



AgEcon SEARCH
RESEARCH IN AGRICULTURAL & APPLIED ECONOMICS

The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
<http://ageconsearch.umn.edu>
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

ECONOMICS, ECOLOGY AND THE ENVIRONMENT

Working Paper No.44

**Tourism and Conservation of Sea Turtles:
An Australian Case Study**

by

Clem Tisdell and Clevo Wilson

August 2000



THE UNIVERSITY OF QUEENSLAND

ISSN 1327-8231
WORKING PAPERS ON
ECONOMICS, ECOLOGY AND THE ENVIRONMENT

Working Paper No. 44

Tourism and Conservation of Sea Turtles
An Australian Case Study^{*}

by

Clem Tisdell[†] and Clevo Wilson[‡]

August 2000

© All rights reserved

^{*} .A background paper for a lecture in Tourism Studies, Faculty of Environmental Management and Agriculture, University of Western Sydney (Hawkesbury Campus) given on Wednesday, 16 August, 2000.

[†] School of Economics, The University of Queensland, Brisbane QLD 4072, Australia
Email: c.tisdell@economics.uq.edu.au

[‡] Postdoctoral Fellow, Department of Economics, The University of Queensland, 4072, Australia

WORKING PAPERS IN THE SERIES, *Economics, Ecology and the Environment* are published by the School of Economics, University of Queensland, 4072, Australia, as follow up to the Australian Centre for International Agricultural Research Project 40 of which Professor Clem Tisdell was the Project Leader. Views expressed in these working papers are those of their authors and not necessarily of any of the organisations associated with the Project. They should not be reproduced in whole or in part without the written permission of the Project Leader. It is planned to publish contributions to this series over the next few years.

Research for ACIAR project 40, *Economic Impact and Rural Adjustments to Nature Conservation (Biodiversity) Programmes: A Case Study of Xishuangbanna Dai Autonomous Prefecture, Yunnan, China* was sponsored by the Australian Centre for International Agricultural Research (ACIAR), GPO Box 1571, Canberra, ACT, 2601, Australia.

The research for ACIAR project 40 has led in part, to the research being carried out in this current series.

For more information write to Emeritus Professor Clem Tisdell, School of Economics, University of Queensland, Brisbane 4072, Australia.

Tourism and Conservation of Sea Turtles:

An Australian Case Study

*Clem Tisdell and Clevo Wilson**

Abstract

Reports on turtle-based tourism at Mon Repos in southern Queensland, pointing out that tourism can have either positive or negative effects ecotourism depending on the way it is conducted or developed. However, turtle-based tourism at Mon Repos satisfies the conditions for ecotourism, and in fact has positive consequences for the conservation of marine turtles. Ecotourism based on the turtle rookery at Mon Repos is managed by the Queensland Parks and Wildlife Service and associated with Mon Repos Conservation Park and the abutting Woongarra Marine Park. The evolution of turtle conservation at Mon Repos is outlined, and the nature of a survey of turtle-watching visitors, conducted by the authors, is outlined. Some information is provided on the characteristics of respondents and about the type of information which led them to visit Mon Repos. The ex post willingness of respondents to pay for their turtle experience is estimated along with their considerable consumers' surplus and this is magnified to take account of all visitors. The significant local (regional) economic impact of turtle-based ecotourism at Mon Repos is also estimated, as well as the educational and conservation impact on visitors of their turtle experience at Mon Repos. It is found that the turtle-based ecotourism facility at Mon Repos is very effective in its educational and conservational impact on visitors, and in fostering social, economic and political support for the conservation of marine turtles

* We are grateful to the Cooperative Research Centre for Sustainable Tourism for providing some financial support for the case study, and to rangers, especially Cathy Stutchbury, and volunteers at Mon Repos for their assistance. We also wish to thank Dr Colin Limpus of the Queensland Parks and Wildlife Service for his assistance. The usual *caveat* applies.

Tourism and Conservation of Sea Turtles:

An Australian Case Study

1. Introduction

All species of sea turtles are threatened with extinction (IUCN, 1996) primarily due to the activities of humans. Threats to sea turtles are detailed in Environment Australia (1998). Marine turtles are victims of human developments of various kinds such as human encroachments on their breeding grounds, damage or death at sea due to boat strikes and fishing activities, death due to ingestion of wastes such as plastics or other pollutants and entanglement in floating ropes and other human-originating flotsam and jetsam. Indigenous communities in the Indo-Pacific also harvest sea turtles for meat and consume their eggs. Turtles are still taken for the souvenir market and despite bans by CITES (Convention on International Trade in Endangered Species) some trade in tortoiseshell (bekko in Japan) obtained from hawksbill turtles *Eretmochelys imbricata*, still continues.

The problem of conserving sea turtles is compounded by the fact that they are highly migratory. Those species which breed in Australia, for example, travel to many other countries in the Indian and Pacific oceans. Consequently, they are a transboundary international resource¹. Loggerhead turtles *Caretta caretta* breeding at Mon Repos beach near Bundaberg in Southern Queensland travel to several other Pacific countries e.g. New Caledonia, Solomon Islands and Papua New Guinea (Queensland Turtle Research, 1994, p.48) where they may be eaten by indigenous people. The leatherback turtles *Demochelys coriacea* which are found in Australian waters may even travel as far afield as Mexico (Limpus, 1988, p.66). Although Australia contains important breeding grounds (rookeries) for six species of sea turtles, the conservation of the populations of sea turtles associated with these rookeries is only partially under Australian control. This does not mean that Australian efforts to conserve sea turtles will be of no avail, but indicates that international cooperation is needed to enhance the effectiveness of these efforts.

Queensland, Australia's second largest state, is situated in tropical and sub-tropical waters and contains internationally important habitats for sea turtles, especially for their breeding. Several policies have been adopted in Queensland in recent years to improve the chances of survival of sea turtles. These include limitations on boat speed when boats are near turtles in marine areas and required avoidance procedures and more recently, the fitting of turtle-excluding devices on prawn trawlers. Non-indigenous persons may not kill or capture turtles nor collect their eggs although indigenous Australians (Aborigines and Torres Strait islanders) may do so for non-commercial purposes (GBRMPA, 1994, p.3). In addition, turtle-based ecotourism is playing a role in Queensland's strategy to help conserve sea turtles.

The main purpose of this article is to examine economic aspects of ecotourism which relies on the sea turtle rookery in Mon Repos Conservation Park, 14 kilometres from Bundaberg in Queensland.

2. Tourism/Ecotourism as a Contributor to Conservation of Sea Turtles

Tourism can either have positive or negative effects on the conservation of turtles depending on its nature. Tourism which has occurred in Malaysia, for example, in the past whereby tourists are offered sea turtle eggs as a special treat or turtle meat is clearly destructive of turtles. Lights from tourist resorts and cars in the vicinity of turtle rookeries are likely to disorientate newly hatched turtles which instead of marching to the sea on emergence move inland to their death. Furthermore, shade on beaches from tall buildings associated with tourist development can result in failure of turtle eggs to incubate successfully because of lack of warmth. Harassment of turtles by tourists can also interfere with their nesting. Consequently, tourists and their activities need to be controlled if they are to be without negative consequences for turtle populations. On the other hand, tourism can have positive consequences for the conservation of sea turtles if it is appropriately managed as at Mon Repos Conservation Park.

Turtle-based tourism at this Park fulfills the conditions for ecotourism (Tisdell, 1996): it is conducted in a manner careful of the environment, provides education about sea turtles,

and is designed to make visitors aware of conservation problems facing turtles and informs visitors of ways in which they can help conserve marine turtles.

The fact that such tourism is sustainable and brings extra income and employment to the local community helps to foster local regional support for such conservation efforts.

In the Bundaberg region, the sea turtles have become a regional icon. A sea turtle has been included in the coat of arms of the Burnett Shire Council. The Bundaberg District Tourism and Development Board (responsible for the general marketing of tourism in the region) also uses a turtle-image to help promote tourism in its region. Furthermore, a Turtle Festival was commenced in 1999.

Ecotourism may also help to promote communal solidarity. Ecotourism, especially that involving animal-watching, is frequently highly labour-intensive and often relies on local volunteers to make it viable from an economic point of view. In the case of the turtle rookery at Mon Repos, local volunteers assist officers of the Queensland Parks and Wildlife Service (QPWS) in a variety of ways e.g. collection of entrance fees, operating a small souvenir shop, assisting with crowd control, organising viewing-parties and collecting scientific data about turtles. Such participation helps to build local support for turtle conservation and avoids economic costs which would be likely to cripple the tourism operation. A similar pattern has been observed for other ecotourism ventures e.g. the Royal Albatross rookery at Taiaora Head in New Zealand (Tisdell, 1990).

The long-term conservation of species is dependent on local political support as well as wider community support. Programmes at Mon Repos are fostering both as is apparent from the more specific information given below derived from a survey of visitors to Mon Repos Conservation Park.

3. Mon Repos Conservation Park: Background on the Turtle Rookery

Mon Repos Conservation Park, although only 45 hectares in size, protects (for about one kilometre) the leeward side of Mon Repos beach which supports the “largest concentration

of nesting sea turtles on the eastern Australian mainland and is one of the two largest loggerhead turtles rookeries in the South Pacific Ocean region” (Kay, 1995, p.3). In the main, it is loggerheads *Caretta caretta* which nest there plus occasionally flatbacks *Natator depressus*, greens *Chelonia mydas* and very rarely leatherbacks *Demochelys coriacea*. It is the most accessible sea turtle rookery in Australia for tourists and its general location is indicated in Figure 1.

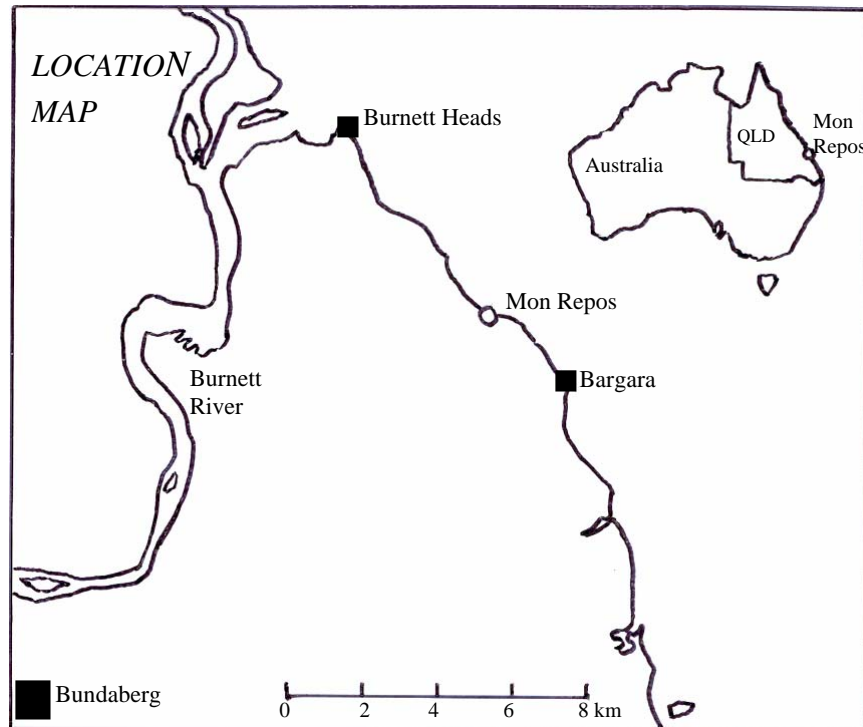


Figure 1: Map showing the general location of Mon Repos (after Kay, 1995, p.1).

The landward boundary of the Park is critical to preventing potential suburban development along the coastline which could have fatal consequences for this rookery. Indeed, there was an imminent threat of such development in the 1980s which led the Queensland Government embarking on a programme to acquire parcels of its freehold land abutting Mon Repos beach and this eventually culminated in the Conservation Park. Casuarinas (she-oaks) were planted by QPWS along the foreshore to reduce light from the leeward side.

Historically the following were important steps in the development of the site for ecotourism

- 1968, Queensland Turtle Research Programme commenced at Mon Repos with the support of a Brisbane-based tertiary education institution with Dr Colin Limpus providing leadership.
- 1981, initial steps towards establishment of Mon Repos Conservation Park; first parcel of land acquired to establish Mon Repos Environmental Park.
- 1985, formal turtle-watching programme commenced by research staff at Mon Repos in order to manage growing crowds.
- 1991, Woongarra Marine Park declared in order to protect sea turtles offshore from Mon Repos (and nearby beaches) during their breeding season.
- 1993-94, Information Centre and Amphitheatre completed at Mon Repos Conservation Park in order to enhance the educational impact of turtle-watching.
- 1994-95, Season service fee introduced; marks the commencement of commercialized ecotourism at the Park.

While the exact proportion of scientists and experts relative to the total number of visitors to Mon Repos and in comparison to ordinary tourists is unknown, it seems likely that the latter have increased proportionately since 1968, and probably since the mid-1980s has exceeded the former. This would accord with the hypothesis of Duffus and Dreaden (1990) about the pattern of development of ecotourism. But it is less clear that the total visitor numbers follow the logistic-type curve suggested by Butler (1980). As can be seen from Table 1, visitor numbers compared to 1993/93 fell substantially in 1994/1995 and did not recover to the levels of 1993/94 until the 1999/2000 season. Whether or not the recent upward trend in visitor numbers will continue remains to be seen.

Table 1.
Annual Number of Visitors to Mon Repos Conservation Park for Turtle-Watching
1993/94 to 1999/2000 Season

Year	Visitor Numbers
1993/94	23,580
1994/95	14,868
1995/96	19,962
1996/97	18,284
1997/98	17,394
1998/99	18,421
1999/2000	23,485

Source: Queensland National Parks and Wildlife Service, 2000 (unpublished data)

One possible reason for the large fall in number of visitors in the 94/95 season compared to the 93/94 season is the introduction of service entrance fees at Mon Repos for turtle watching. While these fees were quite moderate in the 1999/2000 season (see Table 2), they are payable whether or not turtles are seen. The service fee covers entrance to the information centre and amphitheatre, associated presentation and guidance in groups of up to 70 visitors to locations where Park personnel have spotted turtles nesting or about to do so or where hatchlings are emerging from their nests.

Table 2.
Nightly Entrance Fees to Mon Repos During the Turtle Season (Mid-November to
end of March inclusive) 1999/2000

Single visit ticket	Aus \$	Season ticket	Aus \$
Child (5-15)	2	Child (5-15)	5
Pensioner	2	Pensioner	5
Adult	4	Adult	10
Family	10	Family	25
School Groups	1 per student		

Source: Queensland Department of Environment and Heritage, 1999, p.3.

Turtle watching at Mon Repos is seasonal. The season begins in mid-November and continues until the end of March of the following year. There are three phases in that period: in the earlier part, only egg laying activities can be observed, in the second phase both egg laying and hatchling emergence can be observed and in the final phase only emergence of hatchlings can be seen. But all of these phases have their attraction to tourists.

4. Survey of Visitors: Its Nature, Purpose, General Profile of Visitors and Source of Information.

Following a pilot survey in November 1999, a survey of visitors to Mon Repos watching turtles was conducted from December 1999 to March 2000 inclusive using a written questionnaire. It was possible for respondents to post the completed questionnaires or to leave these with rangers or volunteers at Mon Repos. A total of 1,200 questionnaires were distributed and 519 usable replies were obtained giving a response rate of 43 per cent. These 519 responses correspond approximately to the same number of visiting groups so that responses from about 10% of visiting groups during the 1999/2000 season was obtained. Approximately 15 questionnaires per day were randomly distributed either with sales of entrance tickets or to visitors awaiting their turn to view sea turtles. Completed survey forms could either be left with rangers or volunteers at Mon Repos or returned to us in a post-paid envelope.

The main purposes of the survey were to provide information about

- 1) willingness to pay for the sea turtle experience at Mon Repos
- 2) to obtain some indication of the local economic impact of sea turtle ecotourism associated with Mon Repos and
- 3) to find out whether the visit was effective from an educational point of view and in building support for the conservation of sea turtles. Findings about these matters will be reported later.

Most visitors to Mon Repos came in groups. Amongst respondents, groups consisting of two persons were most frequent followed by those consisting of four persons. The majority of respondents (78%) were visiting for the first time. The largest proportion of responding visitors were from Australia (65%) with 79% of these being from Queensland. The UK accounted for 21% of respondents and Germany 6%. European tourists are well represented but very few Asians visit this attraction. The proportion of New Zealand visitors is very small in proportion to their visitation rates to Australia.

Most respondents (78%) said that the main purpose of their visit to Mon Repos was to watch sea turtles, 11% said that they wanted to study sea turtles, and 9% visited because they wanted to entertain their visitors. In this sample, general tourists considerably outweighed specialists and enthusiasts thus indicating a mature phase in the tourism product cycle suggested by Duffus and Dearden (1990). The majority of respondents came by private motor vehicle but 12% came by coach.

Most respondents learnt about the turtle attractions at Mon Repos by word of mouth (39%), from guide books (17%), pamphlets and booklets of the Queensland Parks and Wildlife Service (15%), previous visit (10%), TV (6%) and tourist information centres/brochures (5%). The importance of the personal recommendation effect (cf. Tisdell, 1998) is quite apparent in this case.

The educational attainment of the respondents was well above that of the general population with most having tertiary qualifications. Almost half of the respondents had university degrees, including a substantial number with postgraduate degrees. This accords with previous findings of other researchers that demand for non-consumptive wildlife tourism and tourism/recreation in protected areas rises with levels of education. In general, one would expect a high degree of positive association between demand of ecotourism and the educational attainment of visitors. It may also be true that younger visitors tend to come from the homes of the better educated and have aspirations for further education but this could not be checked in this survey. To the extent that level of education, is positively correlated with the level of present income or future income, ecotourism may be associated

with the better educated and those whose life-time income prospects are above average. The results from this survey appear to be consistent with this hypothesis.

5. Willingness to Pay for the Sea Turtle Experience Mon Repos

In order to determine the view of visitors about the entrance fees to Mon Repos Conservation Park for the purpose of turtle watching, visitors were asked two questions: one was about what they thought *ought* to be the entrance fee (a normative question) and the other about what they were willing to pay (a positive question). The questions were as follows:

1. What do you think the single entrance fee ought to be to watch sea turtles (including guided tours by QNPWS staff, visitor centre and amphitheatre)?

Adult Family Child/ Pensioner

2. What is the single maximum fee you are willing to pay to watch sea turtles (including guided tours by QNPWS staff, visitor centres and amphitheatre)?

For yourself alone For whole family
(if applicable)

It was found that on average respondents thought that entrance fees should be higher than those prevailing in the 1999/2000 season (see Table 2). On average, visitors thought the entrance fee for an adult should be AUD\$5, for a child/pensioner AUD\$3.35 and for a family AUD\$15.25. These amounts are respectively AUD\$1, AUD\$1.35 and AUD\$5.25 higher than charges in 1999/2000.

Interestingly enough respondents were on average willing to pay significantly more than they thought ought to be the charge; the latter reflects social and moral values. On average, respondents indicated that they were willing to pay a minimum of AUD\$8.95 for a single adult visit and AUD\$19.47 for a family visit. These are AUD\$4.95 and AUD\$9.47 in excess of the 1999/2000 fees and are indicative of the extent to which consumers' surplus is obtained. The visitor consumer surplus for the sampled respondents

is AUD\$2,436 and AUD\$2,606 for single adults and family groups respectively (see Table 3).

Unpublished data of QPWS for ticket sales in December 1999 showed that 2593 adult tickets were sold, 420 family tickets, 389 to children entering other than on family tickets, and 189 to pensioners. Assuming that on average families consisted of 4.5 persons, this data indicates that about 51.23% of persons entered on adult tickets, 37.3% on family tickets and about 11.4% on pensioner or children's tickets. Using the above figures for consumer's surplus for adults and families (those on pensioner and children's tickets excluded) and supposing that the composition of ticket sales remained the same for the 1999/2000 season as in December 1999, the total consumers' surplus generated by visits for turtle-watching in the 1999/2000 season (pensioner's and children's ticket-holders excluded) is approximately AUD\$77,722. If the receipts from ticket sales to pensioners and children are added, total value of ticket sales for the 1999/2000 season is of the AUS\$72,728. It is clear that the level of consumers' surplus generated by visits to watch turtles exceeds income from fees.

It should, however, be noted that a small minority of respondents indicated that fees ought to be lower than those charged in 1999/2000 and indicated they would be unwilling to pay these fees for a visit in the future, or if they had known what they would get for their money. Possibly the majority of these dissatisfied respondents failed to see sea turtles – sightings of sea turtles are not guaranteed and payment is not refunded in the event of no turtles being available for viewing.

For those visiting Mon Repos for the first time (78%), it is likely that apart from the risk of not seeing turtles nesting or hatchlings emerging, turtle watching was an experiential good for most. Most visitors to Mon Repos probably have had no previous experience of sea turtle watching and 78% certainly had not previously had this experience at Mon Repos. The experiential nature of the good (cf. Casson, 1982) is probably one of the reasons why so many visitors relied on recommendations from others in making their visit.

The demand curve based on willingness to pay is the ex post rather than the ex ante one. It really indicates what visitors would have been willing to pay in hindsight, that is given their experience at Mon Repos, and possibly also is indicative of the strength of the recommendation which they might give to other potential visitors. Table 3 sets out the maximum amounts which respondents said (ex post) they would be willing to pay to visit Mon Repos for turtle-watching. This table must be interpreted carefully. While one might derive the ex post demand curve from it, it is unlikely to yield the ex ante demand curve. Furthermore, it does not represent the demand for a further visit or is unlikely to do so. But it does indicate the extent of the consumers' surplus of visitors following their visit. Furthermore, it suggests that the entry charge could be raised significantly without a substantial fall in demand.

Table 3
.Maximum Entrance Fees (Aus \$) which Respondents said Ex Post that they would be Willing to Pay for the Sea Turtle Experience at Mon Repos

Adult Entrance Fee	Number of Respondents	Adult Visitors' Consumer Surplus	Family Entrance Fee	Number of Respondents	Family Visitors' Consumer Surplus
0	03		00	02	
2	06		02	01	
3	03		04	01	
4*	46		4.5	01	
4.5	01	0.5	05	01	
5	104	104	08	03	
6	21	42	10*	74	
6.5	01	2.5	11	07	07
7	11	33	12	09	18
7.5	05	17.5	15	51	255
8	22	88	17.5	02	15
9	03	15	18	03	24
10	148	888	20	51	510
12	07	56	22	01	12
12.5	01	8.5	25	29	435
14	01	10	30	15	300
15	28	308	35	02	50
20	25	400	40	10	300
25	05	105	50	07	280
30	03	78	60	01	50
40	01	36	70	01	60
50	02	92	100	02	180
60	01	56	120	01	110
100	01	96	NR	250	
NR	70				
Total	519	AUS \$ 2,436	Total	519	AUS \$ 2,606

- Entrance fee at time of survey.

It is clear that the overwhelming majority of respondents after their experience obtained an economic surplus, and for most this was a significant surplus and the visit represented value for money. For most adult single entrants, their maximum willingness to pay was more than twice their entrance fee.

Further indication of the fact that most respondents were highly satisfied with their turtle watching experience at Mon Repos is that 85 per cent said that they wanted to return in the future. The 15 percent who answered 'No' (5%) and 'Unsure' (10%) were mainly overseas visitors who thought the distance made them unlikely to visit Mon Repos again. Furthermore, a high proportion of respondents (98%) said that they would talk to their friends and relatives about their turtle-watching experience at Mon Repos, and presumably recommend a visit to them.

6. Local Economic Impact of Sea Turtle Ecotourism at Mon Repos

As mentioned above, one factor that may help to develop political support for wildlife-based tourism is its economic impact on the local region where it is located. In order to estimate the local economic importance of sea turtle watching at Mon Repos, respondents were asked questions designed to determine:

- 1) the set of visitors who would not have come to the Bundaberg area except for the possibility of sea turtle-watching at Mon Repos;
- 2) those that would have visited the area but would have reduced their number of day of stay by a specified number;
- 3) and those who were locals

Number of days spent by the first set times their average expenditure per day gives an indication of the primary expenditure which would lost on account of the first set. For the second set, their reduced number of days times their average expenditure per day is relevant.

40% of respondents said that if sea turtles were absent they would not have visited the Bundaberg region. Sea turtles were their main reason for visiting. These 208 respondents (including 8 who would have stayed outside the 60km radius) spent or planned to spend 496 days in the Bundaberg area at an average of 2.38 days per respondent. The average expenditure for the ample and group in the Bundaberg area was AUD\$35.45. In the absence of sea turtles watching in Mon Repos their daily expenditure for this number of days would be lost as an initial economic injection. The loss of income for the Bundaberg area (within a 60 km radius) from the sampled respondents was AUD\$17, 583.20. Loss of income based on number of visitors for the 1999/2000 season assuming 40% did not visit Bundaberg if sea turtles did not occur at Mon Repos is AUD\$792, 581.17. There is also loss of income from the number of reduced days visitors would have spent in the Bundaberg area if sea turtles did not occur in Mon Repos. The number of reduced days among the 99 (19%) respondents was 110 days at an average of 1.11 days per respondent. Loss of income for the Bundaberg area due to reduced days from the sampled respondents if sea turtles did not occur in Mon Repos is AUD\$3,899.50. Loss of income reduced stay by visitors in the Bundaberg area based on numbers for the 1999/2000 season, assuming 19% reduced their stay, if sea turtles did not occur in Mon Repos would be AUD\$175,583.50. Therefore, the total income lost to the Bundaberg area (within a 60 mile radius) if sea turtles did not occur in Mon Repos would on the basis of 1999/2000 season visits amount to $AUD\$792,581.17 + AUD\$175,583.50 = AUD\$968,164.54$, almost AUD\$1m. It is worth noting that 98% of the visitors stayed within a 20-25 km radius of the Mon Repos Conservation Park.

As can be seen the income to the Bundaberg area due to the presence of sea turtles in Mon Repos is close to a million Australian dollars per year. With the multiplier effects the benefits to the region are even larger. Apart from sea turtle watching at Mon Repos, a sea turtle festival has been organised since 1999 to mark the beginning of the sea turtle season in mid November. With such activities and the potential for other commercial tourist activities related to sea turtles, the economic benefits to the region from turtles at Mon Repos are even larger. Considering the short season (approximately 4 months) and the scarcity of the wildlife that is being viewed (average of 190 sea turtles for the last 4 years),

the income generated from sea turtle watching is significant. Sea turtle watching at Mon Repos is, therefore, one of the important economic activities of the region apart from other activities such as whale watching (for approximately 4 months of the year), sugar cane farming, beef production and dairy farming.

7. The Educational Benefit of Turtle Watching and the Conservation Response of Visitors

Nearly all respondents (99%) stated that their visit to Mon Repos Conservation Park for turtle watching was informative. Nearly one-third of respondents become aware of the threats to sea turtles for the first time and more than a half (54%) said that they had obtained additional information about such threats. Table 4 summarises responses about whether respondents learnt about threats to sea turtles and about their biology at Mon Repos.

Table 4.
Visitor Awareness of Threats to Sea Turtles and of their Biology
Following a Visit to Mon Repos

	Number of Respondents	Percentage
For the first time	163	31
Additional information	282	54
Knew most of it before	71	14
No response/Not sure	3	1
Total	519	100

Most respondents said that they were better informed as far as threats to sea turtles are concerned such as about sea turtles being harvested for consumption (56%), collection of eggs for consumption (52%), threats from prawn trawlers (64%), entanglement in crab pots (55%), boat strikes (60%), fox/wild pig predation (59%), natural predators e.g. goannas (45%), natural diseases (37%) and pollution of waterways (53%).

Apart from educating the visitors about threats facing sea turtles, the experience at Mon Repos respondents said they were influenced to be more careful about disposing of plastics

(62%), and fishing gear (47%), switching off lights near beaches (68%), avoiding the purchase of tortoiseshell products, eggs, meat, soups (73%) and in using beaches where turtles nest (75%).

Sea turtle viewing also convinced the respondents about the urgency of protecting/taking action to conserve sea turtles in Australia and elsewhere. A large majority of the respondents (87%) were convinced of the need to take action to conserve sea turtles. Only 5% were unconvinced about the need to take action to conserve sea turtles after their experience at Mon Repos. The rest were not sure (5%) or said the question was not applicable (3%). Similarly, those accompanying respondents (e.g. children/partner/party) were also convinced about the urgency of protecting sea turtles (81%). Only 1% were unconvinced about this while the rest were unsure (9%) or stated that the question was not applicable to them (9%).

Data collected from the survey revealed that the majority of visitors (98%) believed that more action should be taken to minimize threats to sea turtles. Most respondents indicated that their desire to protect sea turtles increased after visiting Mon Repos. The reasons cited included: sea turtles are unique (90%), they are ancient (66%), have recreational value (32%) and they can generate income (23%). It was also revealed that after their sea turtle experience at Mon Repos, respondents were likely to report the sighting of sick turtles (66%) injured sea turtles (66%), poaching or mistreatment of sea turtles (88%).

From the sample of visitors, it is clear that ecotourism associated with the watching of sea turtles at Mon Repos is very effective from an educational point of view. It also fosters support for the conservation of sea turtles in a variety of ways e.g. by increasing awareness of the issues and changing the attitude and behaviour of visitors towards sea turtles. In addition, a majority of respondents (49%) at Mon Repos said they would be influenced to contribute money for sea turtle conservation. 35 percent were unsure, while 15 percent said they were not convinced. 1percent of the respondents did not answer this question.

8. Concluding Comments

Revenues from entrance fees at Mon Repos Conservation Park do not fully cover the costs of the Queensland Parks and Wildlife Service in managing the park and its associated turtle watching programme even though they make a useful contribution. In addition, costs of operations would be considerably higher in the turtle season if it was not for the presence of volunteers² prepared to assist rangers with crowd control, with other activities associated with the ecotourism-experience, and with some scientific work.

But commercial viability of marine turtle-watching is not the appropriate frame of reference for assessment in this case. The presence of the facility provides a significant commercial externality to tourist-related businesses in Bundaberg region, and this adds to local incomes and employment.

Visits also build political support for the conservation of sea turtles through better understanding of the threats to turtles and creation of some empathy in visitors for sea turtles. Political support for sea turtle conservation is important because sea turtles apart from their touristic value, have public good characteristics, for instance, existence and bequest values. Without public support of a political nature, public funding for conservation of sea turtles is likely to be reduced.

In conclusion, it might be noted that the observation of sea turtles nesting or of their hatchlings emerging is like a club good. Exclusion is possible, but for those who pay for the experience it is a shared good. Beyond a point as the number of viewers increase, ease of viewing by individuals declines due to crowding. Viewing parties at Mon Repos are limited to a maximum of 70 persons, presumably partly to ensure the safety of turtles, ensure effective crowd control and one imagines also to ensure that all participants have an opportunity to see the turtles. This constraint provides an upper limit to the possible size of effective turtle-watching operations at Mon Repos. For example, if 200 females arrive in a season to lay eggs and each is watched by 70 persons, only 14,000 persons will be able to observe this process.

As the chances of visitors being able to see turtles decreases, either because of falling population of turtles or increasing number of visitors, tourist dissatisfaction could rise. In these cases, it may be desirable to make some concessions to those who fail to see sea turtles, particularly if entrance fees are raised significantly. For example, half the fee may be refunded or disappointed visitors may be given an opportunity to come on another occasion free of charge or at a reduced charge. Some whale-watching boats offer their customers these possibilities to compensate for failure to see whales during a trip.

In conclusion, it might be noted that the process of increasing turtle breeding populations is a slow one. Female loggerhead turtles do not breed until they are 30-50 years old (Queensland Turtle Research, 1994, p.27). Programmes for managing populations of sea turtles need to be devised with a long-term perspective in mind. Ecotourism development can help provide political support for these programmes. However, given the transboundary migration of sea turtles, international cooperation is needed to increase the effectiveness of programmes to conserve sea turtles.

Endnotes

- ¹ For example, 90% of the nesting green sea turtles in the Australasian region occurs within Australia. But approximately 90% of the harvest occurs outside Australia (Limpus, 1988, p.64).
- ² Mon Repos turtle-ecotourism and associated operations in the 1999/2000 season relied on 36 volunteers contributing 4 hours per week for 5 months.

References

- Casson, M. C. (1982) "Transaction Costs and the Theory of Multinational Enterprise", Pp.22-43 in A. Rugman (ed.) *New Theories of the Multinational Enterprise*, Croom Helm, London.
- Duffus, D. A. and Dearden, P. (1990) "Non-Consumptive Wildlife-Oriented Recreation: A Conceptual Framework", *Biological Conservation*, **53**, pp.213-331.
- Environment Australia (1998) *Draft Recovery Plan for Marine Turtles in Australia*, Environment Australia, Canberra.
- Great Barrier Reef Marine Park Authority (1994) "Turtle and Dugong Conservation Strategy for the Great Barrier Reef Marine Park – Issues Paper for Public Comment", Great Barrier Reef Marine Park Authority, Townsville, Queensland.
- IUCN (1996) *1996 IUCN Red List of Threatened Animals*, IUCN, Gland, Switzerland.
- Kay, A. (1995) *Sea Turtle Encounters, Mon Repos Conservation Park*, Department of Environment and Heritage, Brisbane, Queensland.
- Limpus, C. J. (1988) "The Marine Turtles in Australia, 1988 Review" in International Symposium on Sea Turtles, Hiwasa Community Centre, Tokushima Prefecture, Japan, July 30-August, 3.
- Queensland Department of Environment and Heritage (1999) "Turtle Watching Guide – Mon Repos Conservation Park", Queensland Department of Environment, Bunaberg, Queensland.
- Queensland Turtle Research (1994) *A Matter of Time: Sea Turtles of Queensland*, Queensland Department of Environment and Heritage, Brisbane, Queensland.
- Tisdell, C. A. (1990) "Case Study in the Economics of Biological Conservation: Yellow-eyed Penguins and Wildlife on the Otago Peninsula", Pp.87-100 in C. A. Tisdell, *Natural Resources, Growth and Development*, Praeger, New York.
- Tisdell, C. A. (1996) "Ecotourism, Economics and the Environment: Observations from China", *Journal of Travel Research*, **34**(4), pp.11-19.
- Tisdell, C. A. (1998) "Sustaining and Maximising Gains from Tourism Based on Natural Sites: Analysis with Reference to the Galapagos". Pp.229-252 in C. A. Tisdell, C. J. Aislablie and P. J. Stanton (eds) *Tourism Economics*, Institute of Industrial Economics, University of Newcastle.

PREVIOUS WORKING PAPERS IN THE SERIES

ECONOMICS, ECOLOGY AND THE ENVIRONMENT

1. Governance, Property Rights and Sustainable Resource Use: Analysis with Indian Ocean Rim Examples by Clem Tisdell and Kartik Roy, November 1996.
2. Protection of the Environment in Transitional Economies: Strategies and Practices by Clem Tisdell, November 1996.
3. Good Governance in Sustainable Development: The Impact of Institutions by K.C.Roy and C.A.Tisdell, November 1996.
4. Sustainability Issues and Socio-Economic Change in the Jingpo Communities of China: Governance, Culture and Land Rights by Ren Zhuge and Clem Tisdell, November 1996.
5. Sustainable Development and Environmental Conservation: Major Regional Issues with Asian Illustrations by Clem Tisdell, November 1996.
6. Integrated Regional Environmental Studies: The Role of Environmental Economics by Clem Tisdell, December 1996.
7. Poverty and Its Alleviation in Yunnan Province China: Sources, Policies and Solutions by Ren Zhuge and Clem Tisdell, December 1996.
8. Deforestation and Capital Accumulation: Lessons from the Upper Kerinci Region, Indonesia by Dradjad H. Wibowo, Clement a. Tisdell and R. Neil Byron, January 1997.
9. Sectoral Change, Urbanisation and South Asia's Environment in Global Context by Clem Tisdell, April 1997.
10. China's Environmental Problems with Particular Attention to its Energy Supply and Air Quality by Clem Tisdell, April 1997.
11. Weak and Strong Conditions for Sustainable Development: Clarification of concepts and their Policy Application by Clem Tisdell, April 1997.
12. Economic Policy Instruments and Environmental Sustainability: A Second Look at Marketable or Tradeable Pollution or Environmental-Use Permits by Clem Tisdell, April 1997.
13. Agricultural Sustainability in Marginal Areas: Principles, Policies and Examples from Asia by Clem Tisdell, April 1997.
14. Impact on the Poor of Changing Rural Environments and Technologies: Evidence from India and Bangladesh by Clem Tisdell, May 1997.
15. Tourism Economics and its Application to Regional Development by Clem Tisdell, May 1997.
16. Brunei's Quest for Sustainable Development: Diversification and Other Strategies by Clem Tisdell, August 1997.
17. A Review of Reports on Optimal Australian Dugong Populations and Proposed Action/Conservation Plans: An Economic Perspective by Clem Tisdell, October 1997.
18. Compensation for the taking of Resources Interests: Practices in Relations to the Wet Tropics and Fraser Island, General Principles and their Relevance to the Extension of Dugong Protected Areas by Clem Tisdell, October 1997.

19. Deforestation Mechanisms: A Survey by D.H. Wibowo and R.N. Byron, November 1997.
20. Ecotourism: Aspects of its Sustainability and Compatibility by Clem Tisdell, November 1997.
21. A Report Prepared for the Queensland Commercial Fisherman's Organisation by Gavin Ramsay, Clem Tisdell and Steve Harrison (Dept of Economics); David Pullar and Samantha Sun (Dept of Geographical Sciences and Planning) in conjunction with Ian Tibbetts (The School of Marine Science), January 1998.
22. Co-Evolutions in Asia, Markets and Globalization by Clem Tisdell, January 1998.
23. Asia's Livestock Industries: Changes and Environmental Consequences by Clem Tisdell, January 1998.
24. Socio-Economics of Pearl Culture: Industry Changes and Comparisons Focussing on Australia and French Polynesia by Clem Tisdell and Bernard Poirine, August 1998.
25. Asia's (Especially China's) Livestock Industries: Changes and Environmental Consequences by Clem Tisdell, August 1998.
26. Ecotourism: Aspects of its Sustainability and Compatibility with Conservation, Social and Other Objectives, September 1998.
27. Wider Dimensions of Tourism Economics: A Review of Impact Analyses, International Aspects, Development Issues, Sustainability and Environmental Aspects of Tourism, October 1998.
28. Basic Economics of Tourism: An Overview, November 1998.
29. Protecting the Environment in Transitional Situations, November 1998.
30. Australian Environmental Issues: An Overview by Clem Tisdell, December 1998.
31. Trends and Developments in India's Livestock Industries by Clem Tisdell and Jyothi Gali, February 1999.
32. Sea Turtles as a Non-Consumptive Tourism Resource in Australia by Clevo Wilson and Clem Tisdell, August 1999.
33. Transitional Economics and Economics Globalization: Social and Environmental Consequences by Clem Tisdell, August 1999.
34. Co-evolution, Agricultural Practices and Sustainability: Some Major Social and Ecological Issues by Clem Tisdell, August, 1999.
35. Technology Transfer from Publicly Funded Research for improved Water Management: Analysis and Australian Examples by Clem Tisdell, August 1999.
36. Safety and Socio-Economic Issues Raised by Modern Biotechnology by Dayuan Xue and Clem Tisdell, August 1999.
37. Valuing Ecological Functions of Biodiversity in Changbaishan Mountain Biosphere Reserve in Northeast China by Dayuan Xue and Clem Tisdell, March 2000.
38. Neglected Features of the Safe Minimum Standard: Socio-economics and Institutional Dimension by Irmi Seidl and Clem Tisdell, March 2000.
39. Free Trade, Globalisation, the Environment and Sustainability: Major Issues and the Position of WTO by Clem Tisdell, March 2000.
40. Globalisation and the WTO: Attitudes Expressed by Pressure Groups and by Less Developed Countries by Clem Tisdell, May 2000.
41. Sustainability: The Economic Bottom Line by Clem Tisdell, May 2000.

42. Trade and Environment: Evidence from China's Manufacturing Sector by Joseph C. H. Chai, June 2000.
43. Trends and Development in India's Livestock Industry by Clem Tisdell and Jyothi Gali, August 2000.