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**The Economic Importance of Wildlife Conservation on the Otago Peninsula – 20 Years on**

**by**

**Clem Tisdell**

**November 2007**


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## The Economic Importance of Wildlife Conservation on the Otago Peninsula – 20 Years on[1]

**by**

**Clem Tisdell[2]**

**November 2007**



[1] A background paper prepared for a keynote presentation to the Yellow-eyed Penguin Trust 20th Anniversary Conference, "Almost an Island: Valuing Otago Peninsula" held 12-13 October, 2007 at the Hutton Theatre, Otago Museum, Great King Street, Dunedin, New Zealand. The presentation was given on the morning of 12th October. I am grateful to the yellow-eyed Penguin Trust for supporting my research for completing this article.

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

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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.

# The Economic Importance of Wildlife Conservation on the Otago Peninsula –20 Years On

## Abstract

This article updates a paper which I wrote in 1988 about the economic value of biodiversity conservation on the Otago Peninsula and the scope for expanding wildlife tourism there. After outlining different ways to measure the economic importance of wildlife, I use economic impact analysis to measure the current importance of wildlife tourism on the Otago Peninsula. However, it is also pointed out that the activities of bodies such as the Yellow-eyed Penguin Trust and the Department of Conservation have positive regional economic impacts. The specific methods and assumptions used for this economic analysis are outlined. The gross annual turnover of enterprises directly involved in the viewing of wildlife on the Peninsula is of the order of $6.5 million per year and they employ the equivalent of 70 full-time persons. With multiplier or flow-on effects these economic magnitudes are higher. However, the economic impact of wildlife tourism based on the Peninsula is much greater. The presence of wildlife on the Peninsula attracts travellers to the Dunedin region who would otherwise not visit and entices some who would have visited anyway to stay longer. This increases local expenditure on accommodation, food and so on. As a result, it is estimated that an extra $100 million, or so in expenditure occurs in Dunedin's regional economy and employment is increased by the equivalent of 800-1000 full-time positions. The economic impact of wildlife on Dunedin's regional economy has increased by more than eleven-fold in the last 20 years.

While growth in tourism on the Peninsula is still possible, it is likely to be at a slower rate than in the past. This is because capacity constraints are being encountered. Furthermore, the future security of the Peninsula's flagship species is not assured. In addition, problems are emerging where there is free access to areas where wildlife may be seen. It is observed that the opportunity cost of conserving

most wildlife on the Otago Peninsula is low, but some conflict may be occurring between wildlife conservation and human uses of marine areas. The paper, however, makes it quite clear that the loss of wildlife on the Otago Peninsula would result in a huge economic loss to the Dunedin region.

# The Economic Importance of Wildlife Conservation on the Otago Peninsula –20 Years On

## 1. Introduction

The Yellow-eyed Penguin Trust is celebrating the 20th Anniversary of its foundation. It, together with other organizations and with wildlife-tourism businesses, has played an important part in conserving wildlife on the Otago Peninsula. In the last 20 years, the variety of wildlife species on the Otago Peninsula has increased, the continuing existence of the yellow-eyed penguin *Megadyptes antipodes* has become more secure, and wildlife-based tourism on the Peninsula has become a major industry which annually injects millions of dollars into Dunedin's regional economy and creates jobs for hundreds of people. Twenty years ago, it would have been hard to imagine these developments.

In 1988, I was privileged to be a William Evans Visiting Professor at the University of Otago and was located in the Economics Department. During that time, I wrote a paper on the economics of conserving the yellow-eyed penguins and other wildlife in the Otago Peninsula. My interest in this particular subject was sparked by my contact with John and Moira Parker – Moira was a founding member of the Yellow-eyed Penguin Trust. My paper was presented at the Otago Museum, included as a Discussion Paper of the Economics Department of Otago University (Tisdell, 1988) and subsequently published in modified form in a book (Tisdell, 1990, Ch.7). This paper gives rough estimates of the economic importance to the Dunedin region in 1987 of wildlife tourism based on the Otago Peninsula, suggested that there were good prospects for increasing this tourism, and provided views about how wildlife conservation can be valued in terms of economics. This earlier paper provides a basis for considering how the economic importance of wildlife tourism on the Otago Peninsula has grown in the last 20 years and how the nature of this tourism and wildlife conservation has evolved.

I was fortunate to be invited by the Yellow-eyed Penguin Trust to return to Dunedin to update my earlier study and I did this in late April and early May of this year (2007). The present paper reports my findings and provides comparisons with the situation 20 years ago. Several of my earlier hunches have proven to be correct. For example, I argued that the economic potential of wildlife tourism on the Otago Peninsula had been little realized 20 years ago and that there was considerable room to develop such tourism. I particularly stressed that wildlife tourism based on yellow-eyed penguins (and some other species) had much unrealized potential. This has been borne out by the spectacular growth in wildlife tourism on the Otago Peninsula in the last 20 years (greater growth than I could have imagined in 1988) and the extraordinary expansion in tourism based on the viewing of yellow-eyed penguins.

In this presentation, I'll briefly outline the different ways in which economists assess the economic importance of wildlife conservation, I'll provide current estimates of the economic impact in the Dunedin region of wildlife tourism based on the Otago Peninsula, compare today's situation with that of two decades ago, and consider future possibilities and constraints facing wildlife tourism and conservation on the Otago Peninsula.

## 2. Different Ways of Measuring the Economic Importance of Wildlife Conservation

Basically, economists have two different ways in which they attempt to measure the economic importance of wildlife conservation (Tisdell, 2006; Tisdell and Wilson, 2004).

The first method draws on welfare economics and involves social cost-benefit analysis. The economic worth or value of wildlife conserved as a result of a programme to conserve it is compared with the cost of the programme. If the net

benefits are positive, this indicates that the programme has economic merit and it is more worthwhile the larger the net economic benefits.

Estimating the economic value or worth of wildlife is challenging. The most common method used by economists is to estimate the maximum amount of money individuals would be willing to pay for the continuing presence of the wildlife. In doing this, economists try to estimate the total economic value of the wildlife. This measures the use value of wildlife (for example, its use for tourism and recreation) as well as more intangible economic values usually called non-use values (Tisdell, 2005, pp. 110-113). The latter includes existence values, bequest values and possibly option values. These concepts will be discussed by various speakers at this conference. Some wildlife species have little use value but a high non-use value. This is probably true of the kiwi *Apteryx* spp. and of various species of wombat in Australia such as the northern hairy-nosed wombat *Lasiorhinus krefftti* (Tisdell and Swarna Nantha, 2007, p.1268). On the other hand, some fish species (for example, tuna species) have a high use value relative to their non-use value. I have participated in projects that have estimated these values for some wildlife species, for example the Asian elephant in Sri Lanka (Bandara and Tisdell, 2003) and the mahogany glider in Australia (Tisdell et al., 2005).

The second way in which economists try to gauge the economic importance of an environmental initiative is by its economic impact on variables such as the level of employment, expenditure and incomes, often in a particular region or locality. This is called economic impact analysis. Several contributions to its application to tourism are reprinted in Tisdell (2000, Vol II, Part I). Economic impact analysis is more limited in its scope than is social cost-benefit analysis which estimates total economic value. One reason for this is that economic impact analysis only takes account of the marketed (or commercial) economic components associated with a resource or environmental initiative whereas social cost-benefit analysis takes account of non-marketed components (such as existence value as well).

In practice, economic impact analysis usually has more political clout than social cost-benefit analysis. The latter is normally much more costly to complete because of the type of survey techniques involved and the results may be less objective and more controversial than those for economic impact analysis (see, for example, Dorfman, 1993). Nevertheless, social cost-benefit analysis is believed by many economists to provide a more comprehensive indicator of economic value.

Given the limited time and resources available to me to collect data, I have concentrated on measuring the economic importance of wildlife conservation on the Otago Peninsula by using economic impact analysis. This, however, is only one indicator of its economic importance.

## 3. The Economic Impact Today of the Presence of Wildlife on the Otago Peninsula

My focus now will be on the economic impact on the Dunedin region of wildlife tourism based on the Otago Peninsula. There are, however, additional economic impacts of the presence of wildlife on this Peninsula as a result of the activities of conservation bodies such as the Yellow-eyed Penguin Trust and the Department of Conservation.

### *3.1. Estimation Procedures*

In early May 2007, I interviewed the principals or the representatives of all the tourist operators on the Peninsula charging fees and directly utilizing wildlife for viewing. The enterprises covered included Elm Wildlife Tours, Monarch Cruises, Nature Guides Otago, Nature's Wonders, Otago Peninsula Trust (Royal Albatross Colony) Penguin Place and Sam's Peninsula Off-Road Tours.

Data were collected on the number of visitors and fees charged in the most recent years. From this information, rough estimates could be made of the gross annual

revenue obtained by each establishment. In the case of the Otago Peninsula Trust the relevant data were extracted from its Annual Report for the year ended September 2006 and the components involving the Royal Albatross Colony could be identified. For the data for Monarch Cruises, adjustments were made to its gross revenue to exclude revenue from social cruises and so on. Data were also collected on the level of employment in the enterprises covered.

These direct visitor expenditures have a multiplier or flow-on effect on the local Dunedin economy. This magnifies their economic impact. Furthermore, many visitors to the wildlife attractions incur outlays for accommodation, food, drink, local travel and so on. This results in a further monetary injection to the local economy and has additional income flow-on effects on the local economy.

While no specific regional economic multipliers are available for tourism or wildlife tourism in the Dunedin region, consultants to the Dunedin City Council estimated a series of regional output multipliers for 47 industries in the region as at June 2001 and copies of these were supplied to me via Dr. Dorian Owen. Type II output multipliers (see, for example, Chappelle, 2001) in this series are in the range of 1.31 to 2.05. For accommodation, the multiplier is 1.84. This means that for every dollar spent on accommodation in Dunedin City, a further 84 cents of output is generated in the local region. It seems reasonable, therefore, to assume a regional output multiplier of around 1.7, which is possibly on the conservative side.

Some estimates of daily visitor expenditure in the Dunedin area are available. The Tourism Research Council Domestic Travel Survey (DTS) estimated this expenditure to be $311 per day in 1999-2001 and for the 'Economic Impact Study of the Tri-Nations Test Match' the estimate was $302 per day (see Dunedin City Council and BERL, 2003, pp. 8-9). I will assume a daily expenditure of $300 per overnight visitor[1].

In order to measure the extent of extra expenditure in the Dunedin region due to the presence of wildlife on the Otago Peninsula, it would be helpful to have a couple of bits of information that are not currently available. First, how many people come to the Dunedin region because of the presence of the wildlife who would otherwise not have come? How long did they stay and how much did they spend during their visit? Secondly, of those who would have visited the Dunedin region even in the absence of wildlife or the Peninsula, did they stay longer on average (and by how long) and did they spend more on average because of the presence of the wildlife? To determine these magnitudes, visitors to the wildlife attractions on the Peninsula could be surveyed. However, I did not have the resources to do such a survey.

If we *assume* (and this is a conservative assumption) that most visitors to wildlife attractions in the Otago Peninsula stay an extra day in Dunedin on average because of the wildlife, a minimum figure for their added expenditure to the Dunedin regional economy can be estimated. As will be seen, the primary regional expenditure due to the presence of the Peninsula's wildlife is at least $60m per year and with the multiplier effect, is in excess of $100m per year.

### *3.2. Results*

From this research, it is clear that several wildlife-based enterprises on the Otago Peninsula involve big business. For example, four enterprises now have an annual turnover exceeding a million dollars each and for some their turnover is around $2 million. Nevertheless, a few are quite small with annual turnovers of $20,000 or less. For reasons of confidentiality, I cannot give the estimated turnover of each individual enterprise. However, for the year to September 2006, their combined gross income was in the order of $6.5 million. With flow-on expenditure in the local economy, the activities of these enterprises would have injected at least $11 million in extra income into the local economy based on a multiplier of 1.7. They employed just over 70 full-time equivalent staff (according to the information supplied to me).

With employment multiplier effects, over 100 extra persons would have been employed in the local economy as a result of their direct activities.

However, the income and employment effects on the local economy of wildlife on the Otago Peninsula do not stop there. This wildlife attracts extra visitors with their expenditure to the Dunedin region and results in some visitors who would have visited Dunedin anyway stopping longer and spending more locally.

In the year to September 2006, there were 161,474 visits to the facilities of the Royal Albatross Colony. In approximately the same period 114,550 visitors were received at other wildlife attractions on the Otago Peninsula. This resulted in more than a quarter of a million visits (278,024) to wildlife centres on the Peninsula. Not all visitors who went to other wildlife sites on the Peninsula visited the Royal Albatross Centre and most of those who came to the Royal Albatross Centre did not actually go to view the albatross. It seems possible that the number of out-of-town visitors to the Otago Peninsula involved in wildlife-related activities was of the order of 200,000. Given a stay of an extra day in the Dunedin area by these visitors and the estimated daily expenditure of $300 per day on average, this would have injected an extra direct expenditure into the local economy of $60 million for the year. Thus, given an income multiplier of 1.7, an increase in expenditure (direct plus indirect) in the local economy of over $100 million ($102 million) per year would have been generated. This is (I think) a conservative estimate of the economic impact on the Dunedin region of the presence of wildlife on the Otago Peninsula. See, however, note 1.

I found that wildlife attractions on the Peninsula had a turnover of around $6.5 million to the year ended September 2006 and employed the equivalent of about 70 full-time staff. This meant that for each $1 million of turnover, approximately 10 equivalent full-time persons were employed. Given the above total estimated monetary injection to the economy, wildlife tourism on the Otago Peninsula could result directly or indirectly in the employment of around the equivalent of 1,000

full-time persons in the Dunedin region. Even for very low estimates of economic impact (see Note 1), wildlife tourism on the Otago Peninsula results in the employment of several hundred people in the Dunedin region[2].

## 4. Amazing Growth in Wildlife-based Tourism in 20 years

In 1987, wildlife-based tourism on the Otago Peninsula was in its infancy. The main attraction was the Royal Albatross Colony. Tourism commercially based on the yellow-eyed penguins and other wildlife species was little developed; virtually non-existent. In 1987, the number of visitors to the Royal Albatross Centre was around 14,000. By 2006, this had risen to over 160,000; an increase of more than 11-fold. The early development of this centre up to 1991 is well set out in Higham (2001).

The most rapid growth in wildlife tourism since 1988 on the Peninsula has been the expansion in the viewing (or potential viewing) of the yellow-eyed penguin. From my figures collected from individual tour operators, about 100,000 visitors to the Otago Peninsula included the yellow-eyed penguin in their tour in 2006[3]. This is a spectacular increase compared to 1987. Most of the wildlife-tourism enterprises catering for tourists interested in viewing yellow-eyed penguins came into existence in the early 1990s (1991). The 1990s marked a period of rapid expansion in the industry.

It is difficult to obtain accurate information on the numbers employed in wildlife tourism on the Otago Peninsula in 1987. It seems that about 6 equivalent full-time persons were employed, whereas today about 70 equivalent full-time are directly employed at wildlife tourism sites on the Peninsula, more than 11 times the number in 1987. There has been a remarkable rate of growth in wildlife tourism based on the Otago Peninsula in the last two decades and in its economic impact on the Dunedin region. The magnitude of its impact on the local Dunedin economy has risen by eleven-fold at least.

## 5. Discussion

While further expansion of wildlife tourism on the Otago Peninsula is likely to continue, one should expect its growth to be slower than in the past because some significant carrying-capacity constraints are emerging. If Butler's theory about the tourism cycle were to apply (namely that the development of tourism in the area leads eventually to its environmental deterioration thereby making it less attractive to tourists), there might even be the possibility eventually of a decline in such tourism (Butler, 1980; Tisdell, 2005, Section 10.3). There are in fact several factors that can lead to rapid growth of tourism in an area and its subsequent decline (Tisdell, 2005, Section 10.3). For example, the decline can come about as a result of environmental/ecological deterioration in the attractions, a change in tastes or fashion, or lack of repeat visits where repeat visits are necessary to sustain levels of tourism.

### *5.1. Some capacity constraints and ecological risks*

The royal albatross has been the flagship for developing wildlife tourism on the Otago Peninsula but the yellow-eyed penguin is now just as important (or more so) in this regard, partly due to the activities of bodies such as the Yellow-eyed Penguin Trust. Serious problems have emerged for those wanting to see the royal albatross because the viewing area is too small to cater for all visitors at all times. Consequently, many who want to participate in the viewing of the albatross face delays or unable to see it during their visit to the Peninsula. The problem is worst during periods of peak demand. Today, less than a third of the visitors to the Royal Albatross Centre actually go to the hide to view albatross[4]. Furthermore, fewer visitors to the Peninsula now see the royal albatross than see the yellow-eyed penguin whereas 20 years ago it was the other way round. The emerging capacity problem at the Royal Albatross Colony was already noticed by Higham in the 1990-91 season and he also expressed some concern about possible conflicts between

growth in visitor numbers and wildlife conservation as well as adverse impacts of tourists on important Maori cultural sites (Higham, 2001).

The capacity problem at the Royal Albatross Centre is likely to worsen as the number of tourists visiting the Peninsula increases. The arrival of cruise ships during peak periods of visitor demand adds to the problem. The capacity problem can be addressed by the Otago Peninsula Trust expanding facilities for viewing the albatross. However, this is prevented at present, mainly because of unresolved Maori land claims.

The extent to which wildlife populations are sustainable on the Peninsula is another issue. The royal albatross colony is vulnerable because it is on a single relatively small site. The yellow-eyed penguin is present at several sites but constant efforts by the Yellow-eyed Penguin Trust and tourist enterprises are needed to conserve it. According to owner of one tourist enterprise, its toehold on the Peninsula remains precarious and he is worried about what could happen to its presence as a result of climate changes. While capacity constraints on viewing the yellow-eyed penguin seem to be less serious than in the case of the royal albatross, they do occur and are likely to become more frequent as tourist numbers grow.

### *5.2. Pricing and open-access issues*

The above suggest that in recent times, the growth in demand for viewing wildlife on the Peninsula is increasingly testing the capacity of the industry to cater for it. This may result in rising prices for visits to wildlife attractions where exclusion is possible. Furthermore, seasonal variation in prices may be made to try to deal with peak-load demand problems. Nevertheless, not all tourist operators are happy about these economic options. These developments will exclude some travellers from commercial wildlife attractions on the Peninsula and could result in visitors developing negative perceptions, for example, the perception that they are being 'ripped-off' by those providing wildlife attractions.

In any case, these developments together with the sheer increase in the number of visitors to the Peninsula can be expected to increase pressure on open-access areas (those available to the general public free of charge) where wildlife may be seen. This has, for example, already happened at Sandfly Beach where disturbances caused by unsupervised visitors are reported to have adversely affected the presence of yellow-eyed penguins. Licensed tourist operators using the beach for wildlife tourism are adversely affected. Community programmes in conjunction with the Department of Conservation are underway to counteract such problems but continual effort is going to be required to address them.

### *5.3. Limits to using economics to determine the importance of wildlife*

Controversy continues about how satisfactorily economics can be used as a basis for measuring the importance of wildlife. There is no doubt that economics cannot and should not be the ultimate arbiter of what is of value or of importance (Pigou, 1932). Nevertheless, economics is an important consideration in valuing many things.

Modern economics recognizes that the economic value of many commodities or objects (particularly environmental ones) cannot be determined solely on the basis of the monetary transactions they give rise to. Intangible benefits of wildlife conservation (non-use values) such as existence, bequest and option elements (involving no monetary exchange), can have economic value, as will be discussed at this conference. It is also clear that economic impact analysis (relying as it does on the importance of monetary transactions) gives a limited view of the economic importance of conserving wildlife. Nevertheless, these economic impacts can be a crucial influence on whether political support is gained for wildlife conservation. In most cases, local communities will not be motivated to conserve wildlife unless they can obtain sufficient economic benefits from doing this.

There are those who believe that economics alone cannot satisfactorily be used to determine what wildlife species should be conserved and at what levels of population. At the same time, they do not reject economic considerations as factors to be taken into account in wildlife conservation. If this approach is adopted, targets for populations of wildlife species are set independently of economics and the opportunity costs of achieving the targets (that is, what economic benefits have to be forgone to achieve the targets) are considered. How high are these costs? How can the targets be met at least cost? The latter is a form of cost-effectiveness analysis.

As far as I am aware, the opportunity cost of conserving wildlife on the Otago Peninsula has not been estimated. On the face of it however, it appears to be quite low. Most of focal species use the sea to a large extent (they do so almost exclusively for food gathering) and occupy little land area. The land area occupied by these focal species seems to be quite marginal for agriculture if this is considered to be the main alternative land use. On many tourist properties, sheep and yellow-eyed penguins appear to co-exist. It is, however, possible that increases in some marine dependent species could adversely affect fishing or mariculture to some extent, and that cost might have to be taken into account[5].

### *5.4. Social impacts*

It should also be pointed out that economic measures fail to capture the importance of many social or sociological relationships that develop as a result of community involvement in conservation projects. There is strong community involvement in wildlife conservation on the Otago Peninsula. In part, this demonstrates the high importance that residents of the Dunedin area place on nature conservation. This involvement adds to community cohesion and awareness. It provides some individuals with a greater sense of purpose, reduces their social isolation, and enables them to make a positive contribution to their local community. These social benefits are well set out in a report completed for the World Wide Fund for Nature

by Dianne Buchan (2007). One of her in-depth studies involves a study of the social and economic benefits generated by the Yellow-eyed Penguin Trust.

## 6. Conclusion

It is clear that wildlife-based tourism on the Otago Peninsula has grown tremendously in the last two decades and it now makes a major contribution to income and employment in the Dunedin region[6]. The total turnover of enterprises on the Peninsula catering directly for wildlife viewing was estimated to be over $6.5 million for the year ended to September 2006. But that is only part of the story. There are income and expenditure multipliers to take into account and the presence of this wildlife attracts visitors to come to Dunedin who might not have otherwise visited and those who would have visited anyway to stay longer. This results in extra expenditure locally for accommodation, food, drink, travel entertainment and so on. When this is taken into account, it was estimated that the presence of wildlife on the Otago Peninsula currently adds $100 million or more in expenditure to the economy of the Dunedin region. This could be a conservative figure. It also probably generates (directly or indirectly) 800-1000 full-time jobs.

While there is some scope for further growth in wildlife tourism on the Otago Peninsula[7], the high growth rates that have been experienced since the early 1990s are unlikely to be sustained. This is because capacity constraints are becoming more frequent during periods of peak tourist demand at sites where fees for viewing wildlife are charged. This, together with increasing tourist numbers, is putting strains on open-access areas where wildlife can sometimes be seen free of charge. Community groups and the Department of Conservation are addressing this problem but it remains a constant challenge. Questions were also raised about the extent to which the wildlife populations on the Peninsula are sustainable. Considerable conservation effort is required to sustain these populations. The ecological future of the flagship species on the Peninsula (the royal albatross and the yellow-eyed penguin) is by no means assured. The loss of these species on the

Peninsula would be a considerable economic blow to the economy of the Dunedin region. Therefore, any conservation measures to reduce the chances of this loss could be a worthwhile investment.

This is not to suggest that these species are going to disappear soon, nor that wildlife tourism on the Otago Peninsula is about to disappear. It seems that wildlife tourism in the Dunedin region will in fact expand, for example with the development of a privately owned wildlife sanctuary in the hinterland of Port Chalmers. This will provide a different ecological attraction for wildlife tourists visiting Dunedin and add to Dunedin's reputation as the 'Wildlife Capital' of New Zealand[8].

## 7. Acknowledgements

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## 8. Endnotes

1. Whether or not this figure is on the high side could be debated. The Ministry of Tourism (2006, p. 2) reported that 2.48 million visitor nights were spent in the Dunedin RTO in 2005, and that overnight travellers spent a total of $262.5 million ($142.4 million by international travellers). This works out to

be $106 per overnight traveller per visitor night. The expenditure by international travellers per visitor night was almost $120. These figures are, however, likely to be on the low-side for travellers visiting wildlife attractions on the Otago Peninsula. Even if these lower daily expenditure figures are used, wildlife on the Otago Peninsula would still have a large economic impact on the Dunedin regional economy. It would generate at least $35 million in annual expenditure locally taking into account multiplier effects. This expenditure would probably account for the employment of around 350 persons (full-time equivalents) locally, that is about 10 persons per million dollars of expenditure.

2. There are other ways of appreciating the economic benefit of conserving key wildlife species on the Peninsula. For example, the economic sacrifice (economic benefits forgone) by conserving several species of wildlife on the Otago Peninsula is low. For one thing, they use little land space. This is true of the royal albatross and the yellow-eyed penguin. Only 8 ha. of land is used for the Royal Albatross Colony. It is valuable real estate. If the turnover of the Royal Albatross Centre is divided by this number of hectares, this works out to be $200,000 per ha. Annually and much more in relation to the total impact of the Centre on Dunedin's regional economy. Its direct and indirect economic impact is about $4-6 million per hectare annually. Looked at from a different point of view, each pair of albatross and each pair of yellow-eyed penguins on the Peninsula seems to generate a lot of economic benefit. For example, there are currently 30 pairs of nesting albatross that use the Royal Albatross Colony. On average, the Centre's earnings per pair is over $50,000 annually. If half the regional economic impact of wildlife tourism on the Peninsula is attributed to the Royal Albatross Centre each hectare of it makes an average annual contribution (directly and indirectly) of around $8 million and each albatross pair adds $1 ⅔ million dollars annually to the local economy. I do not have figures for yellow-eyed penguin numbers and the land area used on the Peninsula by yellow-eyed penguins but the economic impact per hectare of land used by those and per

yellow-eyed penguin must also be very high. The economic impact per pair of these penguins on the Peninsula is probably over a quarter of a million dollars annually (see Tisdell, 2007, note 2).

3. The current importance of the yellow-eyed penguin as a tourist attraction on the Otago Peninsula is underlined by the fact that about twice as much is spent at sites which have yellow-eyed penguins as attractions on the Peninsula as is spent at the Royal Albatross Centre.
4. Only about 46,000 to 50,000 of the 160,000 visitors annually to the Royal Albatross Centre (about 30 per cent) actually get a chance to view the albatross. This is mainly because of the capacity problem created by the small hide. The Otago Peninsula Trust would like to build a larger one but this has been thwarted by a land dispute. An alternative possibility might be to try to establish a second royal albatross colony in the area.
5. For example, Wright (1993) notes that the establishment of Hookers' sea lion *Phocarctos hookeri* on the Otago Peninsula could have adverse effects on the fishing industry. It has also been claimed (information supplied to me by Lala Frazer by email on 16/8/07 based on advice from Roger Belton of Southern Clams) that the increase in "the numbers of seals/sea lions, swans and other large birds is having an adverse impact on water purity" in Papanui Inlet. Currently, littlenecked clams are being harvested from the Inlet mainly for export to Europe and the US and this harvesting could be extended to the Harbour. Lack of water pollution is important for the sustainability of markets for these clams.
6. This tourism also has an economic impact in New Zealand generally. This is likely to be substantial given that the majority of visitors to wildlife attractions on the Otago Peninsula are from overseas.
7. It was estimated that the Dunedin area received about 2 million travellers in 2005 (Ministry of Tourism, 2006, p.2). It seems that around 200,000 of these, about 10 per cent visited wildlife attractions on the Otago Peninsula.
8. The property rights of those who cater for wildlife tourists on the Peninsula are interesting and quite varied and cover a wide spectrum. The range of

these rights and their consequences would be worth studying. It would also be worthwhile specifying the supply chains involved in wildlife tourism on the Peninsula.

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