	1	1,516
Tenterfield	8	45	1,923	6,871	6.55	280	44
Armidale, Inverell Glen Innes	6	37	1,581	55,425	0.67	29	436
	232	936	40000	19,872,646			

Appendix 5 – Travel Cost Visitation Rate Relationships

Figure A5.1 – Travel Cost – Visitation Rate Relationship for Yuraygir NP

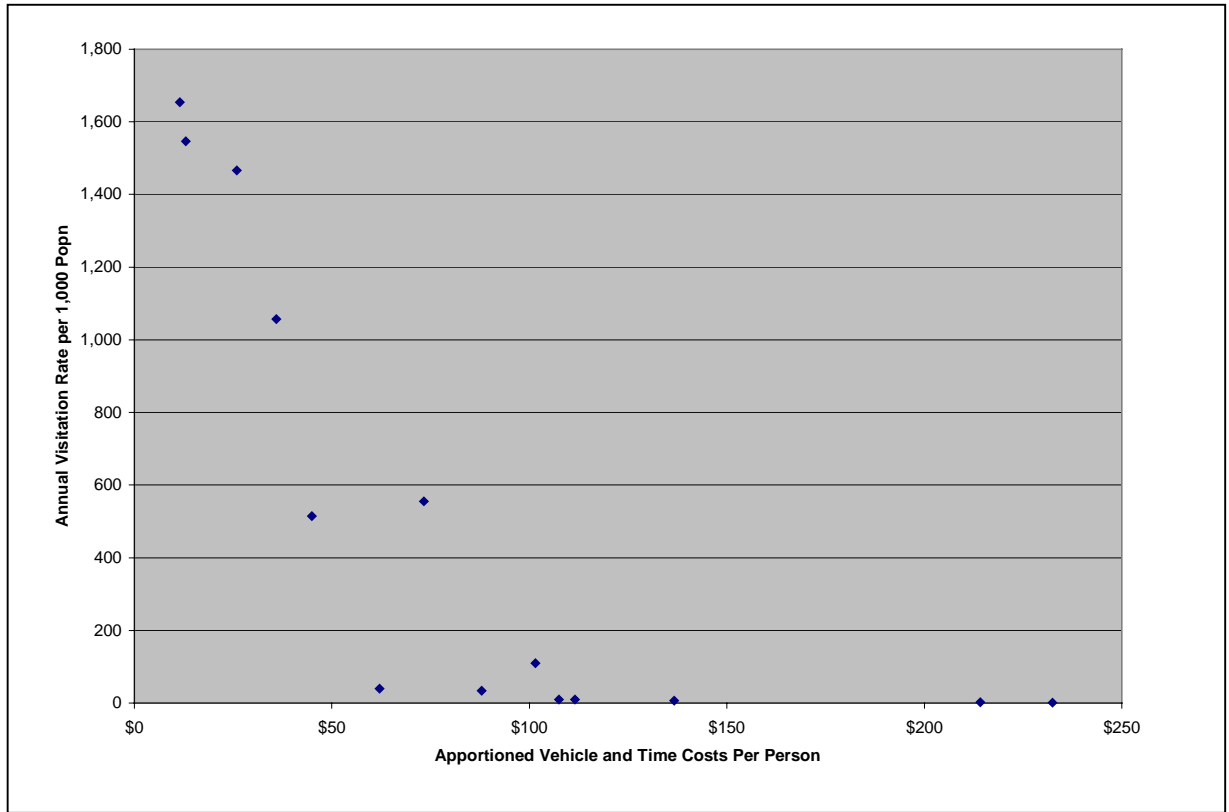


Figure A5.2 – Travel Cost – Visitation Rate Relationship for Washpool NP

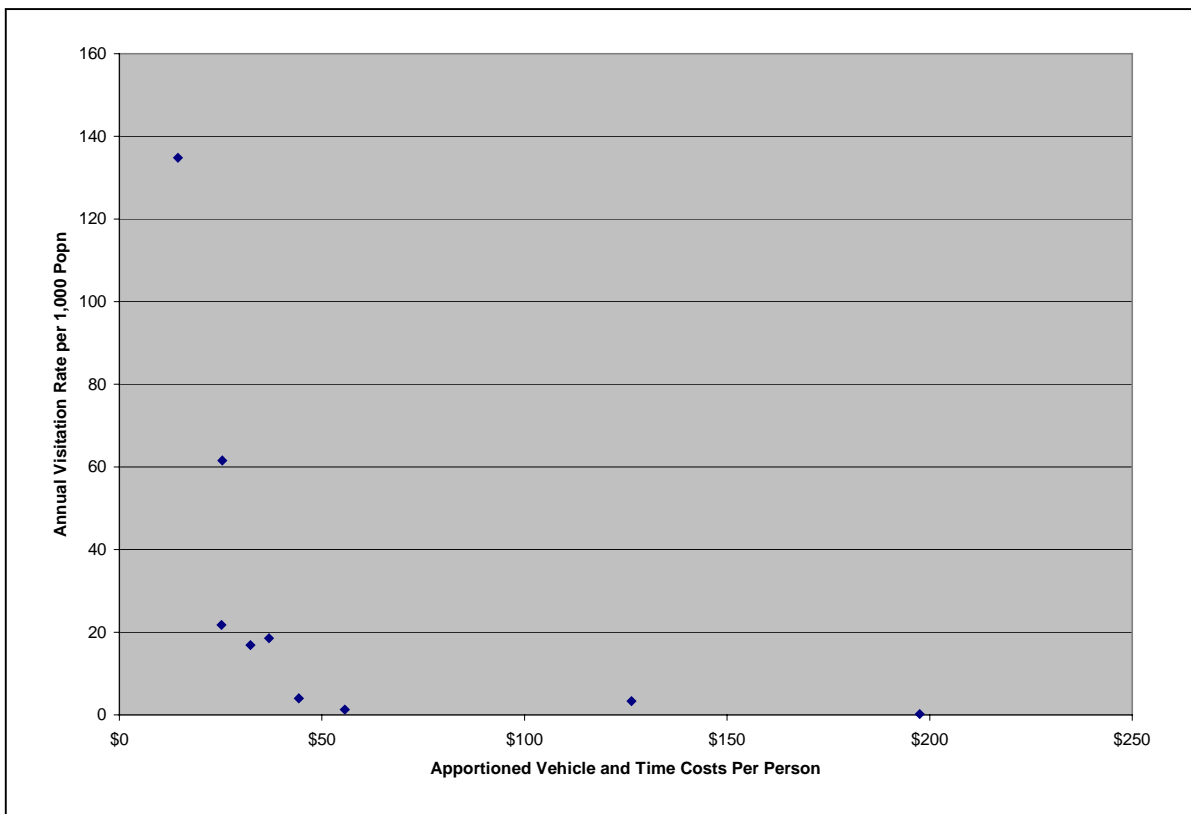


Figure A5.3 – Travel Cost – Visitation Rate Relationship for Gibraltar Range NP

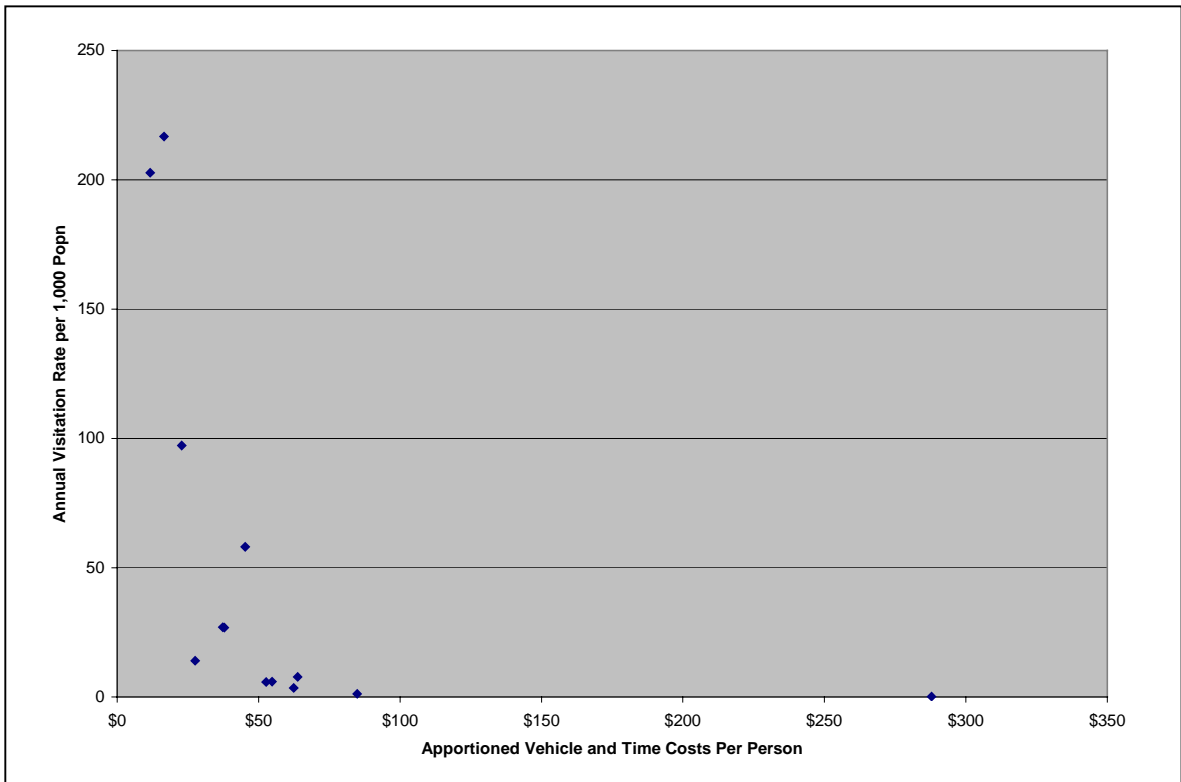


Figure A5.4 – Travel Cost – Visitation Rate Relationship for Nightcap NP

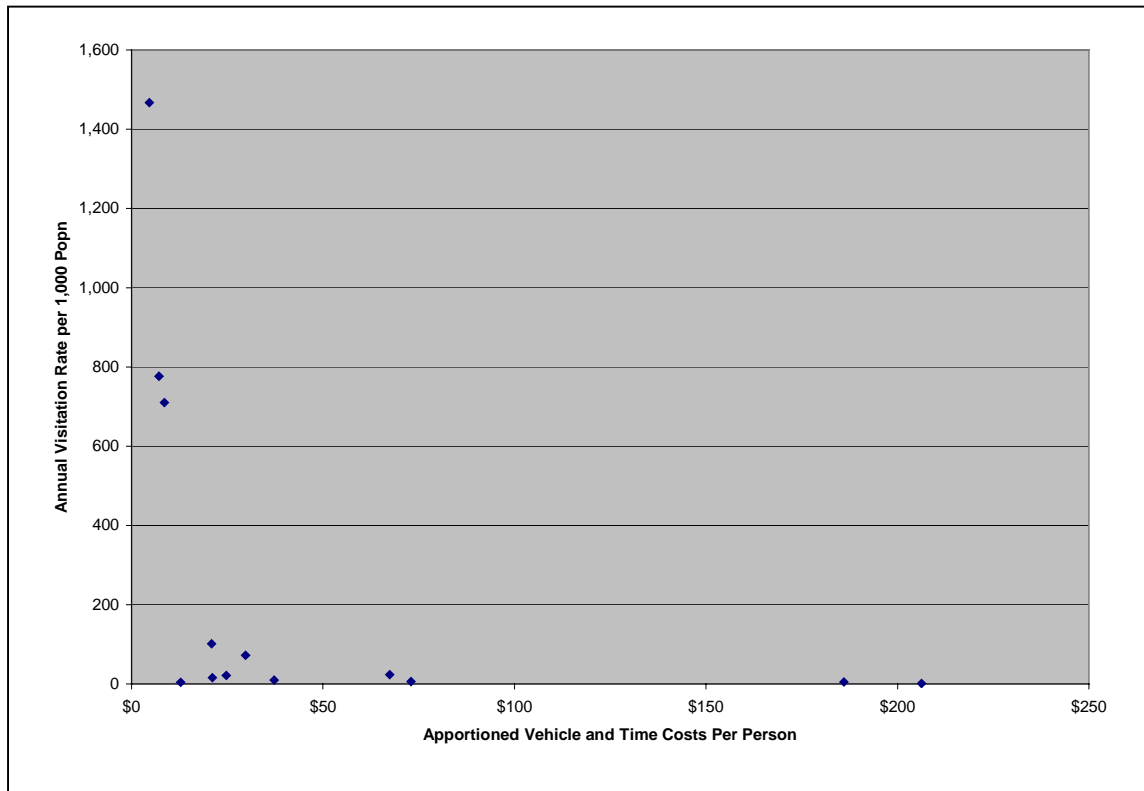


Figure A5.5 – Travel Cost – Visitation Rate Relationship for Boonoo Boonoo NP

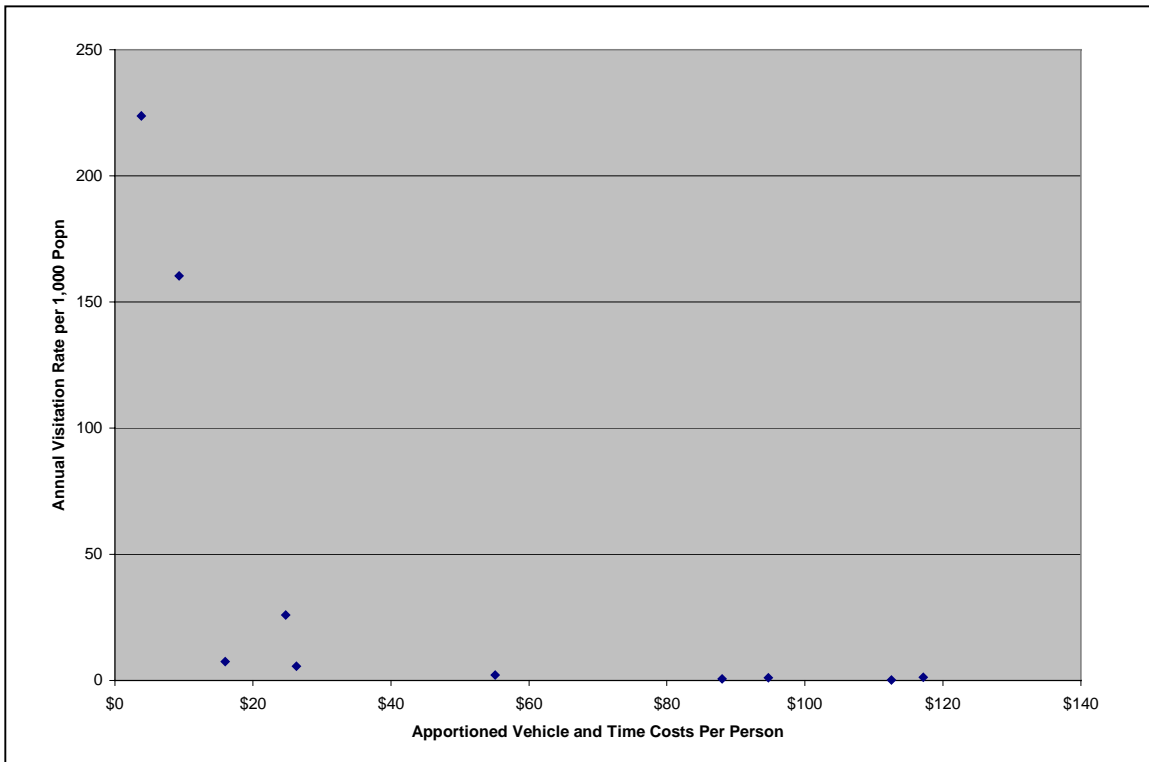


Figure A5.6 – Travel Cost – Visitation Rate Relationship for Border Ranges NP

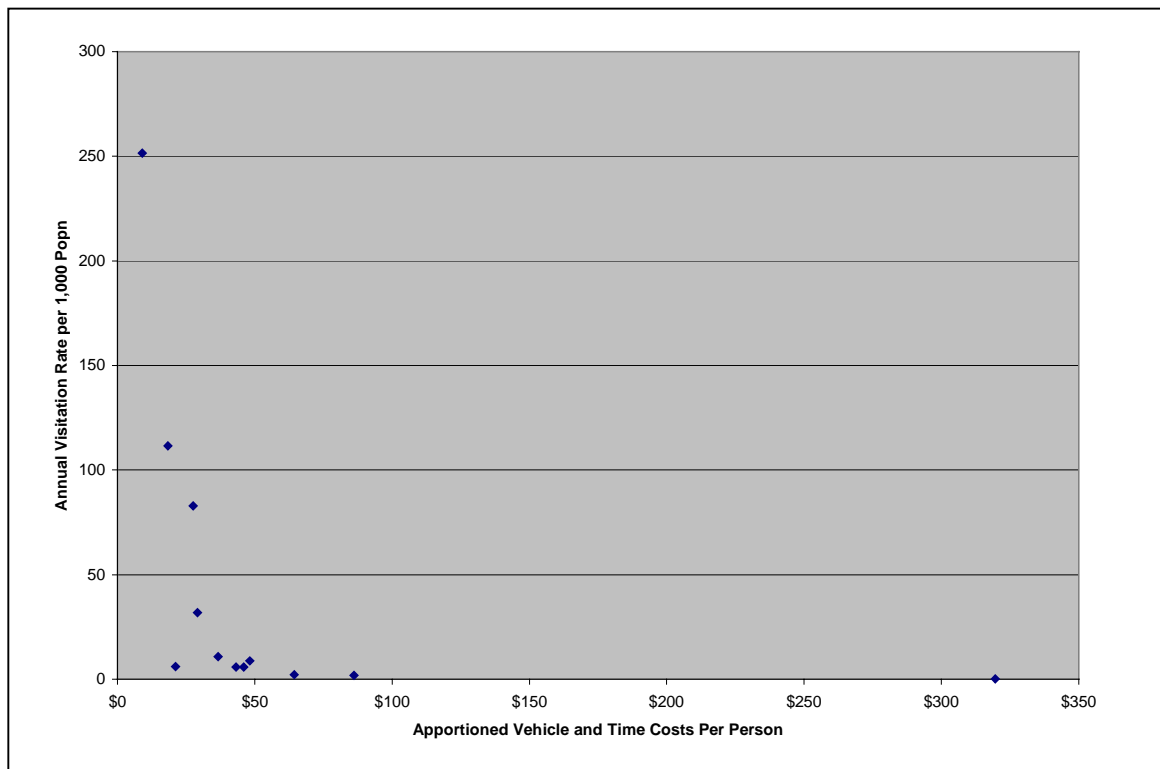
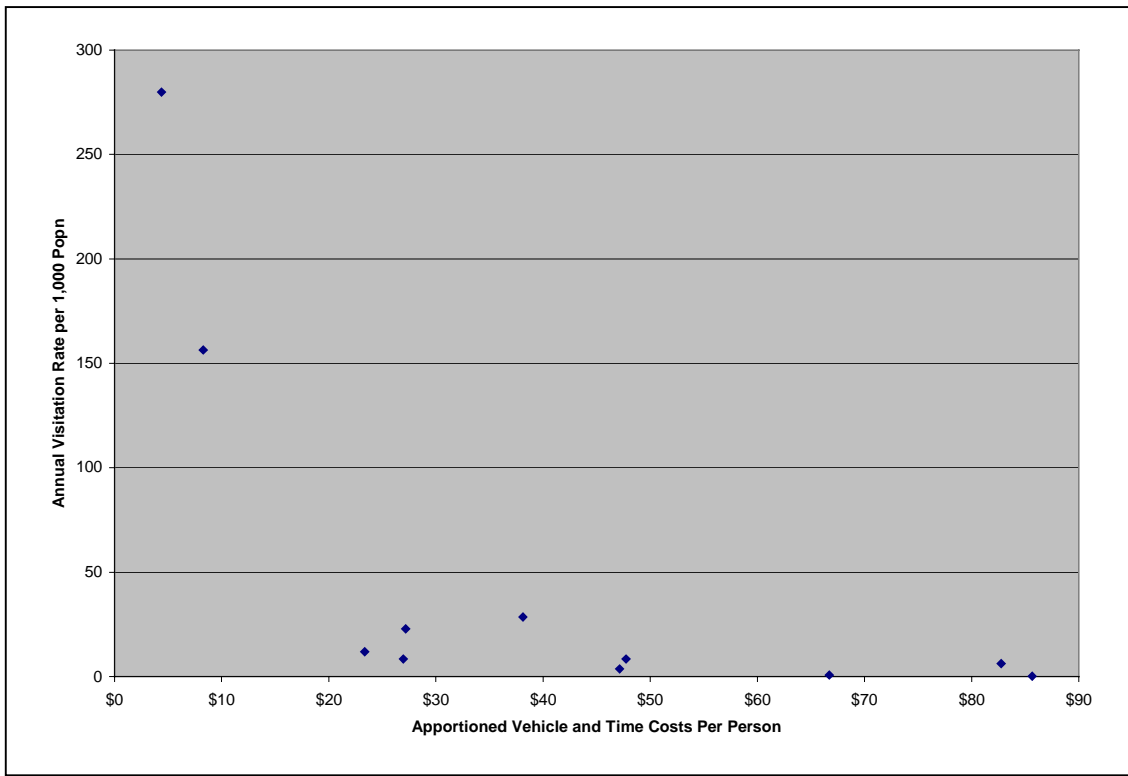


Figure A5.7 – Travel Cost – Visitation Rate Relationship for Baldrock NP



Appendix 6 – Demand Curves

Figure A6.1 – Demand Curve for Yuraygir NP

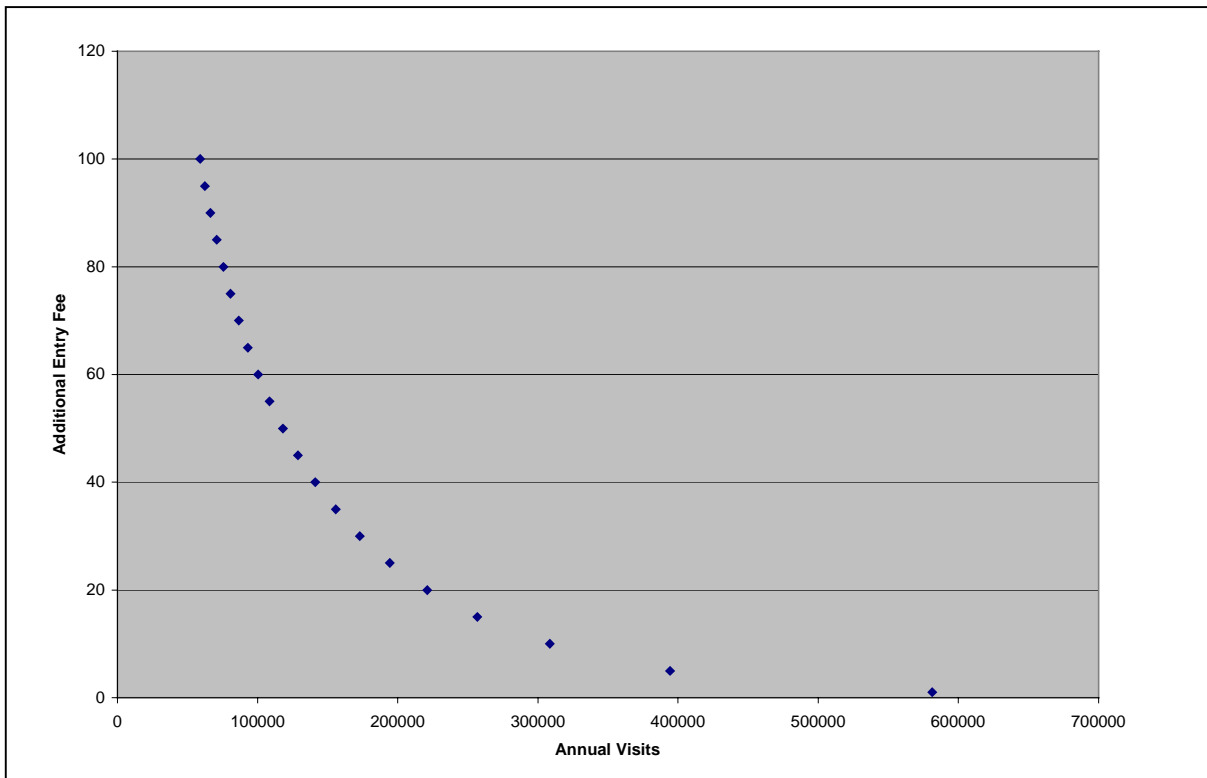


Figure A6.2 – Demand Curve for Washpool NP

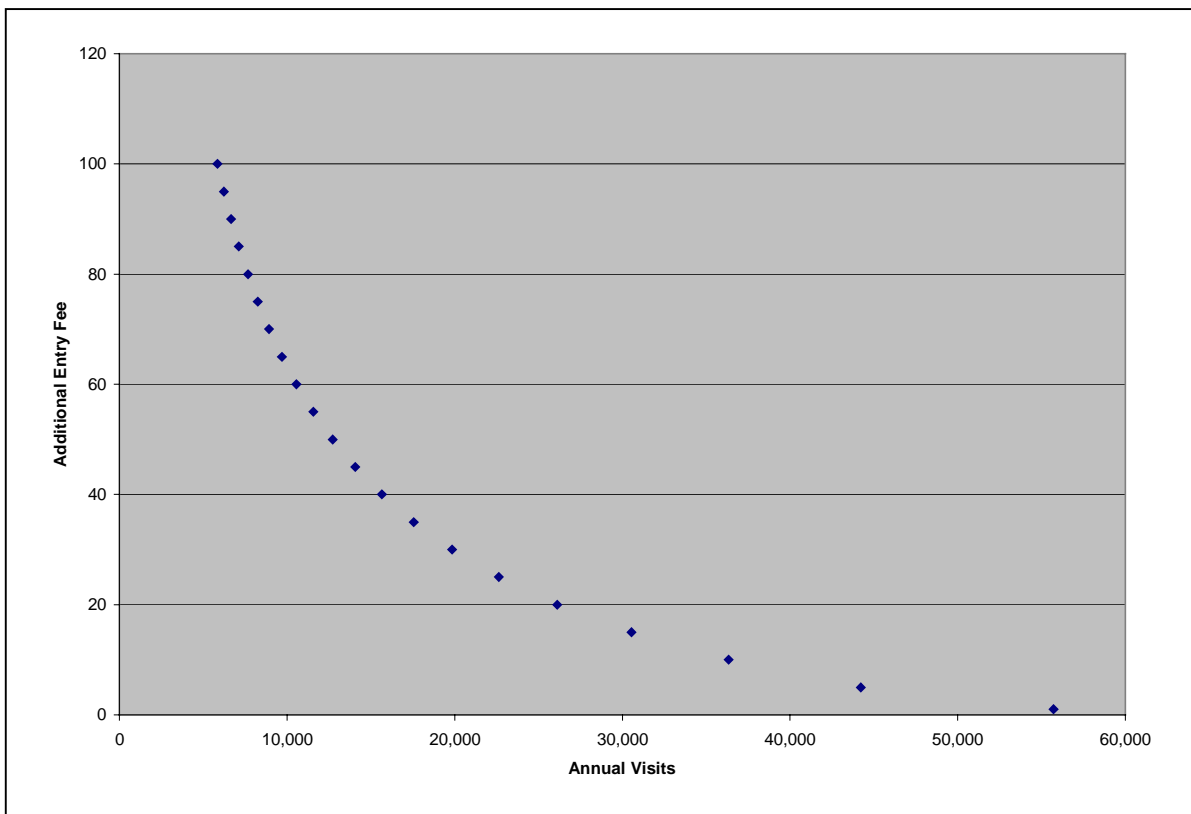


Figure A6.3 – Demand Curve for Gibraltar Range NP

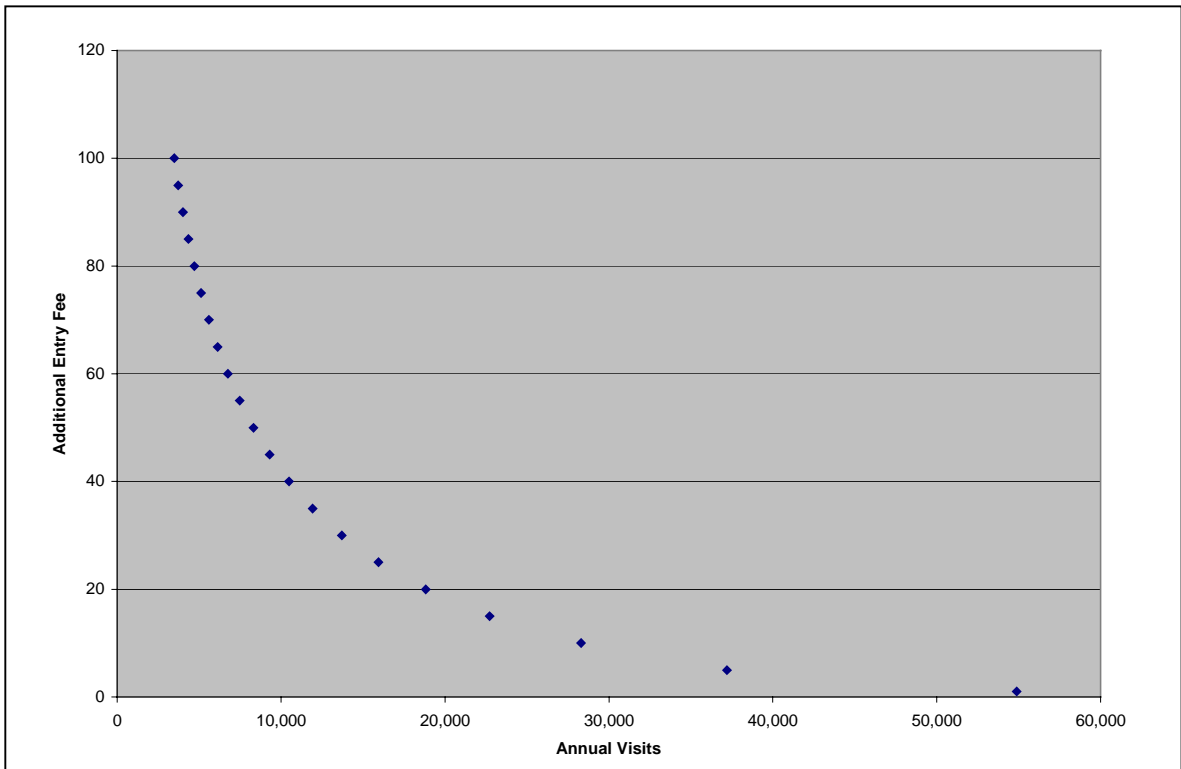


Figure A6.4 – Demand Curve for Nightcap NP

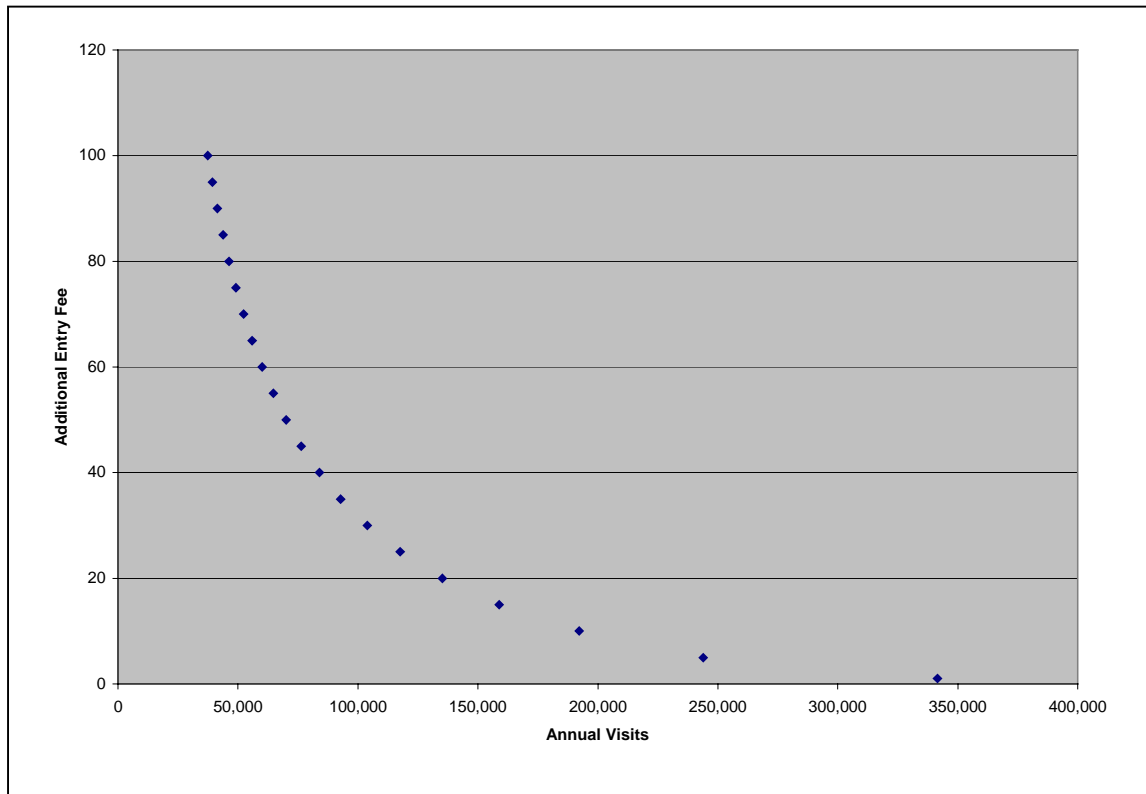


Figure A6.5 – Demand Curve for Boonoo Boonoo NP

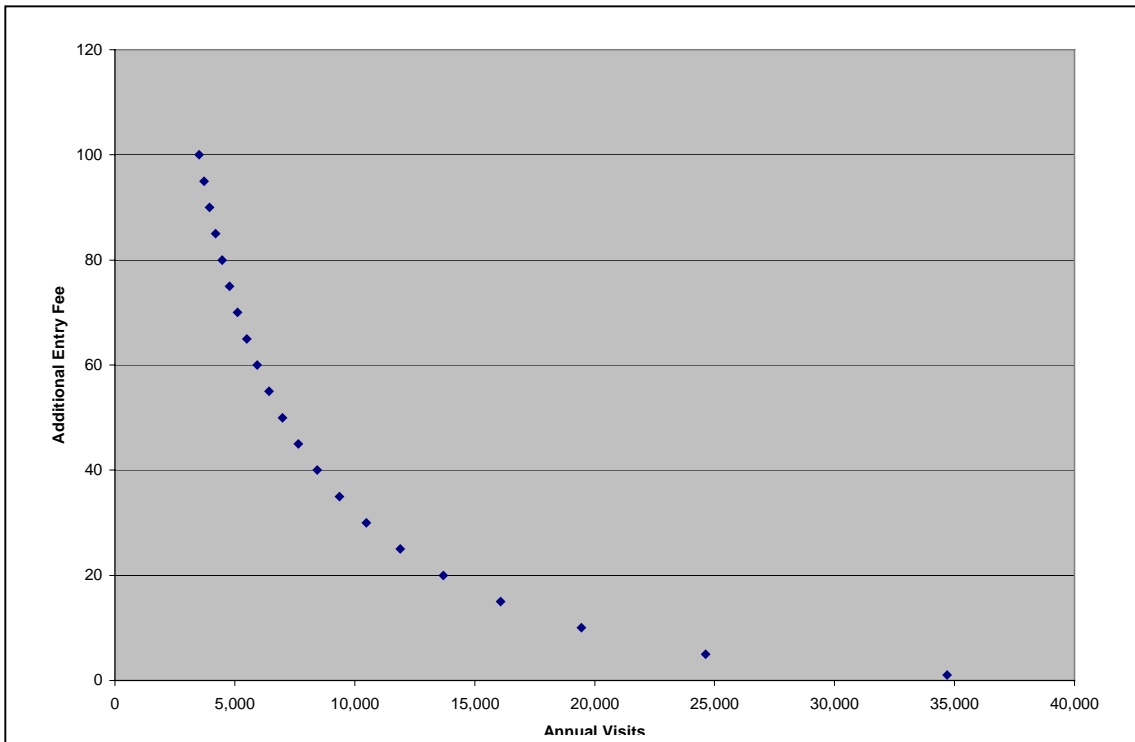


Figure A6.6 – Demand Curve for Border Ranges NP

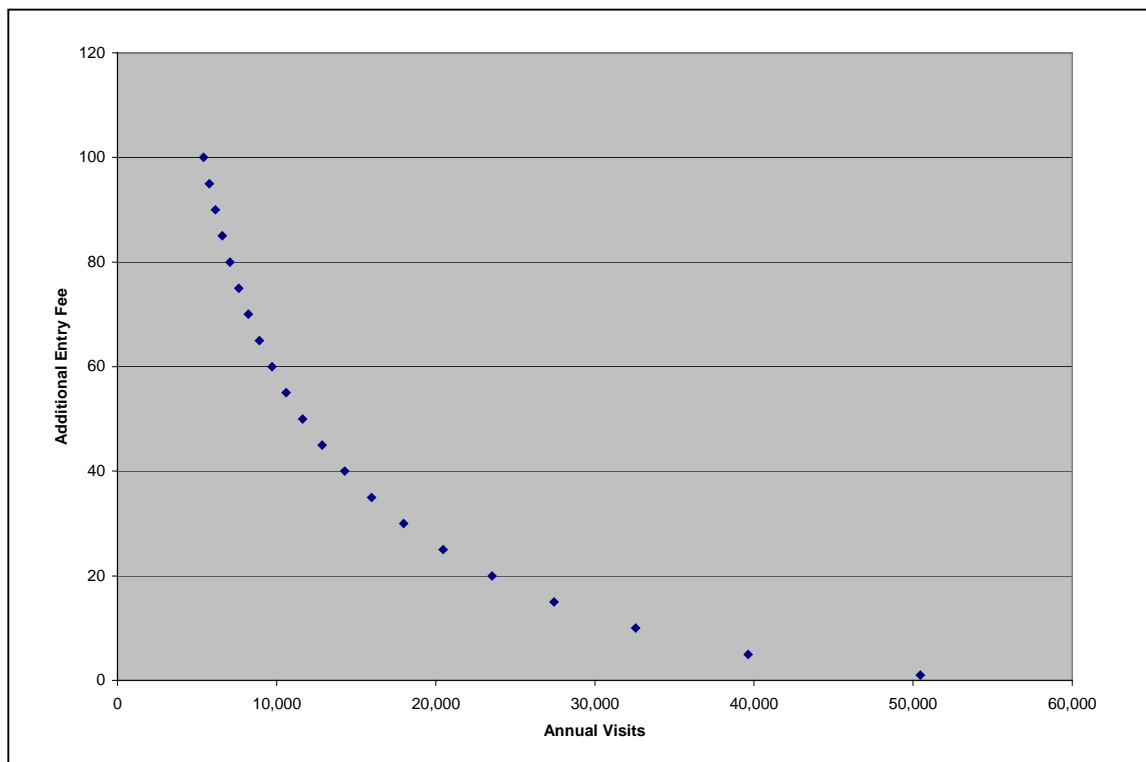


Figure A6.7 – Demand Curve for Baldrock NP

