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ECONOMICS, ECOLOGY AND THE ENVIRONMENT

Working Paper No. 95

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Australian Rainforest**

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BIRDS – THEIR IMPORTANCE TO VISITORS TO AN AUSTRALIAN RAINFOREST

Abstract

Lamington National Park in Queensland, Australia is noted for its rainforest and is part of Australia's fourteen World Heritage listed properties but no systematic study has been done of the importance of birds to its visitors. This study rectifies this situation. It is based on data from survey forms handed to visitors at an important site in this park and completed by visitors following their visit. This yielded 622 useable replies. These enabled us to establish the comparative importance of birds as an attraction to this site. Furthermore, logit regression is used to analyze and to identify factors that increase the likelihood of a visitor saying that birds are an important attraction. In addition, the relative importance to visitors of various attributes of birds at this site is established. These attributes include hearing birds, diversity of birds, seeing lots of birds, presence of rare birds, presence of brightly colored birds and physical contact with birds. Logit regression analysis is used to isolate independent variables that increase or decrease the likelihood that visitors find diversity of birds, brightly colored birds or physical contact with birds at this site to be important. For example, factors such as the level of education of visitors, their gender, knowledge of birds and conservation attitudes are statistically significant influences.

Keywords: Australia, biodiversity, birds, rainforest, tourism

BIRDS – THEIR IMPORTANCE TO VISITORS TO AN AUSTRALIAN RAINFOREST

1. Introduction and Background

No studies appear to have been done of the importance of birds as a factor encouraging visitors to travel to rainforests and of the various attributes of birds that visitors find appealing. At least this is so in Australia. To remedy this situation, we conducted a survey of visitors to Lamington National Park (LNP), Queensland, Australia at the O'Reilly's/Green Mountains site.

This national park is located in the southeast of Queensland in the hinterland of the Gold Coast (see Figure 1) approximately 110 km south of Brisbane (Reader's Digest, 2000) and is part of the Central Eastern Rainforest Reserves of Australia (CERRA), which are World Heritage listed (QPWS, 2001).

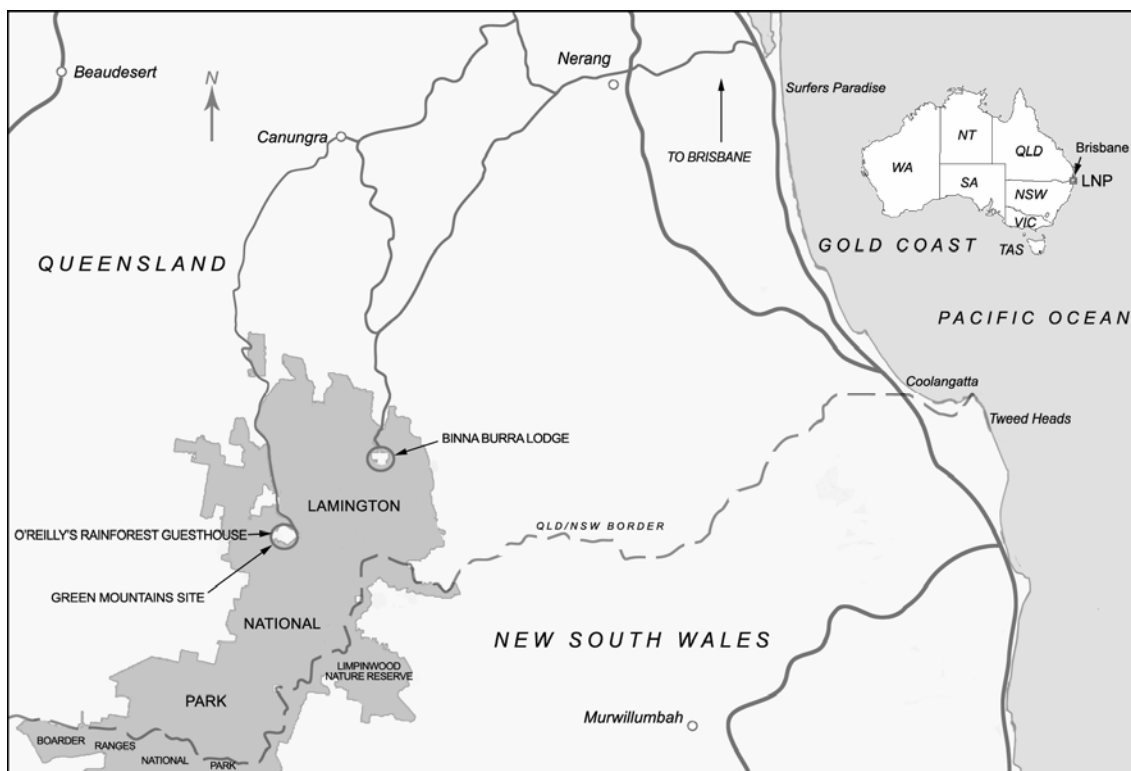


Figure 1: Generalized location map of Lamington National Park, Australia

Source: Based on the Joint Tourism Committee (2000) regional map of Southeast Queensland in 'The Guide'
Note: National park area is shaded and private properties within the park are shown in white.

This national park was established in 1915 and was the second national park to be proclaimed in Queensland (Jarrot 1990). It is the most visited national park in Queensland (Moon and Moon, 2000) and received about 200,000 vehicle arrivals in 2001 (QPWS, 2003). This suggests that about 0.8 million visits occur annually because, as mentioned later, average party size of respondents to the survey was 3.83.

As can be seen from Figure 1, there are two roads leading into the park. One terminates at Binna Burra Mountains Lodge and the other ends at the Green Mountains/O'Reilly's Rainforest Retreat. Vehicle entries at the latter site are about a third less than at the Binna Burra site, probably because the travel time to reach Binna Burra is least from the Gold Coast and Brisbane. Nevertheless, 77,209 vehicle entries were recorded at Green Mountains in 2001. Birds frequent both sites and they are good points for commencing bushwalks into the rainforest. The rainforest setting, abundant wildlife, especially birds, picnic facilities, walking tracks and the panoramic views attract a wide range of visitors to the park. Around 20 percent of the visitors are from overseas and many are from Europe and North America, especially the USA, as will be shown later in the paper. They are both day and overnight visitors but the majority of them are day visitors.

This national park is well known for its birdlife and some threatened species such as the Albert's Lyrebird *Menura alberti* [Bonaparte, 1850], Rufus Scrub-bird *Atrichornis rufescens* [Ramsay, 1867], Eastern Bristlebird *Dasyornis brachypterus* [Latham, 1801] and the Coxen's Fig Parrot *Cyclopsitta coxeni* [Hombron and Jacquinot, 1841] are found in the park. Furthermore, a variety of bird species (which are mostly brightly hued) are fed at the guesthouses and nearby in the park. Hence, this park caters to generalist visitors (average visitors) who like the physical contact and the bright colors of the birds as well as the specialist birdwatchers. Therefore, in many respects, activities related to birds significantly cater for the average visitor and specialist birdwatchers. The importance of LNP to specialist birdwatchers is highlighted by Birding Tours Worldwide (2003) published in Texas, USA. It promotes O'Reilly's as one of the important birding locations for their tours in Australia. LNP is also promoted by the O'Reilly's Rainforest Retreat and the Binna Burra Mountain Lodge operators as a birdwatching destination. The data collected from our survey show that the number of specialist birdwatchers is small compared to the total number of visitors to LNP. However, this does not mean that the average visitors knowledge of birds is low.

Three parcels of private land are enclosed by the national park (see Figure 1). Tourist enterprises providing overnight accommodation have been established on two of these sites. O'Reilly's have guesthouses and a small shopping center. Its shopping center contains a restaurant, caters for take out food and sells birdseed for feeding wild birds, and a gift and souvenir shop. It is adjacent to a picnic area in the national park.

The purposes or aims of our survey were as follows:-

- To determine how important birds are as an attraction to visitors to Lamington National Park using the Green Mountains/O'Reilly's site as a case study;
- To discover the type of visitors who are likely to say that birds are an important attraction to this site;
- To determine and analyze the comparative importance that respondents place on particular attributes of birds at this site; and
- To identify what types of respondents are likely to place importance on the different attributes of birds paying particular attention to the attributes of diversity of birds, presence of brightly colored birds and physical contact with birds.

2. Methodology

Between October, 2001 and March, 2002, 1,536 survey forms were distributed at the Green Mountains car park that adjoins O'Reilly's (with a response rate of 35%) and a further 225 forms (with a response rate of 34%) were distributed to guests at O'Reilly's guesthouse by its management. Response rates in the low 30s are usual for this type of survey (Jakobbsen and Dragun 1996). Respondents were asked to complete this survey form after their visit and were provided with a self-addressed postage paid envelope for its return. A total of 622 useable replies were received. Only one respondent per party was sought and party sizes averaged 3.85 persons. Days of the week on which survey forms were handed out at the car park were varied to reduce possible biases.

Twenty per cent of respondents were visitors to Australia and they were from 17 countries mainly from Europe (mostly UK), North America (mostly USA) and fewer visitors from Asia. The low number of Asians recorded may be due to many Asian visitors not responding to surveys due to language barriers. Of the foreign visitors, 23% were North Americans out of which 16% were from the USA.

The modal age of the respondents was in the 50-60 years range and 80% of respondents were over 30 years of age. While that may reflect older members of a party completing the survey form, this park appears to be very appealing to those in more mature age groups. Furthermore, the family annual income of respondents was relatively high. The percentage of respondents saying that their salary was more than Aus \$60,000 and above was 31% which was the highest of all the income groups in our study. The high income levels of respondents may be partly explained by the presence of a high proportion of ecotourists, especially birdwatchers who are in general well educated and have above average incomes (Sekercioglu, 2002; Ceballos-Lascurain, 1996). According to Cordell and Herbert (2002) the income of an average birdwatcher in the USA is US \$50,000 and about a third of the birdwatchers have at least a college degree. The data collected at LNP also show a very high level of educational qualifications among the respondents with 15% possessing post-graduate degrees. Apart from being well educated, birdwatchers also have a high degree of ecological knowledge and a high awareness of conservation issues (Cordell and Herbert, 2002). However, it should be pointed out that the results in our sample are not solely explained by the presence of specialist birdwatchers since they constitute only a fraction of the sample as pointed out earlier. The results suggest that most ecotourists (nature lovers) have similar characteristics to birdwatchers. Most visitors to this site were nature lovers with 59% expressing a strong or very strong support for nature conservation.

Of the 622 respondents 47% were male, 51% were female and 2% did not indicate their gender. For 47% of the respondents, it was their first visit, for 34% their second, for 9% their third and once again 9% indicated that they had visited more than thrice. One per cent did not respond. Information provided by respondents on their level of income indicated that it was above average. Sixty-two percent of respondents were day visitors and 38% stayed overnight either within the national park at O'Reilly's, or at the camping ground, or nearby.

After the data from the returned survey forms were collated and summarized, logit regression analysis was mostly used to analyze the impact of independent factors on the likelihood that birds are an important attraction in bringing visitors to this site. Influences on the likelihood of respondents saying that various attributes of birds at this site are important were also analyzed in a similar way.

3. Results – Importance Of Birds As An Attraction

Visitors were asked to rank the features listed in Table 1 in terms of whether they were very important, important or unimportant reasons for their decision to visit the Green Mountains/O'Reilly's site of LNP. To obtain a ranking based on the degree of importance attached to these features by visitors, a weight of zero was attached to a feature if a respondent considered it to be unimportant, one if it was said to be important; and two if stated to be very important. The resulting ranking of the features based on the weighted averages are shown in Table 1.

Table 1

Ranking of factors attracting visitors to O'Reilly's/Green Mountains site

Rank	Feature	Weighted Average
1	Rainforest	1.89
2	Birds	1.74
3	Get Close to Nature	1.68
4	Rare Ecosystem	1.45
5	Much Biodiversity	1.42
6	Good Start for Walks	1.41
7	Away from Routine	1.37
8	World Heritage	1.22
9	Cool Green Spot	1.07
10	Bringing Visitors	0.85
11	Good Picnic Spot	0.69
12	Other	0.27

* Weighted by using zero if respondent said a feature is unimportant, one if it is said to be important and two if it is said to be very important.

From Table 1, it can be seen that after the presence of the rainforest, birds are ranked as the second most important feature attracting visitors to this site.



Figure 2: Rainforest is the prime attraction to LNP



Figure 3: The survey site is a good starting point for bushwalks – walkers on the Border Track

In order to determine the type of visitors who are likely to say that the presence of birds is important we conducted logit and probit regression analyses. The results of these two analyses are shown in Table 2. For the purpose of this analysis, responses of ‘important’ or ‘very important’ were combined (coded as one) and ‘unimportant’ was coded as zero. Table 2 lists only the statistically significant independent variables and their levels of statistical significance.

Table 2
Factors listed increased the probability of visitors saying that the presence of birds is an important site attraction

Attribute of Respondent
LOGIT ANALYSIS
Female rather than male (6%)
Says important ^a as a picnic spot (1%)
Says important ^a for bringing visitors (1%)
Says important ^a for getting close to nature (1%)
Says important ^a as a good starting point for walks (4%)
Considerable biodiversity is an important ^a attraction (1%)
Close physical contact with birds is important ^a (1.2%)
PROBIT ANALYSIS
Rates diversity of birds as important ^a (1%)
Rates rare birds as important ^a (1%)
Close physical contact with birds is important ^a (5%)
Brightly colored birds are important ^a (5%)

* Figures in parenthesis indicate statistical significance for at least the percentage level indicated

^a These factors are considered important or very important by respondents

Source: Based on the authors' survey data

As can be seen from Table 2 females are more likely to be attracted to this site by the presence of birds than males. The level of statistical significance of this is 6%. Visitors with diverse interests seem to find birds to be an important attraction. For example, although only a small proportion of visitors regarded this site as important for picnics or for bringing visitors (see Table 1) they were likely to say birds are important at this site. Also those who rate biodiversity generally, or diversity of birds at this site, as important attractions are likely to rate birds at this site as important. This is also true of those who like physical contact with birds or brightly colored birds. But these latter persons seem to be relatively distinct from those who believe that diversity of birds or the presence of rare birds at this site are important.



Figure 4. Mother and child in physical contact with colorful parrots at O'Reilly's

Thus it appears that different types of visitors believe that birds are important at this site for different reasons. The next section should help elucidate that situation.

4. Results – The Importance to Visitors of Attributes of Birds at this Site

Respondents were asked to rank the attributes of birds listed on Figure 5 as unimportant, important and very important at this site. Once again weights of zero, one, and two were used respectively to compute a weighted average of the importance of these attributes. The results are set out in Figure 5.

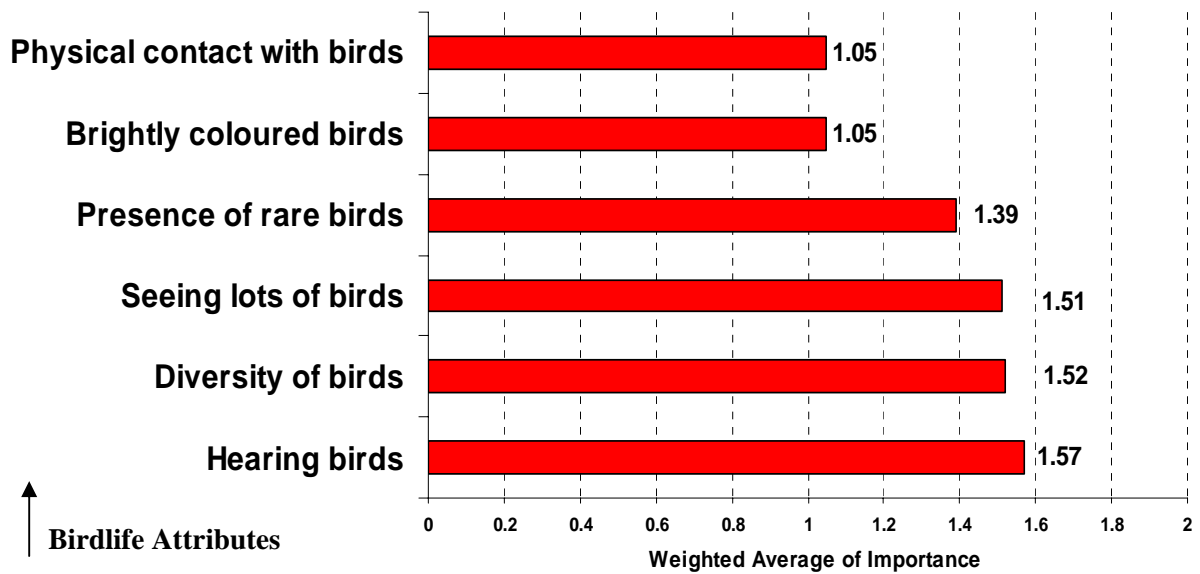


Figure 5: The average ranking of the importance of various attributes of birds at this site

Hearing birds turned out to be the most important aspect of birds, followed closely by the diversity of birds and seeing lots of birds. Presence of rare birds occupied fourth place. Seeing brightly colored birds and physical contact with birds were given a lower ranking although they still remained important on average.

Brightly colored birds commonly seen at the O'Reilly's site and in the national park picnic grounds opposite O'Reilly's are the King Parrot *Alisterus scapularis* [Lichtenstein, 1816] and the Crimson Rosella *Platycercus elegans* [Gmelin, 1788]. The Regent Bowerbird *Sericulus chrysocephalus* [Lewin, 1808], Australian Brush-turkey *Alectura lathami* [Gray, 1831] and the Wonga Pigeon *Leucosarcia melanoleuca* [Latham, 1801] are also some of the frequently seen birds in this area. It must be mentioned here that although these birds are found in the rainforest and in the guesthouse/QPWS picnic grounds they are not exclusively restricted to rainforests but can also be found in wooded areas, farms, gardens and parks within their range (Reader's Digest, 1997). Species such as the King Parrot and the Crimson Rosella can sometimes be seen in their hundreds in some of these habitats (Reader's Digest, 1997).

Grain is used by many visitors to feed the parrots (the above mentioned species) and the Regent Bowerbird may be fed with fruit. Parrots perch on people to obtain access to food

and this aspect is popular for photographing. Birds continue to be fed at O'Reilly's and in the picnic area and surrounding area of the park despite signs by the Queensland Parks and Wildlife Service warning against the feeding of wildlife (see Figure 6).



Figure 6: Warning from Queensland Parks and Wildlife Service not to feed wildlife at Green Mountains

Birds that may be heard in the rainforest include the Green Catbird *Ailuroedus cassirostris* [Paykull, 1815] which makes a distinctive cat-like call and the Paradise Riflebird *Ptiloris paradiseous* [Swainson, 1825] which makes a high pitched whistle followed by a gunshot-like crack. The rare and difficult to see birds include Albert's Lyrebird *Menura alberti* [Bonaparte, 1850], Rufus Scrub-bird *Atrichornis rufescens* [Ramsay, 1867], Eastern Bristlebird *Dasyornis brachypterus* [Latham, 1801] and the Coxen's Fig Parrot *Cyclopsitta coxeni* [Hombron and Jacquinot, 1841].

While in comparison to other aspects of birds at the site, seeing brightly colored birds and having physical contact with birds might seem to be relatively unimportant, they are very important for some groups of visitors. In fact a dichotomy exists in the interests of different types of visitors to the site. A high degree of cross correlation exists between visitors who

believe physical contact with birds and brightly colored birds are important. However, this group is less likely to rank the other attributes of birds at this site, such as diversity of birds as important. Conversely, those who rank diversity of birds as important, and attributes other than physical contact and bright colors as important, are less likely to rate physical contact with birds and brightly colored birds as important.

This is evident from Table 3 which shows the degree of association between the respondents' statements about the importance of various attributes of birds at this site.

Table 3
Cross tabulation of percentage of respondents specifying that various
bird attributes are important at this survey site

ATTRIBUTES	Seeing lots of birds	Hearing birds	Large variety or diversity of birds	Presence of rare birds	Brightly colored birds	Close physical contact with birds
Seeing lots of birds	100	83	79	73	71	66
Hearing Birds	85	100	80	75	68	63
Large variety of birds	78	78	100	84	67	62
Presence of rare birds	66	67	77	100	61	59
Brightly colored birds	55	51	52	52	100	69
Close physical contact with birds	48	45	46	48	66	100

Further analysis supports the view that visitors to this site can be divided basically into two groups – those who enjoy brightly colored birds and physical contact with birds and those who may have a more intellectual attitude and believe that diversity of birds at this site is important. Sometimes individuals from these two groups are in conflict. Many of those in the latter group oppose the feeding of birds at this site. However, the groups are not completely disjoint.



Figure 7: Many visitors enjoy feeding colorful birds at the O’Reilly’s site and having physical contact with these birds

Using logit regression analysis, let us consider the factors that increase the likelihood of a respondent saying that diversity of birds of this site is important. We also do this to identify factors that increase the likelihood of a respondent saying that physical contact with birds and the presence of colorful birds are important. These results can then form the basis to differentiate between the groups.

Many possible independent variables were tested to determine whether they had a statistically significant influence on the probability of a respondent saying that the attributes listed in the headings of Tables 4, 5 and 6 are important. For example, level of income and age were tested but found not to be statistically significant. Only the statistically significant variables are listed in these tables.

Table 4 sets out the factors that increase the probability of a respondent saying that diversity of birds at the site is important. Respondents are more likely to say this if they are male rather than female, have a tertiary education rather than a lower level of education, and if they claim to have a good knowledge of birds rather than a poor level of knowledge of birds.

These relationships are statistically of high significance. While the statistical significance of the other attributes listed in Table 4 is not as high, they are still statistically significant.

Table 4

The probability of a respondent saying that bird diversity is important increases with the attributes listed. Logit regression analysis*

Attribute of the respondent
Good knowledge of birds (1%)
Positive attitude to nature conservation (3.5%)
Higher level of education (1%)
Stays overnight (3%)
Male rather than female (1.5%)

* Relationship is statistically significant for the percentage level indicated in brackets

Table 5 lists factors that are associated with a fall in the likelihood of a respondent saying that physical contact with birds at this site is important and indicates the statistical significance of the relationship. Similarly, Table 6 lists factors that are associated with a decline in the probability of a respondent saying that brightly colored birds at this site are important.

Table 5

The probability of a respondent saying that physical contact with birds is important falls with the attributes listed. Logit analysis*

Attribute of the respondent
Higher level of education (1%)
Good knowledge of birds (2%)
Member of a conservation organisation (1%)
Positive attitude to nature conservation (1%)
Male rather than female (9%)

* Relationship is statistically significant for the percentage level indicated in brackets

Table 6

The probability of a respondent saying that brightly colored birds are important falls with the listed attributes. Logit analysis*

Attribute of the respondent
Has a higher level of education (1%)
Has a good knowledge of birds (1%)
Is a member of a conservation organisation (2.5%)
Has a positive attitude to nature conservation (1%)
Male rather than female (1%)

* Relationship is statistically significant for the percentage level indicated in brackets

As highlighted by Table 7, the relationship for the importance of diversity of birds is the opposite in sign to those for physical contact with birds at this site. This is also true for the importance of brightly colored birds except where the respondents' 'attitudes to nature conservation' is positive.

Table 7

Signs of probability relationships between the importance of bird attributes and respondent's characteristics using logit regression analysis*

Respondent's characteristics	Diversity	Physical contact	Brightly colored
Higher level of education	+	-	-
Good knowledge of birds	+	-	-
Member of conservation organisation	+ ⁿ	-	-
Positive attitude to nature conservation	+	-	+
Female rather than male	-	+ ^a	+
Stays overnight	+	- ⁿ	- ⁿ

All relationships are significant at the 5% level or less unless otherwise stated

^a Significant at 9% level

ⁿ Not statistically significant

Table 7 indicates that those who have a higher level of education, have a good knowledge of birds, and have a positive attitude to nature conservation are more likely than others to say that diversity of birds at this site is important, but less likely to say that physical contact with birds or the presence of brightly colored birds are important. These factors provide a basis

for dividing visitors into two partially overlapping groups in terms of the importance they place on the attributes of birds at this site.

5. Discussion and Conclusion

The presence of birds is clearly an important attraction for visitors to the Green Mountains/O'Reilly's site in LNP although some of the commonly seen birds are not confined entirely to rainforests. The presence of birds is the second most important feature attracting visitors to this site and is only surpassed by the rainforest as an attraction. On average, birds rank as quite an important attraction having a weighted average of 1.74 which is well in excess of the figure which would just result in their being ranked as important.

The importance of birds as an attraction at this site is underscored by a further result. Respondents were asked if there were no birds at this site, would they still visit it. If they answered 'Yes', they were asked whether they would reduce the frequency of their visits and if so, by what percentage.

Sixteen per cent of respondents said they would not visit the site if birds were absent and 27 per cent said they would still visit but reduce the frequency of their visits. Thus there would be a reduction or cessation of visits by 43 per cent of respondents if birds were absent.

Hearing birds in the rainforest proved to be the most important attribute of birds mentioned by visitors followed by diversity of birds at this site. Seeing lots of birds was ranked third. The average weighted importance of seeing brightly colored birds and physical contact with birds came lowest in the scale. However, they were very important for some visitors.

In fact the evidence suggests that there are basically two groups of visitors. One rates physical contact with birds and brightly colored birds as important, the other rates diversity of birds as important as well as hearing birds, seeing lots of birds and rare birds. The two groups only partially overlap. Factors have been identified such as the level of the respondents' education, gender, and so on that help to differentiate between those groups. To some extent, the values of those groups are in conflict. Those belonging to the last mentioned group are generally opposed to the feeding of native birds whereas those in the first group enjoy feeding these birds and having physical contact with them. There seems to be no easy way to resolve their conflict.

Both groups find birds to be an important attraction and support conservation of birds for different reasons. If those who feed birds because they like to have contact with them were denied this opportunity, the public's net support for bird conservation could decline. Public policy does, in any case, have to take account of the heterogeneity of the interests in birdlife of tourists/recreationists.

In conclusion, it might be observed that Australia's policy of promoting its marsupials, such as koalas and kangaroos, as tourist attractions seems unbalanced given Australia's large variety of bird species many of which are endemic and their obvious appeal to tourists, as revealed for example by this study. Most Australian birds can be seen by day whereas most of its marsupials are as a rule only active at night or around dusk and dawn. Chances of seeing Australia's marsupials during the day in the wild are comparatively low. Furthermore, Australian marsupials are not very vocal, particularly compared to its bird species. The sounds of Australian birds add to their appeal, especially in rainforest settings where wildlife is often hard to see.

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