A METHOD FOR ESTIMATING THE STATE-WIDE ECONOMIC SIGNIFICANCE OF NATIONAL PARK TOURISM: THE CASE OF QUEENSLAND

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This study devises a methodology to measure the economic significance of national park tourism, which is applied to the State of Queensland, Australia. Development of a methodology to provide this information is important to demonstrate the attraction of national parks to tourism and to provide a basis for government decisions on allocating funds for national park management. A strategic national park sampling logic was developed to allow surveys to be conducted in a stratified, representative sample of the over 500 Queensland parks. Data on expenditure by tourists were analyzed (employing sensitivity and risk analysis) to find the “national park-generated” component of tourist expenditure directly attributable to the attractions of the national parks. A deliberately conservative approach was taken to address the economic information needs of State Treasury Departments, which are responsible for allocating funding to park management authorities. The contribution to the gross state product (GSP) was estimated at \$345 million annually, representing 4.9% of tourism’s contribution to GSP, or five times the current annual government expenditure on national park visitor management in the State of Queensland. Recommendations for some improvements to the methodology were developed based on the study conducted.

Key words: Tourism spending; National parks; Economic significance; Value added; Queensland

Introduction

In Australia, the most significant terrestrial protected areas are called “national parks.” The vast majority of national parks are managed by the eight state and territory governments, with only a minority being directly managed by the Australian Government. Under the current arrangements,

each individual state and territory government is responsible for the provision of a suitable level of resourcing for the prudent management of the parks systems. A vital question is, among competing needs, how much funding should governments allocate to park management?

It is widely recognized that parks provide a range of market and nonmarket benefits for cur-

rent and future generations (Parks Forum, 2008). Unfortunately, it has proven not to be a simple task to place dollar values on all of these benefits in order to demonstrate the economic value of investment in parks and their management. There has been considerable research and project work undertaken on determining an appropriate means for estimating the economic value of tourism and recreation in parks. The principal driver for such activity has been a strong desire by government park management and tourism promotion agencies, the tourism industry, and the park users themselves to provide accurate data on the economic significance of national parks. Such information is now considered critical for substantiating arguments to respective Treasury Departments for the allocation of sufficient funds to ensure the ongoing management of parks for environmentally and economically sustainable tourism use. This article therefore focuses on the development of a practical methodology for deriving the most appropriate economic measures to put before Treasury Departments.

The research reported arose from a project commissioned by the Queensland state government park management and tourism agencies. The brief was to estimate an economic value associated with tourism to Queensland's national parks, appropriate to inform the government, and particularly the Treasury Department, in making resources available for park management.

The scope of the brief and the methodology developed focuses on establishing information relevant to annual decisions on budgeting for management for sustainable tourism use of existing national parks. Thus, the aim was to provide a simple "return on investment" measure to inform decision makers. The scope, therefore, is not a full cost-benefit analysis of private and social costs and benefits of tourism use of national parks. Nor is the study an impact assessment study of the addition of new national parks or closure of existing parks. There are generally no entry fees to national parks in Queensland, so economic value as would be measured by revenue raised is not a relevant measure. Furthermore, it is widely accepted that national parks are tourist attractions and economic activity associated with visits to parks includes money

spent in the regional economies on accommodation, transport, food and beverages, etc., which provides a return to the state economy.

This provided an opportunity to devise a methodology using elements of the best available approaches based on economic theory, recent literature, and previous studies to generate an estimate for use by the government and also to test this methodology with a view to suggesting any improvements for future updates and its wider application. Therefore, this article discusses the methodology, reports the results for the Queensland national parks study, and also makes recommendations for future applications of the methodology to state level estimates.

Queensland is a useful location in which to examine the economic value of tourism and recreation in parks as tourism is an important industry for the state and contributes 5.8% of gross state product (GSP) (Office of Economic and Statistical Research [OESR], 2006). Queensland is endowed with many natural attractions, and while national parks are an important resource for the tourism industry, no accurate up-to-date economic data on the tourism value of national parks were available. The national park estate in Queensland includes over 500 individual parks and protected areas of differing size and visitation levels, stretching from the coast to the outback. Significantly, it features five World Heritage Areas, including the islands of the Great Barrier Reef.

Many economic studies of national parks undertaken in the past have been somewhat limited in their wider usability as they have focused particularly on individual parks or clusters of parks in a given region. In contrast, the approach provided here seeks to provide an estimate of the state level economic value of national park tourism based on a representative sample of different types of parks across a diverse range of geographic regions and park characteristics.

Information appropriate to decision makers such as Treasury Departments would typically need to address the following questions:

- What is the additional spending in an economy that can be directly attributable to the attraction of national parks?

- What is the contribution of this spending to GSP?
- How does the contribution to GSP compare to current expenditure on park management?

This article builds on the approach developed by Ballantyne, Brown, Peg, and Scott (2008), and using data collected for that study, extends the analysis to address each of the questions posed above. The methodology used measures of net additional spending in the economy due to the attractions of the parks (that would not have occurred if the opportunity to visit the parks did not exist). For Queensland national parks, the value added to GSP of spending arising from visits to national parks is estimated and the result is compared with annual spending on national park management.

This article proceeds with an initial review of methods of measuring the economic value of tourism to national parks in order to explain the approach selected for this study. The Queensland study methodology section includes: a discussion of the population data that were used; the strategic approach to sampling parks; the approach to surveying visitors to gather relevant economic data; and the steps in analyzing that data. Results for the State of Queensland are presented and discussed. Recommendations for improvements to the methodology for future application are discussed and the broader findings and observations from this research are summarized.

Approaches to Measuring the Economic Value of Parks

The concept of total economic value (TEV) takes an economic and anthropogenic approach to describing the range of values that arise from natural environments. These values include: direct use (including tourism use); indirect use; option and quasioption values; and existence and bequest values (Pearce & Moran, 1994). Economic methodologies exist that allow dollar value estimates to be placed on this entire range of values (for Queensland, for example, see Environmental Protection Agency, 2003).

Often, a focus in valuing natural environment areas, such as national parks, has been in terms of placing a dollar value on direct use values such as tourism and recreation. This method provides a

conservative estimate of the broader TEV, given difficulties in measuring the range of nonmarket values in the TEV, and general acceptance of the tangible values associated with visitor use. Alternatively, the focus may be on the direct use only, where information on economic value helps inform decisions on investment in management of that use (Driml, 2010). This is particularly relevant in informing management for sustainable use, by investing in the maintenance of natural capital (Pearce et al., 1993).

When estimating the economic value of tourism in parks, the question of what to measure is obviously very relevant. Many studies have estimated the value to tourists in terms of consumer surplus generated by visits; where willingness to pay is above what visitors actually have to pay. This is considered the relevant measure of economic welfare and is the most appropriate measure to be used in cost-benefit analysis of proposals (e.g., to expand the park estate or change management of parks) (Campbell & Brown, 2003; Keske & Loomis, 2008). The Travel Cost Method (TCM) (a revealed preference method) has been used for several decades to estimate consumer surplus from use of recreation areas (Bockstael, 1995). Consumer surplus estimates are also able to be generated using the stated preference methods of Contingent Valuation (Carson, 2000) and Choice Modeling (Bennett, 1999), both of which have the advantage over TCM of incorporating use and nonuse values.

Another suite of studies has focused on direct spending by visitors and its economic significance to a region (Carlsen & Wood 2004; Gillespie Economics & BDA Group, 2008; Johnson & Moore, 1993). It may be argued that direct spending provides a proxy measure of the nonmarket values of the economic value of tourism using a "production-based" approach to valuation (Campbell & Brown, 2003).¹ The particular advantage of expenditure-based measures is that values may be considered by decision makers in the context of indicators of economic significance such as value added to the economy or employment generated. These measures are most relevant to the aims of the methodology. Mindful of this fact, the eco-

conomic significance of visitor spending approach is taken here.

Direct Expenditure by Tourists to National Parks

All economic significance studies take direct spending by tourists as a starting point. One of the first such studies in Australia (Driml & Common, 1995) estimated all the direct spending by visitors to a number of World Heritage Areas. This study served to highlight that national parks and protected areas were in fact economic resources, not totally "locked away" from use.

There are two disadvantages of the simple direct expenditure measure. First, it does not differentiate between spending that is simply redistributed in the economy by domestic tourists (between sectors and/or subregions) and net additional spending by inbound tourists. Second, it does not identify what component of expenditure is due to the attraction of the national park; that is, the expenditure that would not have occurred in the study area if the opportunity to visit the park did not exist. In other words, there is no attempt to define a counterfactual scenario against which to compare the status quo.

Carlsen and Wood (2004) developed the concept of the "attribution" factor. Attribution expenditure is considered the proportion of all direct spending by tourists to a region that can be attributed to an attraction such as national parks (Jones & Wood, 2008). The same authors recommend that the attribution factor is calculated using "measures of visitor motivation and activities" (p. 432). A concern with this approach, as Carlson and Wood (2004) acknowledge, is that while a visitor's choice of a particular national park-based activity and spending could be highly motivated by the existence of the park, it does not always necessarily follow that that visitor would not have undertaken some other activity (and its associated spending) in that same region, in the absence of the park.

Some studies have focused on identifying the subcomponent of direct expenditure that is in effect net additional expenditure in a region due to the attraction of the national park. That is, the expenditure that would not have occurred in the study area if the opportunity to visit the park did not exist. This component has been termed the

"substitution" effect (Carlson & Wood, 2004; Johnson & Moore, 1993). This is where the visitor nominates that they would have substituted their visit to the region with a visit to another region, state or country. Recent Australian studies estimating substitution expenditure include Carlsen and Wood (2004), Tremblay (2007), and Tremblay and Carson (2007). These studies focused on single parks or regions, and do not attempt to estimate state level substitution expenditure.

The approach taken here defines and estimates variations of the attribution and substitution effects, which we term the "national park-associated" (NP-associated) expenditure and the "national park-generated" (NP-generated) expenditure, respectively. The distinguishing factors of this approach from previous studies are that the population of tourists on which the survey is based is comprised of only those tourists who visit national parks, and the focus is on their spending in the state. The NP-associated measure of expenditure reported in this study includes all spending in a region by people who visit national parks in the region. The NP-generated expenditure, which we argue is the methodologically appropriate measure for decision-support purposes, is clearly a subset of the NP-associated expenditure.

Along with spending by international tourists who would not have visited the state if the opportunity to visit the parks did not exist, NP-generated expenditure also includes spending by Australian tourists and state residents who would have alternatively traveled outside the state and state residents who would not have traveled to the region of the parks. Accordingly, the approach taken here is to attribute their total, tourism-related spending to the national parks, irrespective of how much of their trip was actually spent in the park. We justify this protocol on the assumption that these visitors would not have undertaken any tourism-related spending in the state if the national parks were not there. Importantly, this approach serves to define the "counterfactual" situation in this study.

This methodology mirrors approaches to estimating the economic impact of special events. Practitioners of event assessment consider the appropriate measure is "new" or "inscope" expenditure (Dwyer, Forsyth, & Spurr, 2005) which is

"expenditure that would not have occurred in the region had the event not occurred" (Jago & Dwyer, 2006, p. 8). The events literature suggests that the inscope expenditure includes spending by visitors who only visited the region for the event. There are differing views on whether event expenditure by locals who would otherwise have spent the money outside the region (termed "retained" expenditure) should be included and it may be excluded where it is difficult to measure (Jago & Dwyer, 2006). In this study, the NP-generated expenditure is the equivalent of "inscope" expenditure and does include the equivalent of "retained" expenditure by state residents who would otherwise have traveled outside the state or not have travelled to the region where parks are located.

Measures of Economic Significance

Measures of economic significance of direct spending include the direct value added component, household income, and employment supported by that spending. In addition, measures of the indirect effects (multiplier effects) as this spending flows through a regional or state economy, can be estimated using, most commonly, input-output analysis or Computable General Equilibrium (CGE) analysis.

Perhaps the most prominent approach used to date to convey economic significance has been to generate "multiplier effects" based on direct expenditure by tourists to national parks. Regional or state level input-output models have been used to estimate output, income, and employment multipliers that express direct, and flow on (indirect and induced) effects in an economy due to tourism expenditure (Gillespie Economics & BDA Group, 2008; Saayman & Saayman, 2006).

The measure favored for this analysis is the value-added component of direct spending (i.e., income in the form of wages, profits, interest, and rent). This is the equivalent of the output (spending) minus the cost of intermediate inputs to the tourism production process. This is the contribution of tourism spending to GSP (Office of the Queensland Government Statistician, 2002).² This somewhat conservative approach was chosen as it: (i) correctly differentiates income (value added) from total expenditure; (ii) does not depend on es-

timates of income from the indirect, flow-on effects from tourism expenditure that can result in highly exaggerated impacts, difficult to defend; and (iii) is consistent with the Queensland Treasury Department's preferred measure of an activity's contribution to the economy: "Value added is considered to be the appropriate measure of economic activity and the preferred measure for the assessment of the contribution of a special event or development project to the Queensland economy" (Office of the Queensland Government Statistician, 2002, p. 44).

Measures of the value-added component of direct tourism spending and direct employment generated are available for tourism in Queensland from state level Tourism Satellite Accounts (TSA). A TSA published by the Queensland's Office of Economic and Statistical Research (OESR) (2006) was used for the Queensland study.³ TSAs use input-output analysis to generate economic significance measures. While it may be argued that CGE models provide better estimates of value added from an activity, no CGE models with a tourism sector at the state level were available for Australia at the time of this study.

Return on Investment in Park Management

An addition to the methodology that takes it a step beyond other Australian studies of the economic value of tourism to national parks is to compare the value-added measure with spending on park management. While not a full cost-benefit assessment of the private and social costs and benefits of allowing tourism in national parks, it does give an indication on the return to the state economy on annual investment in management of parks for tourism use.

Queensland Study Methodology

The steps used in the methodology are outlined in this section.

Step 1: Questionnaire Design

The questionnaire used for the survey was based on one developed initially by Wood, Glasson, Carlson, and Hopkins (2006). The final five-page multi-item questionnaire used in the study was the

result of further development by the research team, in consultation with key stakeholders, namely Queensland tourism and national parks agencies.⁴ The questionnaire included questions to identify whether respondents had visited a national park(s) in the defined tourism/parks region. The economic component of the questionnaire included a request for respondents to indicate what they had spent, or intended to spend, in the tourism/parks region (delineated by a map) on: package holiday cost (not spent locally); travel; accommodation; food and drinks in local hotels/restaurants and stores/supermarkets; activities and trips; and other (equipment, souvenirs, etc.). Respondents were asked to specify if their answers were for themselves or their group and for one night or the whole time in the local region.

The questions used to calculate the NP-generated proportion of visits were as follows:

- A) If the national parks in this region (please refer to map) did not exist, would you have chosen to visit this region anyway?
 - (a) Yes
 - (b) No
- B) If you answered "No" at question A, what would you have done instead of visiting this region? (Please tick one box only)
 - (a) Stayed at home
 - (b) Traveled elsewhere in Queensland
 - (c) Traveled to another state
 - (d) Traveled to another country

Respondents who answered "No" to question A and answered (a) or (c) or (d) to question B were included in the sample of NP-generated respondents.

Step 2: Sample Frame Design

Specifying the Population of Visitors. A challenge with tourism and park visitor studies is having sufficiently reliable and valid information on the population of visitors to enable sample results to be extrapolated to population estimates. In Australia, regular national level surveys are carried out for domestic tourists in the National Visitor Survey (NVS) and for international visitors in the International Visitor Survey (IVS). These provide

data for all the states and territories and the tourism regions within them. It is acknowledged that confidence in the estimates improves with more observations (Tourism Research Australia, 2008b) and so a 5-year average was calculated for each region. The population of domestic overnight visitors to national parks, and the number of visitor nights spent in the region where the parks were located, was able to be estimated directly from the NVS (day trips were excluded from this study at the request of the commissioning agencies). The IVS estimate was less certain and therefore two estimates were used in the analysis: a conservative "best population estimate" and a "maximum population estimate."

A Strategic National Park Sampling Logic. The park size, location in relation to tourism centers, and visitor numbers vary significantly among the 500 national parks in Queensland. Selecting representative parks for the survey was therefore a challenge. In addition, the research had a budget that was sufficient to survey several hundreds of visitors, but surveying needed to be undertaken in a strategic way to maximize the representativeness of the sample. Based on discussions with experts from the Queensland Parks and Wildlife Service (QPWS) and Tourism Queensland, emphasis was placed on stratifying the parks at the regional level and then selecting some regions in which to conduct the survey work. This was approached by using Queensland's tourism regions as a basis for sampling. Queensland has 12 "tourism regions" that align with the regions used for reporting NVS and IVS data.⁵ Experts from QPWS and Tourism Queensland, working with members of the study research team, developed a system to classify the regions according to four principal types—Iconic, Urban, Remote, and Outback⁶ (see Table 1). It should be noted that this work was based on significant prior effort by staff of the agencies involved in terms of detailing the different types of parks and attractions that existed in the state at the time of the study. In turn, each of the tourism regions was awarded a classification to reflect the predominant characteristics of tourism to parks in the region. One region, representing each of the four classifications, was then selected and a group

Table 1
Classification of Tourism Regions

Classification	Characteristics of Tourism to Parks	Tourism Regions	Parks Surveyed
Iconic	High visitor numbers, likely high attraction of visits to the region due to the existence of the parks and high average direct expenditure value	Tropical North Queensland (including Cairns), Mackay, Whitsundays, Wide Bay, Great Sandy	Cairns region parks
Urban	High visitor numbers, likely low attraction of visits to the region due to the existence of the parks and average direct expenditure value	Brisbane, Gold Coast, Sunshine Coast	Gold Coast hinterland parks
Remote	Low visitor numbers, likely high attraction of visits to the region due to the existence of the parks and average direct expenditure value	Capricorn, Carnarvon, Townsville, Toowoomba	Carnarvon National Park
Outback	Low visitor numbers, potentially low attraction of visits to the region due to the existence of the parks and average direct expenditure value	Outback	Outback parks: particularly Lark Quarry & Pine Gully (Hughenden region)

of parks in each of those four regions was identified for later administration of the survey.

Step 3: Conduct the Survey

Surveying was conducted in 2007. Most of the survey data were collected by interview during survey periods of 5–7 days in the field in each region. Specific locations for surveying were selected using the local knowledge of national park managers and staff of regional tourism authorities. A purposive sampling method was applied, selecting respondents who, in the judgment of the researcher, would best supply the necessary information (Balvanes & Caputi, 2001). Only one respondent per travel group was asked to participate in the survey. Questionnaires were also distributed via regional visitor centers in close proximity to each of the park areas selected for the study to enable respondents to mail back their responses to the researchers after their visit.

The sampling approach was selected in order to maximize the number of interviews that could be conducted with the funds available and was based on expert knowledge of tourism patterns. The authors acknowledge that the sampling approach reflected resource and time constraints. Recommendations for a future sampling approach are included in a later section of this article.

Step 4: Develop the "NP-Generated Factor"

The NP-generated factor is the number of respondents who reported they would otherwise not have visited the locality, as a proportion of the number who visited a national park. This was calculated for each of the four regions surveyed and represents the factor for each of the four types of tourism/parks region (Iconic, Urban, Remote, and Outback).

Step 5: Calculate the Mean Spending per Respondent per Day

The expenditure data from the sample showed large variance around the sample mean and in all cases, the standard deviation was greater than the sample mean.⁷ For the Gold Coast, the mode was higher than the sample mean, indicating a negatively skewed distribution of observations. In the other three cases, the distribution was positively skewed. Stynes and White (2006) note that this latter pattern is typical for expenditure by visitors to natural environment recreation sites and that it is typical to have some quite high expenditure observations. To test the sensitivity of our estimates to inclusion of large outliers, two estimates of sample means were generated from the sample data. The "original data estimate" used all the ob-

servations in the sample. In the "excluding outliers estimate," observations that were more than 3 standard deviations from the sample mean were excluded from the analysis (an option suggested by Stynes & White, 2006). This resulted in removal of a small number of outlier observations at the high expenditure end of the range, for each survey region.

In addition, given the variability of the data a Monte Carlo type simulation was performed using the @RISK spreadsheet add-in, with a view to deriving confidence intervals for our estimates. Given the absence of suitable data on which to derive specific probability distributions, a triangular probability distribution based on the sample minimum, mode, and maximum observations, was assumed and simulations with 10,000 iterations were performed.

Step 6: Calculate the NP-Associated Expenditure

The NP-associated expenditure for the four regions surveyed was calculated by multiplying the mean spending by survey respondents in each surveyed region by the defined population for that region. Visitor nights for the population of tourists were defined for each region from the NVS and IVS datasets using two estimates for the IVS data ("conservative population estimate" and "maximum population estimate"). This was then extrapolated to all regions by applying the spending means from the surveyed regions to the other regions according to their tourism/parks regional classification (refer to Table 1) and multiplying by the populations for those regions. Results for all regions were summed to produce the result for Queensland.

Step 7: Calculate the NP-Generated Expenditure

The NP-generated factor was applied to the NP-associated expenditure for each region according to its tourism/parks region classification. Results for all regions were summed to produce the results for Queensland.

Step 8: Apply Sensitivity Analysis

Where more than one estimate is used for key variables, sensitivity analysis is warranted, to as-

certain the possible variability of results generated. In this case, we used two estimates for mean spending and two population estimates giving a total of four expenditure estimates. Applying a Monte Carlo type simulation, the ranges of possible values for total expenditure (at the 90% confidence interval) were estimated for each of the four scenarios and compared. If the bands overlap the results can be considered relatively insensitive to the choice of alternative expenditure and population estimates.

Step 9: Calculate the Value Added and Employment Supported From the NP-Generated Expenditure

The Queensland Tourism Satellite Account used in this study reports both total expenditure by tourists and the contribution of tourism to GSP (OESR, 2006). The proportion of GSP to total expenditure derived from the TSA was used to estimate the contribution to GSP from NP-generated expenditure. The TSA was also used to estimate employment supported by the NP-generated expenditure by applying the ratio of tourism expenditure to full time equivalent jobs for Queensland to the NP-generated expenditure.⁸

Step 10: Compare the Value Added From NP-Generated Expenditure With the National Parks Visitor Management Budget

The annual funding for National Parks management includes activities to manage visitor presence in National Parks as well as conservation-oriented activities. The research team confirmed with the QPWS that the information made available by the agency on the visitor management component of their budget included: capital works, visitor information, on ground services, and forward planning. A simple comparison was made between annual value added from NP-generated expenditure and the annual visitor management budget.⁹

Queensland Study Results

Our sample consisted of survey respondents who had visited a national park. It totaled 656 responses, with the regional breakdown shown in Table 2.

Table 2

NP-Generated Factor (NPG)

Region (Category)	<i>n</i>	NPG Factor (%)
Cairns (iconic)	216	20.6
Carnarvon (remote)	236	18.5
Gold Coast (urban)	114	12.2
Outback (outback)	90	19.1

The NP-generated factor [the percentage of respondents who would not have visited the region in the absence of opportunity to visit the park(s)] is shown in Table 2. For all regions except the Gold Coast, around one fifth of visitor spending by people who visit parks would not have occurred in the State if the opportunity to visit the parks did not exist. The lower NP-generated factor for the urban region is consistent with there being a range of other attractions and reasons to visit (e.g., business or visiting friends and relatives) in those areas.

The expected sample means for spending per respondent per day for each region, obtained using the simulation outlined in Step 5 of the methodology, are shown in Table 3.

With two estimates for mean spending and two estimates for the population, four different estimates of spending were made, as outlined in Table 4.

The spending estimates for the whole of Queensland for NP-associated expenditure and NP-generated expenditure are shown in Table 5. These are based on summing results using expected mean values for each region, according to the four estimates outlined in Table 4.

For the purposes of sensitivity analysis, the results for the four estimates were compared using

ranges for spending generated in the Monte Carlo type analysis. The 5th percentile value indicates the point where at least 95% of estimates are above that value and the 95th percentile limit indicates that only 5% of estimates lie above that value. The band of values between these two points corresponds to the 90% confidence interval. Figures 1 and 2 show the 95th percentile values at the top of the bands, the 5th percentile values at the bottom of the bands, and the mean values lying in between, for each estimate. These figures illustrate that removing outliers reduces the top end of the band but the lower bound is similar across assumptions. Therefore, we can be confident that the values are at least as much as the lower bound shown. Furthermore, as the range of values in the 90% confidence interval overlaps for all four estimates this suggests that the results are reasonably robust.

As estimate 2 represents the midpoint of this range, this estimate is used to illustrate the remainder of the analysis. Under this scenario, the estimate of NP-associated expenditure is \$4.43 billion per year and the estimate of NP-generated expenditure is \$749 million per year. The 5th percentile values indicate a 95% probability that the values are at least \$2.08 billion and \$328 million per year, respectively.

Total tourist expenditure in Queensland (excluding day trips) was approximately \$15.9 billion in 2007 (Tourism Research Australia, 2008a; 2008b). This figure includes spending by international and Australian tourists inbound to Queensland as well as residents of the state taking trips at least overnight. The NP-associated expenditure is 28% of this total and NP-generated expenditure,

Table 3

Spending per Person per Night, Sample Data, Means (90% Confidence Intervals in Parentheses)

Region	Minimum (\$)	Maximum Excluding Outliers (\$)	Maximum Original Data (\$)	Mode (\$)	Expected Means Excluding Outliers (\$)	Expected Means Original Data (\$)
Cairns	0.27	335.37	840.00	50.00	128.55 (29.10–266.20)	296.76 (46.00–658.00)
Carnarvon	1.18	278.72	692.86	30.00	103.30 (21.20–220.00)	241.35 (33.00–541.00)
Gold Coast	0.21	316.23	325.00	175.00	163.81 (52.80–269.00)	166.74 (53.50–275.60)
Outback	0.90	266.71	383.33	35.00	100.87 (22.20–211.20)	139.74 (26.40–301.70)

Table 4
Alternative Expenditure Estimates

Estimate	Description
Estimate 1	Conservative population estimate, excluding outliers
Estimate 2	Conservative population estimate, including outliers
Estimate 3	Maximum population estimate, excluding outliers
Estimate 4	Maximum population estimate, including outliers

a subset of the former, is 4.7% of this total. The estimate of 28% is supported by research that estimated that 21% of all tourism spending in Australia in 2007 was made by tourists who visited national or state parks (Tourism Research Australia, 2008c).

At the state level, the size of the economy is measured by GSP. The TSA for Queensland (OESR, 2006) reports both the total Queensland tourism expenditure and the contribution to GSP. The contribution to GSP was 46% of tourism expenditure. This factor of 46% was applied to NP-generated expenditure, giving the contribution to GSP at \$345 million per year, or 4.9% of the tourism sector's contribution to GSP.

The ratio of full-time equivalent jobs supported by tourism spending estimated from the TSA was 1 job per \$169,800 in spending. Applying that ratio results in an estimated 4,413 full-time equivalent jobs, or 4.2% of tourism's full-time equivalent employment in Queensland, supported by the NP-generated expenditure of \$749 million per year.

In order to place the contribution to GSP into some context for decision makers, it is useful to compare it with what is currently spent on management that can be attributed to tourism use of

national parks. The Queensland Government spent \$67 million on visitor management in 2008 (McNamara, 2008). A simple comparison shows that our conservative estimate of the contribution to GSP of NP-generated expenditure (\$345 million) is over five times the government visitor management budget.

Of course, this is not to claim that revenues directly or indirectly accruing to the State budget (e.g., through consumption taxes on NP-generated expenditure) will necessarily be sufficient to fully offset the government's spending on park management. However, this should not be the criterion on which decisions on public spending are made. From a standard cost-benefit analysis perspective it is sufficient to demonstrate that the total value of the additional benefits, irrespective of to whom they accrue, should be at least as great as the additional costs. How those costs are to be financed is a separate issue.

Suggested Improvements to Methodology

One of the most important improvements suggested here is in the approach to sampling park visitors. Given that surveying of all parks in the

Table 5
Estimated Expenditure for Queensland (90% Confidence Intervals
in Parentheses)

	NP-Generated Spending (\$ Millions)	NP-Associated Spending (\$ Millions)
Estimate 1	449.33 (229.75– 692.48)	2,935.99 (1,472.44– 4,416.62)
Estimate 2	749.36 (328.30–1,302.27)	4,433.23 (2,086.79– 7,273.41)
Estimate 3	671.40 (338.55–1,044.17)	4,138.28 (2,174.46– 6,525.25)
Estimate 4	1,147.78 (491.36–2,018.67)	6,690.87 (3,133.17–11,112.08)

Figure 1. NP-associated spending for Queensland: means and 90% confidence intervals. The vertical lines show the 90% confidence intervals. The highest point of each vertical line is the 95th percentile limit, the lowest point is the 5th percentile limit and the mean is also shown.

state would not be feasible, this is aimed at making the sampling focused, efficient, and able to be related to population data. A stratified sample of international visitors, domestic overnight visitors, and day trippers is recommended as these groupings can be converted up to population results, based on datasets from national-level surveys of

international and domestic tourists; in Australia's case, the NVS and IVS datasets.

Information on the population of Australian tourists who visit national parks is available from the NVS on a regional basis. This can be used to convert the sample results for domestic overnight visitors and day trippers to population results. It is

Figure 2. NP-generated spending for Queensland: means and 90% confidence intervals. The vertical lines show the 90% confidence intervals. The highest point of each vertical line is the 95th percentile limit, the lowest point is the 5th percentile limit and the mean is also shown.

possible to use methodology developed by Driml and McLennan (2010) to estimate populations for international visitors who visit parks, on a regional basis. This "population" will still be an estimate and sensitivity analysis is still recommended.

For each region, standard sampling procedure indicates that a sample of 40 tourists from each stratum is required (Driml & McLennan, 2010). A quota sampling approach can be used to most efficiently obtain the sample (Veal, 1997).

This approach in fact means that sampling is more focused and will require fewer respondents than were sampled in the Queensland study. This may provide the opportunity within a given budget to survey in more regions. For example, sampling could be undertaken in two regions from each tourism/parks classification group (e.g., Iconic, Urban, Remote, and Outback).

The stratification of regions according to tourism/parks classifications is a means of approaching the task of sampling over the large area of a state in a representative manner, assuming budget constraints. It is recommended that this approach is retained in the updated methodology. If budget constraints are not a challenge, sampling could occur in each tourism region.

The Queensland study excluded day trip tourists. However, this category of visitors could easily be included in studies as the population is available from the NVS data. Inclusion of day trip tourists would increase the NP-associated expenditure estimate, but is not likely to have a similar proportional increase in the NP-generated expenditure as many day trippers would have been in the region anyway.

Discussion and Conclusions

This article discusses and demonstrates a methodology for estimating a direct expenditure measure of the contribution of national parks to the local economy, using data from a survey of national park visitors in the state of Queensland, Australia. The method focused on the additional spending in the state that can be attributed to the opportunity to visit parks. This NP-generated expenditure includes that of inbound visitors to the state who would not have visited if the opportunity to visit the parks was not available, plus the

avoided "leakage" in spending by residents of the state who would alternatively have chosen to travel out of the state or would not have travelled to the regions where the parks are located.

It is argued that this conservative approach provides a useful, lower bound estimate of the economic benefits from tourism spending, relevant for understanding the role of national parks in generating additional economic value to the state, and for assessing the return on state expenditure on park management. It is worth noting that indirect and induced multiplier effects were not reported. It could be argued that because we define NP-generated expenditure to include only that expenditure that would not have occurred in the absence of the opportunity to visit the parks, inclusion of the associated multiplier effects is justifiable and the common criticism that the same flow-on effects could have occurred anyway do not hold. However, given that tourism-specific multipliers are notoriously difficult to compute given that there is very often significant excess capacity in the tourism and hospitality sector, we have opted to err on the side of caution by relying exclusively on the income gained from direct tourism spending. For this reason we focus on the value added component of direct spending as the contribution to GSP.

As a conservative measure of the economic contribution of tourism to national parks to the state, this may not suit everyone, especially those who rely on "big numbers" for purposes of advocacy. It is argued here that where Treasury Departments are required to justify budgetary allocations on the basis of an activity's contribution to the local economy, the deliberately conservative measures reported here are most appropriate, easier to defend, and thus more likely to be accepted. If raising public and industry support for national parks is important, estimating employment supported is a useful addition to economic analysis. Here again we prefer not to rely on the employment generated through the flow-on effects but only that which can be attributed to direct spending on the parks.

The proposed methodology includes the development of a stratified sampling approach, using tourism regions as its basis. The advantage of using tourism regions in Australia is that the data on the population of tourists who visit national parks

are available at this scale. However, one qualification of using such an approach is that the stratification does rely on the expert knowledge of people in the national parks and tourism management agencies to classify regions into a coherent and manageable set of similar regions. It may be that some regions are so unique there will be only one region in a classification, as applies to the Outback region selected in this study.

Improvements are suggested to the sampling approach, using quota sampling of the strata of international, domestic overnight, and domestic day trip visitors, to increase efficiency and ensure the ability to relate the sample to the population.

Given the variability of survey-based estimates, appropriate sensitivity and risk analyses need to be undertaken to provide the range of possible values at specified confidence limits to test the robustness of the estimates.

The results of the Queensland study are presented with a range of spending totals generated using sensitivity analysis. Those selected for interpretation of economic significance show a notable contribution of \$345 million per year to GSP from tourism to national parks in Queensland that is exclusively due to the opportunity to visit national parks. The contribution to GSP represents more than five times the amount spent currently in the state on park management for visitor use.

As noted earlier, one aim of this work was to test the methodology with a view to developing an approach for application at the state level for wider use in Australia and elsewhere. The recommendations for future use of this include:

- A state level measure is appropriate and this can be obtained by using stratified sampling based on tourism regions.
- Sampling should focus only on tourists who visit national parks—for efficiency and accuracy reasons.
- Population data can be used in the survey design phase to inform stratifying the sample based on the key variables of visitor origin (domestic overnight, day trip, and international).
- Direct expenditure measures should include the NP-associated measure of what all tourists to national parks spend in the state and more importantly the NP-generated component of spend-

ing that is exclusively attributable to the opportunity to visit the national parks.

- The contribution to Gross State Product of the NP-generated expenditure provides a relevant economic measure.
- Comparison of the contribution to GSP with current park management budgets is useful, though it is noted that more work is warranted on the best approach for this.
- Communications material should be developed to explain the results to stakeholders.

Further research could include investigating the role of different attractions within national parks in terms of their direct contribution to the economic significance of parks. This could involve the integration of approaches such as choice modeling with the methodological approach presented here. Another possible area of research could investigate applying the approaches used here to other tourist attractions in order to estimate their economic significance and, in a more general sense, to validate the suitability of the research methodology developed for such purposes.

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Notes

¹As any supply-side approach to nonmarket valuation is unable to capture consumer surplus including nonuse values, where feasible, demand-side stated preference methods would be preferred (see Campbell & Brown, 2003).

²OESR (2006) uses gross value added at basic prices plus taxes less subsidies on production to measure GSP, and estimates presented in this article use that definition.

³TSAs are also available with a Queensland state tourism sector for 2006/2007 (van Ho et al., 2008) and for 2007/2008 (Pambudi et al., 2009). Regional tourism TSAs are now available for Queensland (Pham, Dwyer, & Spurr, 2010). However, these state level TSAs do not report total spending for Queensland used in the analysis, so the authors were not able to calculate value added as a percentage of total spending.

⁴The authors would like to acknowledge the contribution of Professor Jack Carlsen, Curtin Sustainable Tourism Research Centre, to the questionnaire design.

⁵A 13th region was added to the list by modifying some of the existing regional boundaries.

⁶This classification also drew on work the Curtin Sustainable Tourism Research Centre (not currently published) by Carlsen, Jones, and Wood.

⁷The data were input and analyzed to the point of providing sample means for expenditure by the Curtin Sustainable Tourism Research Centre.

⁸It is assumed here that the spending profile of tourists who visit national parks has the same distribution across sectors as that for all Queensland tourists. The authors believe that this is justified as the NP-associated expenditure estimate used represents 28% of all tourism spending in Queensland (see Queensland study results section).

⁹It is acknowledged that further research is warranted on determining the best way to effectively measure tourism management costs (including separating tourism or visitor management costs from other park management and how best to include capital works) and how to make a relevant comparison.

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