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**Information and Wildlife Valuation: Experiments and Policy**

**by**

**Clem Tisdell and Clevo Wilson**

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**Clem Tisdell† and Clevo Wilson‡**

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# Information and Wildlife Valuation: Experiments and Policy

## Abstract

An experiment involving 204 residents of Brisbane, Australia is outlined and the results are reported and analysed. Two consecutive surveys of the respondents provide data about their stated knowledge of 23 wildlife species present in tropical Australia, many of which exclusively occur there. In addition, these surveys provide data about the willingness of respondents to pay for the conservation of those species belonging to three taxa: reptiles, mammals, and birds. The respondents' stated knowledge of the species is compared with their willingness to pay for species' conservation, and relevant inferences are drawn. When the respondents' knowledge of the species is experimentally increased in a balanced way, it is found to result in more dispersion (greater discrimination) in respondents' willingness to contribute to conservation of the different wildlife species in the set considered. A set of factors likely to be important in influencing individuals' support for the conservation of wildlife species is identified and there is critical comment on recent valuation literature. Both theoretical and policy conclusions are drawn from the results. (*JEL* Q51, Q57, Q58).

**Keywords**: biodiversity, contingent valuation, endangered species, environmental evaluation, knowledge, wildlife conservation.

# Information and Wildlife Valuation: Experiments and Policy

## 1. Introduction

The degree of knowledge that individuals have of different wildlife species influences their economic valuation of the different species and their willingness to pay for their conservation. Variations in such knowledge are capable of altering, both stated and revealed preferences, and therefore, have important implications for techniques used for economic valuation and policies derived from such methods. However, there have been few empirical studies of the relationship between the knowledge individuals have of different wildlife species and their willingness to pay for their conservation. The main exception is the experimental research by Samples et al. (1986). More recently, Spash (2002), drawing on the theories of Ajzen et al. (1996) and Ajzen and Driver (1992), emphasises how the provision of information can be preference-forming due to interaction effects.

The purpose of this paper is to report on and interpret the results of an experimental survey involving a sample of 204 Brisbane (Australia) residents. It examines the relationship between their stated knowledge of various Australian tropical wildlife species and their stated willingness to pay for their conservation. It considers the initial relationship and the subsequent relationship once the respondents' knowledge of all the species has been experimentally increased.

First, the nature of the experiment is described and then measures of the respondents' stated knowledge of the species are given. Variations in the respondents' knowledge as a result of the experiment are specified. The respondents' stated knowledge of each of the species is then related to their stated willingness to pay for its conservation. The effects of a reduction of uncertainty about the species on the willingness to pay of respondents for the conservation of each of the different species are given particular attention. It is, however, recognised that factors other than knowledge of species, such as the abundance of a species, influence willingness to pay for their conservation. That raises doubts about whether the willingness to pay for the conservation of a particular species is a reliable indicator of its total economic value. The policy relevance of this, and other findings, are discussed before concluding.

## 2. The Nature of the Experimental Survey

An experimental survey was conducted in 2002 of 204 residents of Brisbane drawn from different suburbs with varying socio-economic characteristics. Potential respondents were mostly contacted by letter drops and the sample was adjusted so that it had a similar age composition to that of the residents of Brisbane and a similar gender composition. While care was taken to select a representative group of Brisbane adults (persons of 18 years of age and older), it should be noted that prediction of population parameters is not the prime objective of this research.

The sample of respondents came in groups of 40-50 to a central place, mainly to The University of Queensland. These meetings were arranged at different times of the day and on both weekdays and at weekends to ensure full participation by those selected to participate.

Each group at the initial meeting completed Survey I, a written questionnaire, which was designed to provide information about the knowledge of each of the respondents about each of a set of Australian wildlife species present in tropical Australia. The survey also collected information on how much financial support each of the participants would be willing to give for the conservation of each of these species. Other relevant information was also obtained. The completed survey forms were then collected.

In the second part of the meeting, participants attended an informative and illustrated lecture by Dr. Steven Van Dyck, the then Curator of Birds and Mammals at the Queensland Museum. His lecture mostly concentrated on the mahogany glider. This tropical gliding possum had not been officially sighted for several decades and he had 'rediscovered' it. Following this lecture, participants were given a second survey form (Survey II) to take home and asked to complete this after reading an accompanying booklet containing coloured photographs and descriptions of wildlife species mentioned in the surveys. They were requested to return the completed second survey form in the self-addressed pre-paid postage envelope provided within a fortnight.

After some follow-up, all participants completed and returned the forms for Survey II. Survey II also collected additional information (not reported here) on respondents' knowledge and views about other aspects of Australian tropical wildlife.

In the booklet, we endeavoured to provide non-emotive and a balanced amount of information about each of the wildlife species considered in the survey. The aim was to provide information without influencing the preferences of the respondents. We recognise, however, that this ideal is difficult, or even virtually impossible, to achieve. The provision of information is not, as a rule, merely informative but is liable to alter preferences[1] (Spash, 2002). We were unable to control the information in the lecture given by Dr. Van Dyck and its presentation. This lecture primarily focused on the mahogany glider and was presented in an entertaining manner that undoubtedly increased the empathy of the audience for the mahogany glider. As will be evident later, there was a major rise in the willingness of survey participants to pay for the conservation of the mahogany glider in Survey II compared to Survey I, and in their stated amount of knowledge of it. It, therefore, became an outlier in Survey II in the set of tropical species considered. Nevertheless, the stated level of knowledge of respondents about the set of species considered increased and became more balanced and even in Survey II compared to Survey I. This is apparent from the analysis presented in the next section.

## 3. Stated Degrees of Knowledge of the Wildlife Species Considered

The wildlife species considered by respondents are listed in Table 1. They consist of species from three taxa: birds, mammals and reptiles. Both in the initial survey, Survey I, and in the subsequent survey, Survey II, participants were asked to self-rank their perceived knowledge of each these species as ‘very good’, ‘good’, ‘poor’, or ‘non-existent’.

**Table 1:**
**List of Australian wildlife species covered in surveys of knowledge and comparative economic valuation of respondents**

| Common name | Scientific name | Abbreviation |
|---|---|---|
| **Reptiles** | | |
| Saltwater crocodile | *Crocodylus porosus* | *Sc* |
| Freshwater crocodile | *Crocodylus johnstoni* | *Fc* |
| Hawksbill turtle | *Eretmochelys imbricata* | *Ht* |
| Taipan snake | *Oxyuranus scutellatus* | *Ts* |
| Northern long-necked turtle | *Chelodina rugosa* | *Lt* |
| **Mammals** | | |
| Lumholtz's tree kangaroo | *Dendrolagus lumholtzi* | *Tk* |
| Red kangaroo | *Macropus rufus* | *Rk* |
| Koala | *Phascolarctos cinereus* | *K* |
| Mahogany glider | *Petaurus gracilis* | *Mg* |
| Northern bettong | *Bettongia tropica* | *Nb* |
| Northern quoll | *Dasyurus hallucatus* | *Nq* |
| Dugong | *Dugong dugon* | *D* |
| Northern hairy-nosed wombat | *Lasiorhinus krefftii* | *Nw* |
| Eastern pebble-mound mouse | *Pseudomys patrius* | *Em* |
| **Birds** | | |
| Southern cassowary | *Casuarius casuarius* | *Scw* |
| Brolga | *Grus rubicundas* | *B* |
| Golden-shouldered parrot | *Psephotus chrysopterygius* | *Gp* |
| Palm cockatoo | *Probosciger aterrimus* | *Pc* |
| Eclectus parrot | *Eclectus roratus* | *Ep* |
| Gouldian finch | *Erythura gouldiae* | *Gf* |
| Red-tailed black cockatoo | *Calyptorhynchus banksii* | *Bc* |
| Golden bowerbird | Prionodura newtoniana | *Gb* |
| Australian magpie | *Gymnorhina tibicen* | *Am* |
| Kookaburra | *Dacelo novaeguineae* | *Kb* |

A weighted index of the average degree of knowledge of participants of each of the species was obtained by assigning a weight of 3 to 'very good', 2 to 'good', 1 to 'poor' and zero to 'non-existent'. There is a degree of arbitrariness in this assignment as there would also be so in the participants' self-assessment of their degree of knowledge. However, these knowledge measures do allow some progress to be made with the analysis. A related article (Tisdell, forthcoming) using somewhat different weights, arrived at conclusions that are compatible with those reported here.

Figure 1 shows the relationship between the initial level of the indices of self-stated knowledge of the species ($k_1$) obtained in Survey I and the subsequent indices ($k_2$) obtained in Survey II. We observe that the largest increases in the indices occurred for wildlife species that were initially more poorly known than the others. While all of these initially poorly known species, except the mahogany glider, remained less well known than species that were initially better known, differences in the degree of knowledge of the species were substantially reduced in Survey II compared to Survey I. Knowledge of the various species was more balanced. On the whole, the better known species are those that occur naturally in the vicinity of Brisbane, are common in zoos are large (e.g. southern cassowary) or are dangerous to man (e.g. saltwater crocodile). Species that are confined to the tropics (especially small areas of it), or are smaller in size and relatively innocuous were the least well known by the Brisbane sample of respondents.

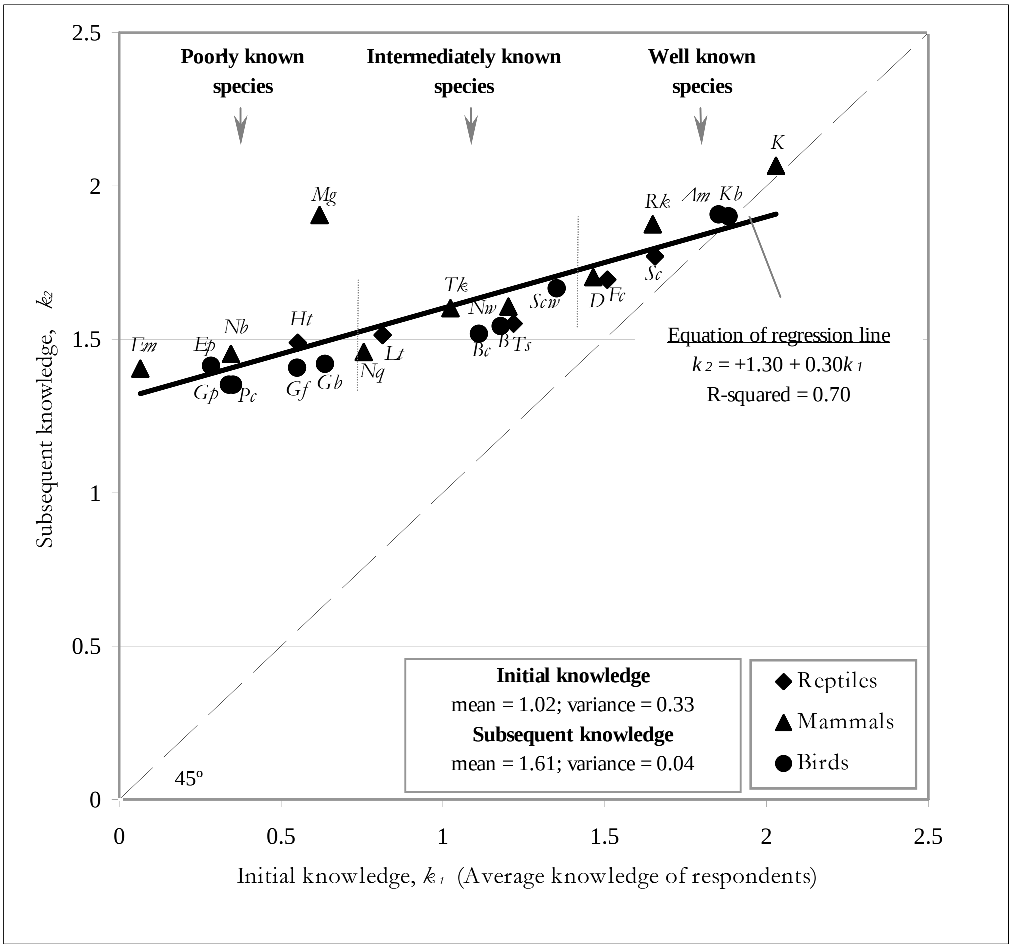


**Figure 1: Initial knowledge indices (Survey I) versus subsequent knowledge indices (Survey II) for bird, reptile and mammal species in surveys**

The degree of increase in the stated knowledge of the mahogany glider in Survey II stands out noticeably from the other increases. This is primarily a result of the presentation by Dr. Van Dyck mentioned above.

The rise in the average degree of knowledge of the species surveyed and reduction in the degree of uncertainty about them is evident from Table 2. The mean value of the knowledge indicator rises for each of the taxa. It might be observed that the mean level of knowledge is less for birds in the selected set than for either reptiles or mammals. The degree of knowledge of the species becomes more even in Survey II than in Survey I as highlighted by a substantial fall in the variance of knowledge of them as well as a considerable reduction in all the coefficients of variation.

**Table 2:**

**Mean values of knowledge indices and their dispersion between species**

| **Survey I** | | | | | **Survey II** | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Taxa** | $\mathbf{k_1}$ | $\sigma^2$ | $\sigma$ | **C.V.** | **Taxa** | $\mathbf{k_2}$ | $\sigma^2$ | $\sigma$ | **C.V** |
| Reptiles | 1.15 | 0.21 | 0.46 | 40.31% | Reptiles | 1.60 | 0.01 | 0.12 | 7.63% |
| Mammals | 1.02 | 0.41 | 0.64 | 62.60% | Mammals | 1.67 | 0.05 | 0.23 | 13.77% |
| Birds | 0.95 | 0.37 | 0.61 | 64.03% | Birds | 1.55 | 0.04 | 0.21 | 13.62% |
| All the above | 1.02 | 0.33 | 0.57 | 56.40% | All the above | 1.61 | 0.04 | 0.20 | 12.72% |

k = mean of knowledge index
$\sigma^2$ = variance
$\sigma$ = standard deviation
C.V. = standard deviation/mean; the coefficient of variation.

## 4. Stated Degree of Knowledge of the Species Related to the Willingness to Pay for their Conservation

In both Survey I and Survey II, respondents were asked the following question:

*"Suppose that you are given AUS$1,000, but you can only use it to donate funds to support the conservation of the reptiles in Australia listed below. Suppose that a reliable organization were to carry out the conservation work and your money would supplement other funds for this purpose. What percentage of your $1,000 would you contribute for the conservation of each of the reptiles listed below? Your total should add up to 100%."*

| **Reptiles** | **(%)** |
|---|---|
| Saltwater crocodiles | |
| Freshwater crocodiles | |
| Hawksbill Sea Turtles (a marine species with a beautiful shell) | |
| Northern Long-necked (Freshwater) Turtles | |
| Taipan Snakes | |
| | **100** |

They were also asked the same type of question in relation to the birds and mammals listed in Table 1. This enables us to consider whether there might be any systematic relationships between the willingness of respondents to pay for the conservation of species and their stated knowledge of these species.  In interpreting the results, it is necessary to bear in mind that factors other than knowledge may influence the respondents' allocation of funds for the conservation of the various species.

The scatter of observations for the average level of initial knowledge of the species and the average allocation of funds for their conservation are graphed in Figures 2-4 for each of the taxa.

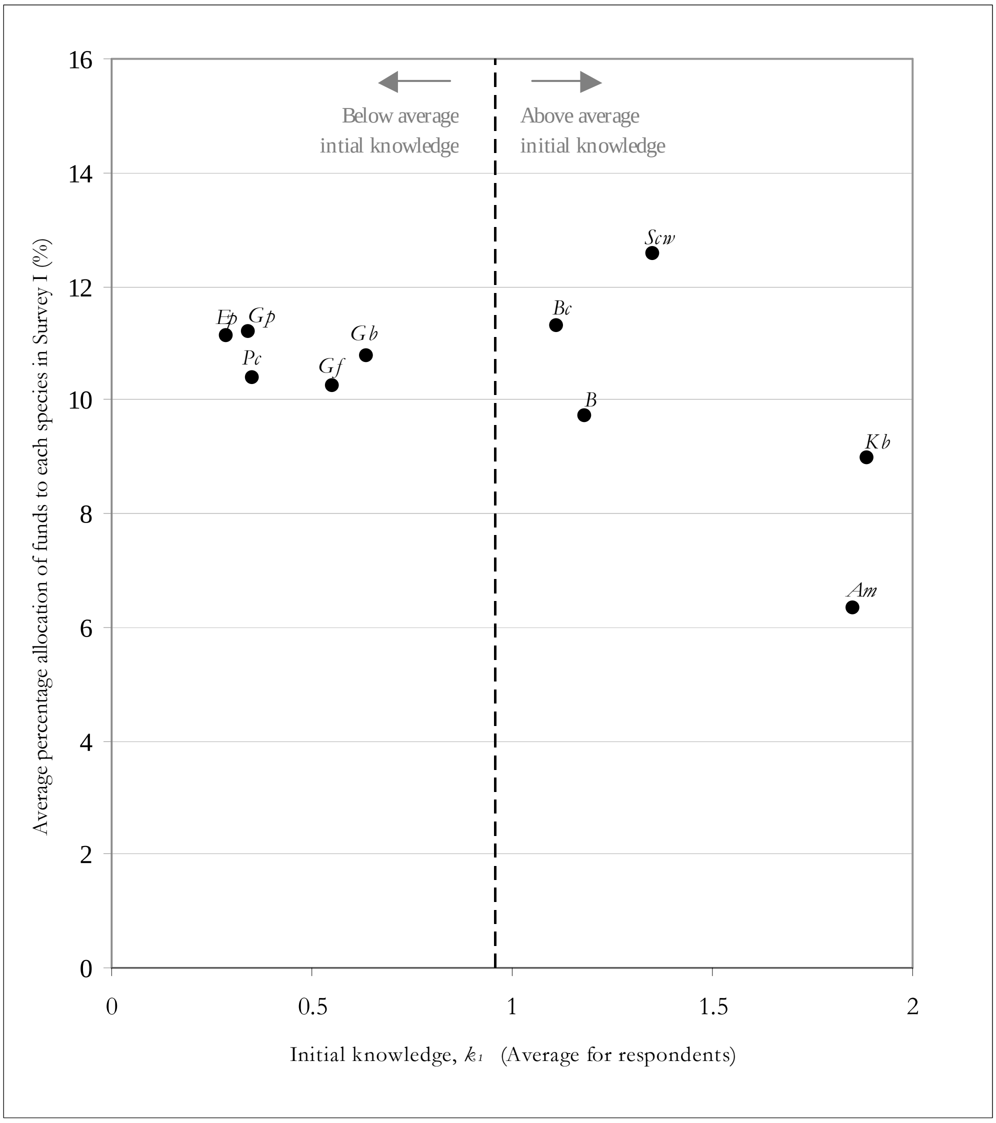


**Figure 2: Initial knowledge indices versus percentage allocation of funds to each bird species in Survey I**

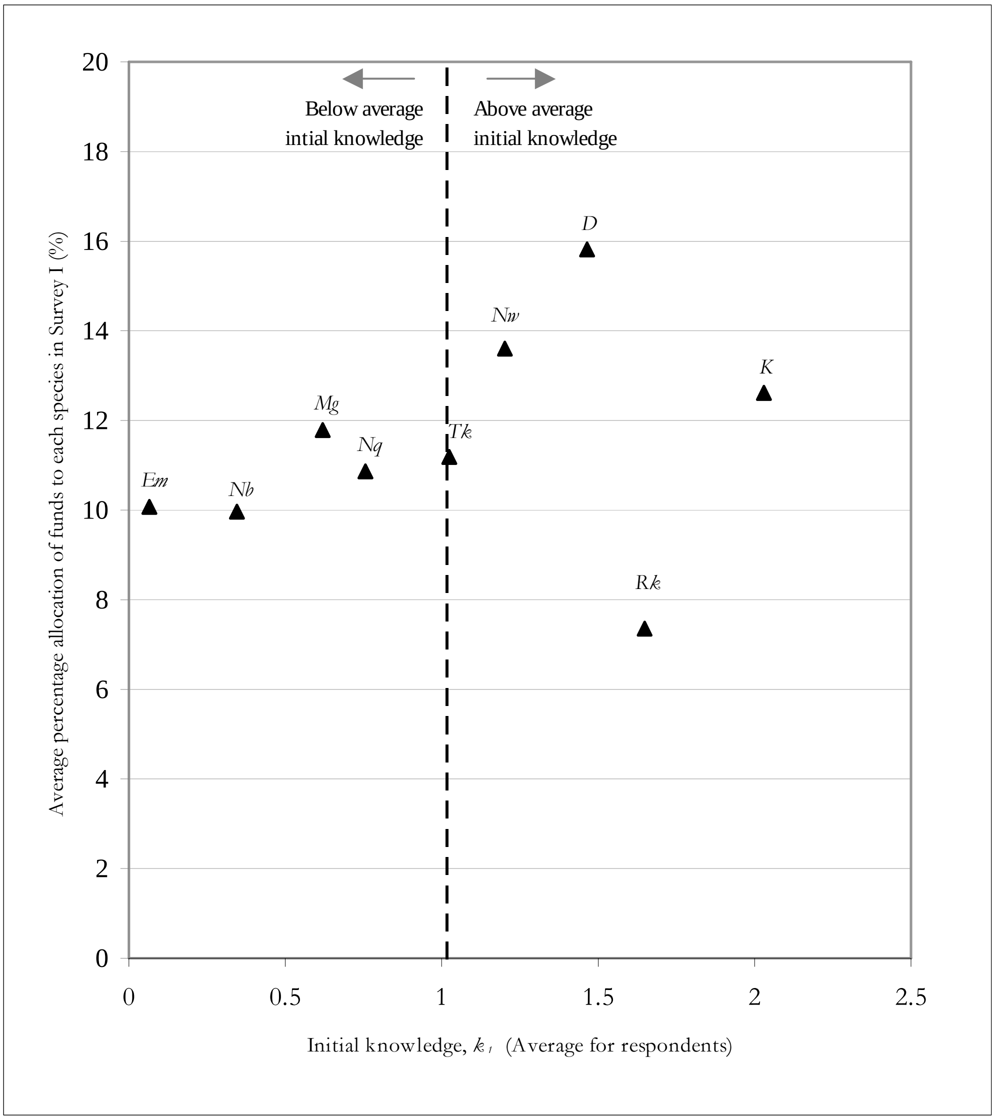


**Figure 3:** **Initial knowledge indices versus percentage allocation of funds to each mammal species in Survey I**

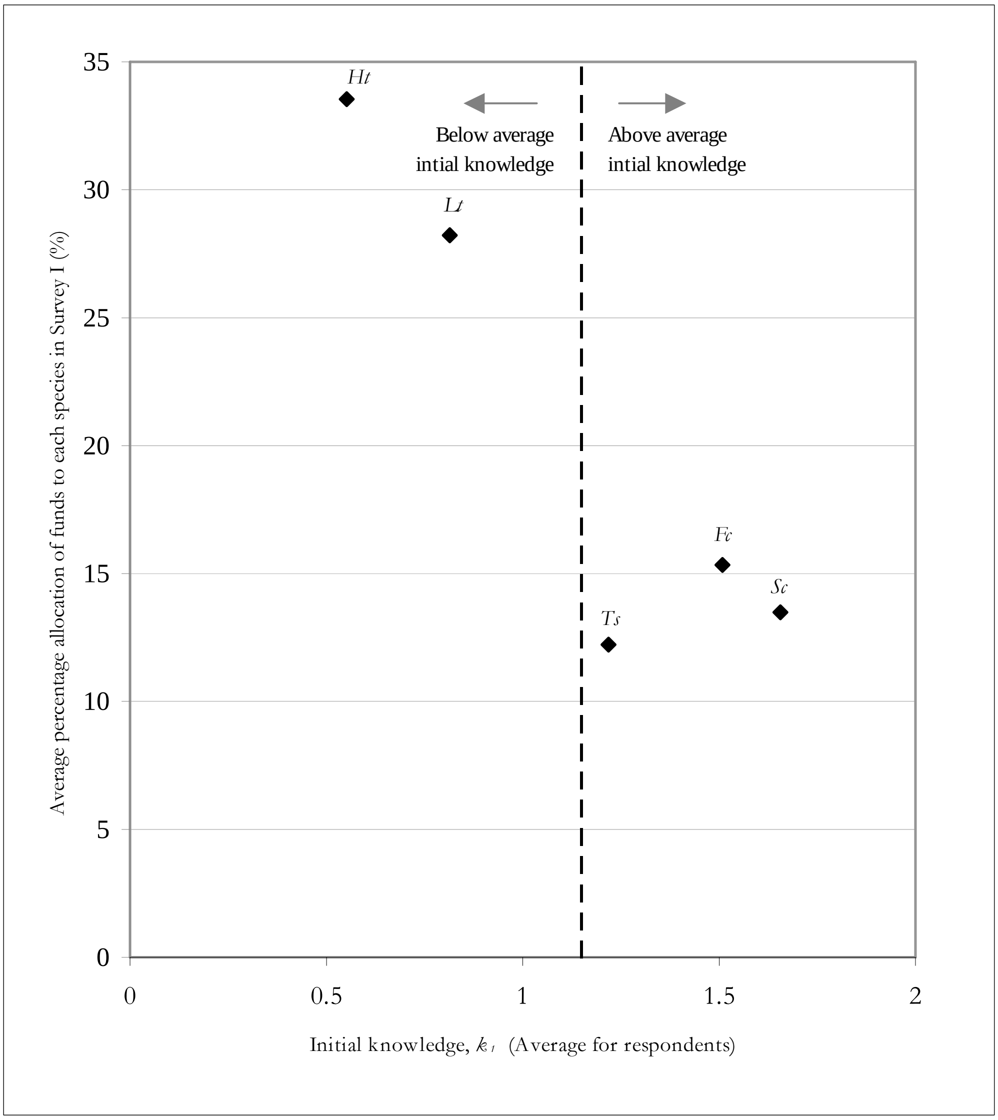


**Figure 4: Initial knowledge indices versus percentage allocation of funds to each reptile species in Survey I**

In these figures, the vertical broken line divides the set of observations into those which are below the average of knowledge of the species in each taxa and those which are above this average. Several observations can be made from Table 3, which provides statistics for observations in each of those divided sets for each of the taxa.

**Table 3:**

**Descriptive statistics relating to the scatters in Figures 2-4 for Survey I**

| **% allocation for 'below average' knowledge set** | | | | | **% allocation for 'above average' knowledge set** | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Taxa | $\bar{y}_1$ | $\sigma^2$ | $\sigma$ | C.V. | Taxa | $\bar{y}_2$ | $\sigma^2$ | $\sigma$ | C.V |
| Reptiles | 30.88 | 14.15 | 3.76 | 12.18% | Reptiles | 10.70 | 1.88 | 1.37 | 12.82% |
| Mammals | 10.67 | 0.71 | 0.84 | 7.91% | Mammals | 10.40 | 12.05 | 3.47 | 33.39% |
| Birds | 10.75 | 0.19 | 0.44 | 4.07% | Birds | 8.47 | 21.57 | 4.64 | 54.82% |

$\bar{y}$ = mean percentage allocation
$\sigma^2$ = variance
$\sigma$ = standard deviation
C.V. = standard deviation/mean; the coefficient of variation.

It can be seen that on average the allocation of funds for conservation of the less well known species (those for which knowledge is below average) is greater within each of the taxa than for the better known species. Secondly, the variance and coefficient of variation of stated contributions are much less for the poor knowledge set of birds and of mammals than for the better than average knowledge set.

In the case of reptiles, the situation is slightly different. While the coefficient of variation of contributions is lower for the poor knowledge set of species than for the good knowledge set, the variance shows the opposite relationship. There may be special reasons for this. Snakes and crocodiles may have evoked almost equally negative images in the minds of the respondents. Although the species of turtles were slightly less well known than snakes and crocodiles, turtles appear to evoke a more positive image. This and the small number of species in the set may make it problematic to generalise from the results for the reptile taxa.

Concentrating on the set of birds and set of mammals, consider the reasons why the average allocation of conservation funds to the poorly known species by respondents might exceed that for better known species. It might be because these species are less well known, they are considered to be rare and likely to be more endangered than the better known ones. Therefore, financial support for their survival may be felt to have urgency. This accords with the finding of Fredman (1995) for a group of his respondents that the lower the population of the white-backed woodpecker, the greater the willingness of this group to pay for its survival. Bandara and Tisdell (2004) observed a similar relationship in Sri Lanka for the Asian elephant. An additional factor could be that individuals may be willing to pay more in order to keep their options open in the case of the more poorly known species.

The lower variances and coefficient of variations of contributions to conserve the more poorly known bird and mammal species compared to the better known ones may also reflect Laplace's principle of insufficient reason (Laplace, 1951). This principle suggests that when a similar degree of uncertainty exists, probabilities should be treated equal. Because of insufficient reason, there may be a tendency for respondents to treat all poorly known species as equally worthy of support. This is reflected in the following comments given by respondents:

*'All others (sic) equal but I would reapportion % according to the degree to which their existence is in danger, if I knew the figures'*
*'I need to read and find out which species are more needy of protecting'*
*'I would need more information such as which has greatest need (e.g., most endangered)'*

It might be also observed from Figures 2 and 3 that in the set of better known species those that achieved the highest allocation of conservation funds are ones widely believed to be endangered in Australia. This is true, for example, of the southern cassowary, the dugong and the northern hairy-nosed wombat. Those with the lowest allocation in this set (the Australian magpie, the kookaburra, and the red kangaroo) are not in danger of extinction in the foreseeable future. It seems that both the perceived utility which individuals expect from the continued existence of the species and the degree of threat to their continuing existence influence the individuals' willingness to pay for the conservation of different wildlife species.

Figure 5 shows, for Survey II, the scatter of respondents' knowledge of species and the average willingness of respondents to allocate funds for their conservation. The spread of knowledge about the species is less than in Survey I and the stated knowledge of about all has risen.

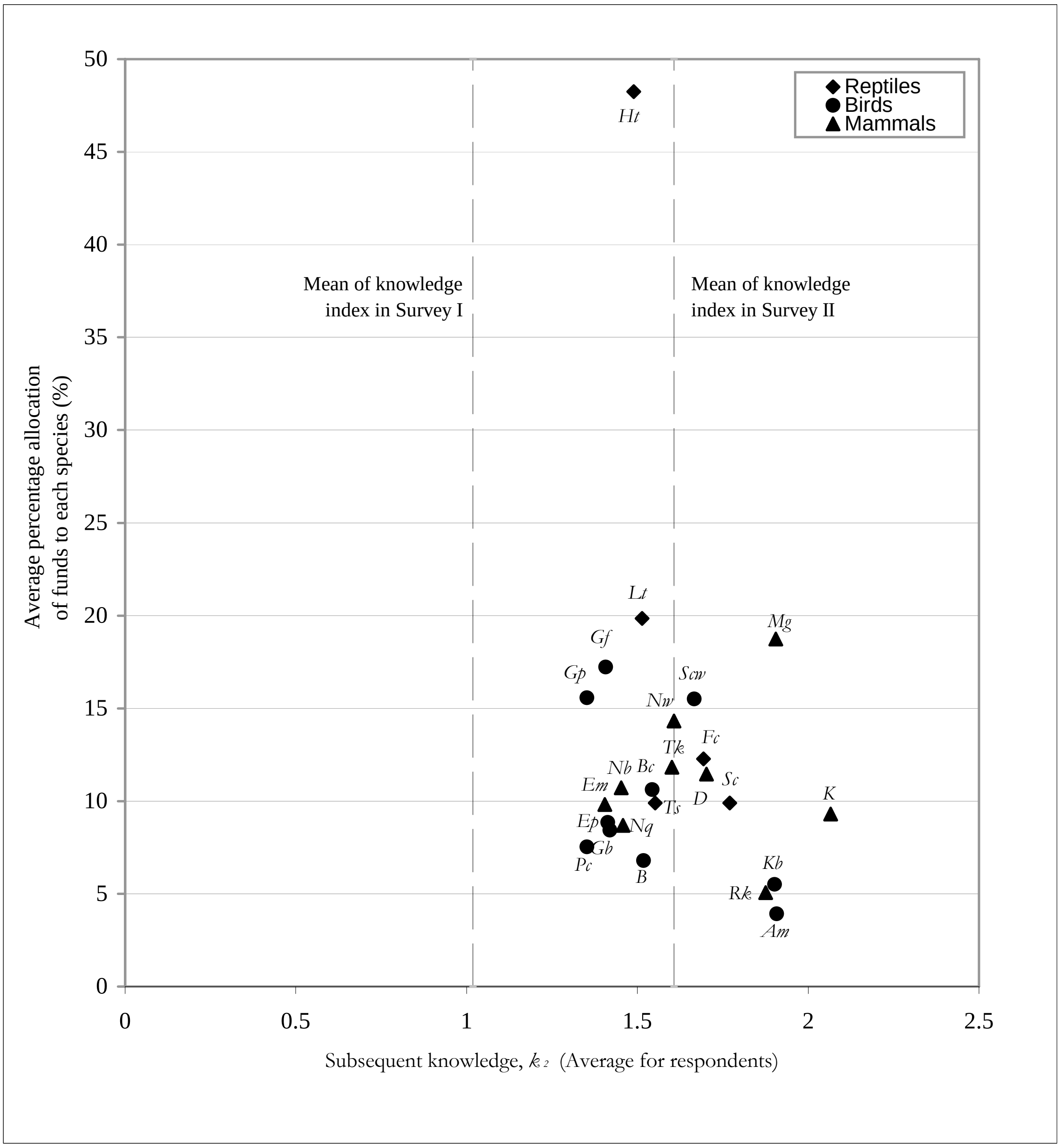


**Figure 5:** **Subsequent knowledge (Survey II) indices versus percentage allocation of funds to each species (Survey II)**

Table 4 is useful in interpreting the results. The mean values in this table ought to be 20, 11.11 and 10 percent for reptiles, mammals and birds respectively in both surveys but due to rounding and minor errors, they are slightly higher in Survey I. This does not, however, affect the basic conclusion. The dispersion of willingness to pay for the various species in all of the taxa are substantially higher in Survey II than in Survey I. As a result of increased and more 'balanced' knowledge across the board, individuals became more discriminating in their willingness to allocate funds for the conservation of species within each of the taxa.

**Table 4:**

**Statistics of percentage allocation of funds in Survey I and Survey II for conservation of wildlife species**

| **% allocation (Survey I)** | | | | | **% allocation (Survey II)** | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Taxa | $\bar{y}_1$ | $\sigma^2$ | $\sigma$ | C.V. | Taxa | $\bar{y}_2$ | $\sigma^2$ | $\sigma$ | C.V |
| Reptiles | 20.56 | 93.61 | 9.68 | 47.05% | Reptiles | 20.04 | 265.26 | 16.29 | 81.29% |
| Mammals | 11.48 | 5.81 | 2.41 | 21.01% | Mammals | 11.11 | 14.58 | 3.82 | 34.38% |
| Birds | 10.27 | 2.87 | 1.69 | 16.48% | Birds | 10.00 | 21.24 | 4.61 | 46.09% |

$\bar{y}$ = mean percentage allocation
$\sigma^2$ = variance
$\sigma$ = standard deviation
C.V. = standard deviation/mean; the coefficient of variation.

## 5. Discussion

An individual's knowledge of a wildlife species, the individual's perceptions of the extent to which this species is believed to be endangered, and the degree to which an individual feels empathy with (or derives utility from or likes) this species' existence, probably influences the individual's willingness to support financially its conservation. Thus WTP does not seem to reflect only individual's total economic valuation of a species. This statement is true even if the amounts that individuals say they are willing to pay for conserving a species are authentic. It seems that in many cases where these types of WTP questions are asked, individuals are not valuing the species as such but the alternative policies proposed for their conservation. For example, the red kangaroo receives a low allocation of funds in both our Survey I and Survey II and in comparison to the northern quoll (see Figures 3 and 5). This does not mean that the total economic value or the likeability of the red kangaroo is less than that of the northern quoll (a marsupial cat). The red kangaroo is correctly perceived to be much less endangered and much less in need of conservation effort than the northern quoll. If the red kangaroo should become endangered, it is possible that individuals may put an even higher value on action to save it than the northern quoll.

The type of factors that may be important in influencing individuals' WTP to support schemes for the conservation of particular species probably include those listed in Table 5. Utility or economic value of species is often not an overriding influence on WTP to support conservation schemes for particular wildlife species. That is not necessarily irrational. Furthermore, it implies that WTP does not, as a rule, represent the total contingent value of the species when it is obtained by a method that enquires about the willingness of individuals to contribute funds to schemes to conserve it. Such WTP estimates are likely to underestimate the total economic value of species that are not endangered.

**Table 5:**

**List of factors that may be important in influencing individuals' willingness to contribute to schemes to conserve particular species of wildlife**

| Factor | Comment |
|---|---|
| 1. Judgement of respondent about the effectiveness of the conservation scheme | |
| 2. Perceived degree of threat to the survival of the species | This influences the perceived urgency of action |
| 3. The 'likeability' of the species influences its utility and valuation | This will be influenced by knowledge of the species |
| 4. Ethical considerations | For example, the right of other species to exist |
| 5. Degree of knowledge of the species | Can affect factors 2 and 3 and possibly 1 |

Metrick and Weitzman (1996, 1998) have analysed factors influencing US government decisions about the preservation of endangered wildlife species. Their study, however, differs from that here because they use a revealed preference type of approach and concentrate on government decisions and seem to assume that these mirror the preferences of citizens. The approach adopted here is a stated preference type, directly based on responses of individuals. Also, Metrick and Weitzman (1996, 1998) do not take into account the knowledge factor nor relate government decisions to all the factors listed in Table 5. Nevertheless, the scope of the research investigations overlap to some extent.

For example, Metrick and Weitzman (1998, p. 33) find that 'charismatic fauna effects' dominate our decisions about support for conservation of wildlife species. This attribute, therefore, can be interpreted as having a major influence on the likeability of a species. They also find that 'scientific factors' such as 'the degree of endangerment' and 'taxonomic uniqueness' are not as important influences on wildlife conservation decisions as 'visceral characteristics' such as physical size and whether the species is considered to be a 'higher form of life' (Metrick and Weitzman, 1996, p. 14-15).

While charismatic factors seem to be important, it is possible that the analysis of Metrick and Weitzman exaggerates their importance as far as the decisions of individuals to support the conservation of wildlife species is concerned. This is so if individuals' stated likeability of species is assumed to be highly correlated with positive 'visceral characteristics'. We found, for example, for the focal group of reptiles that while the willingness of respondents to allocate funds for their conservation is positively correlated with their likeability, even disliked species or those not liked very much (e.g. taipan snakes and crocodile species) were allocated significant funding for conservation by respondents, and that also the perceived degree of a species' endangerment was a significant influence on the respondents' allocation of funds for their conservation (Tisdell et al., 2004).

For many respondents, the decision to allocate funds to such species is an ethical one (compare Kotchen and Reiling, 2000). Many respondents mentioned that all species have an equal right to exist. This is reflected in their comments:

*'Each has as much right to exist as any other and each has a role/s in the ecosystem'*
*'All species have a purpose and equal right to survive regardless of human attitude towards them'*
*'Each species has an important place in overall scheme of things'*

From this experimental survey, it emerges that a strong demand exists for saving wildlife species about which individuals have little or no knowledge of. In fact, on average individuals seem prepared to pay more to conserve poorly known species than those they knew better. This suggests that there is a strong public demand to conserve as yet undiscovered species. Thus, our empirical results support the conjecture of Bishop and Welsh (1992, p. 415) that existence values could exist for obscure or previously unknown wildlife species— our experiment indicates that such values do in fact exist.

On the other hand, these experimental results indicate the need to qualify Randall's (1986, p. 15) statement that "individuals place no value on resources [such as wildlife species] of whose existence or usefulness the are entirely unaware". Nevertheless, in the absence of any knowledge of the existence of species or their possible existence, individuals will not be in a position to take political action to conserve them. Since for many wildlife species non-use values are the major component of their total economic value (Stevens at al. 1991; Fredman and Boman, 1996; Bandara and Tisdell, forthcoming; Tisdell and Wilson, forthcoming), they are to a large extent pure public goods and their provision is subject to market failure.

Conserving them, as a rule, will require public or collective action. Observe that in the light of the experimental results the potential existence of unknown species is a source of WTP for their conservation.

The experimental results show that variations in knowledge and have a substantial impact on individual's WTP for the conservation of wildlife species. Distortions in these components can 'corrupt' valuations of species by individuals, and result in a form of path dependence. While the provision of 'balanced' information to individual's can help to reduce valuation distortions, balance is a matter of judgement and as pointed out by Spash (2002), and interactive influences between the evaluator of values and the evaluated can rarely be eliminated. Thus a phenomenon akin to the Heisenberg uncertainty principle in physics may occur (Heisenberg, 1930).

Furthermore, it may be fanciful to believe that by an interactive process of knowledge provision, one can end up with the 'true' preferences of individuals because preferences do no exist in a vacuum but are to a considerable extent learnt and path dependent. Yet several scholars (e.g. Randall, 1986) believe that 'true' preferences do exist and can in principle be discovered. While it seems possible to increase ones' knowledge about the preferences of individuals for environmental goods, some degree of rational scepticism seems called for about the extent to which 'true' preferences of respondents will be revealed, even assuming that respondents are acting in good faith in answering questions about their WTP.

## 6. Concluding Comments

Wildlife valuation is an important component of rational economic choice about policies for conservation of wildlife species. If one is using a stated preference approach to such valuation, this article finds that provision of information about species and subsequent changes in individuals' knowledge about them substantially alters their willingness to contribute funds for their conservation. While there appears usually to be substantial support *en bloc* for conserving species that are little known, as knowledge is increased, greater variation or discrimination in support for conserving these species occurs. Increased knowledge does not, however, necessarily improve choices. If it is 'unbalanced' or selective (but say not false), it may bias choices. Increasing the knowledge available to individuals does not necessarily, therefore, improve policy choices, although one would like to believe that 'balanced' provision of information would. However, balance is a matter of judgement and the observer is likely to influence the values of the observed in communicating information. The full breadth of the issues involved have not yet been adequately explored in stated preference approaches to economic valuation. At the same time, it needs to be recognised that revealed preferences are also not exempt from knowledge distortions. Furthermore, this article suggests that from a policy point of view, one must be wary of using willingness to contribute to schemes to conserve species of wildlife as indicators of the total economic value of the species. Such payments are a reflection of the value of the conservation scheme and the perceived need for it. While common species in no risk of extinction may be highly valued, individuals may be willing to contribute little to a scheme for their conservation because they see little need of it.

Finally, there are many countries, such as the USA and Australia that have a large land mass with sparse human populations in remote areas, such as in Alaska and the Mojave desert in the case of the USA and in the northern tropics in Australia's case. Wildlife species in such areas tend to be less well known by most of the population than wildlife in denser areas of human habitation. This can affect the distribution of funds for wildlife conservation. The extent of biodiversity (number of species) in remote areas may be underestimated by the public and support for the conservation of individual species may be less focused than in areas of higher human habitation because of poor knowledge of species in remote regions. If the general level of biodiversity (number of species) in remote regions is poorly known compared to settled areas where the extent of biodiversity is more fully known, public support for conservation in remote areas is likely to be less than would be desired, because the extent of biodiversity in remote regions is underestimated. This would be so even if the general public's knowledge of individual species in remote regions should be quite poor. The experiments indicate considerable support by respondents for the conservation of poorly known species.

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Notes:

[1] There are also further complications. For example, the link between information communicated to an individual and the subsequent knowledge imparted ('learning') is variable. It depends on the set of the individual, the individual's ability to understand the messages transmitted and the way in which they are presented. We, therefore, assess the individuals' knowledge of species in these surveys both prior to extra information being supplied to them and after its supply to them.

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