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Public Attitudes to the Use of Wildlife by Aboriginal Australians: Marketing of Wildlife and its Conservation

ABSTRACT

Attitudes of a sample of the Australian public towards the subsistence use of wildlife by indigenous Australians and whether or not indigenous Australians should be allowed to sell wildlife and wildlife products is examined. It has been suggested that allowing such possibilities would provide economic incentives for nature conservation among local people. We explore whether those sampled believe that indigenous Australians should do more than other groups and institutions to conserve Australia's tropical species, and whether or not indigenous Australians should be allowed to take common as well as endangered wildlife species for food. Attitudes of the sampled public towards indigenous Australians earning income from trophy hunting and from the harvesting of northern long-necked turtles for the pet trade are canvassed. We find that the positive conservation consequences of sale of wildlife by indigenous Australians could be weak, although social justice suggests that they should not be denied this opportunity.

Keywords: Australia, Australian Aborigines, indigenous rights, public attitudes to conservation, subsistence rights, sustainable use, resource management, wildlife conservation.

Public Attitudes to the Use of Wildlife by Aboriginal Australians: Marketing of Wildlife and its Conservation

1. INTRODUCTION

While Australian Aborigines and Torres Strait Islanders constitute a minority group in Australia, they control large areas of land mainly in northern and central Australia as a result of the granting of Native Title. The granting of Native Title occurred following the *Mabo v Queensland (No. 2)* (1992) and *Wik Peoples v Queensland* (1996) High Court of Australia decisions that upheld the land rights to Australian indigenous Australians who could establish traditional links to the land provided that these rights had not been extinguished by legislative or other acts of government (such as the granting of freehold title) (Butt *et al.*, 2001). Hence, for example, more than 44% and 20% of areas of the Northern Territory and South Australia respectively are now legally indigenous land (AIATSIS, 2005). Overall, about 16 to 18% of Australia was estimated to be held by Aborigines in 2000 (Pollack, 2001). Many of these areas provide important habitat for conserving Australia's wildlife species. According to the Australian National Strategy for the Conservation of Australian Species and Communities Threatened with Extinction, Aboriginal-owned lands include areas important to endangered and vulnerable species, particularly ground-dwelling mammals (Endangered Species Advisory Committee, 1992, p. 18). Threatened wildlife species that occur in these areas include the bilby (*Macrotis lagotis*), the great desert skink (*Egernia kintorei*) and the southern marsupial mole (*Notoryctes typhlops*) (Australian Government Department of the Environment and Heritage, 2004). Furthermore, several parks and nature conservation reserves in the Northern Territory, South Australia and West Australia abut Aboriginal lands (such as Kakadu National Park in the Northern Territory; see for example, Altman, 2001, p. 5). Thus the management of Aboriginal lands have important implications for the conservation of Australia's native wildlife species.

Australian Aborigines living in these remote areas have few opportunities to earn cash income and depend heavily on Australian government assistance for cash. Their opportunities to earn cash income are limited partly because they have been restricted

in selling their wildlife resources to earn cash income, although they have been allowed to utilise these for their own needs. Furthermore, there is little scope to convert their lands to commercial agriculture or commercial pastoral undertakings. This is because these lands are quite marginal for this purpose, which is probably the reason why they were not commandeered by early European settlers.

Nevertheless, the Government of the Northern Territory, as part of its policy to try to conserve wildlife species by sustainable use, has in recent years adopted policies to provide landholders with economic incentives to conserve wildlife by allowing regulated commercial use of species. Aboriginal landholders have been included in these schemes. Species that are subject to commercial use are saltwater crocodiles (*Crocodylus porosus*) (for the leather trade), long-necked turtles (*Chelodina rugosa*), goannas (*Varanus* spp.) and the freshwater threadfin rainbowfish (*Iriatherina wernerii*) (for the pet trade), as well as plants such as cycads (*Cycas arnhemicus*) (decorative plants for gardens) and bombax (*Bombax ceiba*) (wooden material for sculpture-making) (Cochrane, 2005).

For example, some Aboriginal groups are able to earn cash income from the harvesting of crocodile eggs on their lands to supply eggs to crocodile farms. In the Northern Territory, about 65 percent of the crocodile eggs currently harvested by crocodile farms come from Aboriginal lands. This generates an income of almost a quarter of a million Australian dollars annually for Aboriginal communities in the Northern Territory (at the estimated average price of Aus$15 per crocodile egg). Given the shortage of cash of remote Aboriginal communities, it is no doubt a welcome addition to their cash income. A similar sustainable use policy is pursued in Western Australia. However, Queensland does not legally permit the commercial sale of wildlife products by its Aborigines and Torres Strait Islanders, but permits only use of wildlife for sustenance on native title lands.

Bodies such as the IUCN (IUCN-UNEP-WWF, 1991, pp. 4, 69) have recommended that indigenous people be provided with economic incentives to conserve wildlife, and have supported the strategy of conservation through sustainable use. The Federal Government of Australia has recently been discussing plans to give Aboriginal families greater private ownership and broader economic opportunities using their communal

lands (Karvelas, 2005). This may mean not only greater empowerment for Aboriginal communities to benefit from the use of natural resources on their lands, but also could result in cost-effective management of vast and remote lands in Australia (Whitehead, 2002; Altman, 2004). Furthermore, the *Yanner v Eaton* (1999) High Court decision recognised the right of Native Title holders to hunt wildlife in accordance with traditional law and custom. This raises the question of what are the attitudes of Australians in general to the use of wildlife by Australian Aborigines and Torres Strait Islanders. With this in mind, we surveyed a sample of the Brisbane public to determine their attitudes to the conservation of wildlife and the subsistence and commercial use of these by Australian Aborigines and Torres Strait Islanders. This paper reports and interprets the results.

2. METHODOLOGY

Questionnaire-based surveys were conducted to obtain data for this study. The sampling location was Brisbane, Queensland. This location was selected because the researchers are located there, and so costs of conducting the research could be minimised. Furthermore, Brisbane is the capital of Queensland state and three-fourths of the population of the state live in the southeast of Queensland (in and around Brisbane) (Australian Bureau of Statistics 2005). It is thus expected that the sample drawn for this study would be representative of the population of Queensland.

Two serial questionnaires were employed in this study, Survey I and Survey II. The questionnaires were designed to evaluation the public's attitudes towards Australia's tropical wildlife, using various focal Australian tropical mammal, bird and reptile species. The questionnaires also inquired about policy for conserving Australian's tropical wildlife, and among the questions asked are those addressed in this paper. These questionnaires were pre-tested on a group of university students and were improved for clarity.

In 2002, 1500 flyers invitations to participate in this study were distributed in different suburbs of Brisbane of varying socioeconomic characteristics. The invitation stated that the surveys will be about the use and conservation of Australia's tropical natural resources. The precise aims and details of the survey were withheld at this point to minimise self-selection bias. In the invitation circulars, it was mentioned that selected

participants would receive Aus$20 (Aus$1 = US$0.77; 15 August 2005) for their participation, refreshments, a wildlife presentation, free parking at the survey venue (mainly The University of Queensland) and an opportunity to win Aus$200 in a lucky draw. Participants were informed that they can attend survey sessions on weekdays and on weekends. This arrangement was designed to enable people with work commitments, for example, to attend at a time convenient for them, thereby maximising survey participation. Interested potential participants were told to contact by telephone a facilitator. The facilitator then selected a sample of 204 people from among the respondents that matched as closely as possible the age and gender distribution of the Brisbane population for those aged 18 years and above. The sample had a similar age distribution to the population of Brisbane except for the age class of 35-44 year olds where there was a slight shortfall. The gender ratio was 0.81 males to every female, which is close to the gender ratio of the Brisbane population of 0.93 (Australian Bureau of Statistics, 2002). The percentage of participants in the sample born in Australia is 73% whereas the remainder were born overseas (compare with the 74% of the population of Brisbane were born in Australia, according to the 2001 Australian census) (Australian Bureau of Statistics, 2002). Participants gave no indication of whether they were of Aboriginal heritage or not, but it is felt that few or any were.

The survey participants were divided into five groups of about 40 people. Some groups met at the survey venue on weekday slots while the others attended on a weekend. Each survey session was divided into two. In the first half of the survey sessions, participants were asked to fill out Survey I. Survey I inquired about participants' background and various questions to gauge their general attitudes towards 24 mammal, bird and reptile species and the conservation and use of these species. They were also asked questions about conservation and use policy, some of which involved the use of wildlife by Australian Aborigines and Torres Strait Islanders. After completing this task, participants were given a break.

Then, they were provided with information about the species in the survey by means of a public presentation, and a booklet of readings containing photographs, descriptions, life history, geographic distribution and conservation status of each of these 24 focal species. Participants were given the second questionnaire, Survey II, and were instructed to take the booklet of readings home and read it before filling out Survey II.

Survey II asked questions similar to that in Survey I. It was designed so that changes in attitudes of participants after learning more about the selected Australian tropical wildlife could be gauged. Participants were provided with self-addressed, postage-free envelopes for the convenient return of their completed Survey II. All participants returned their completed survey form in about 2 weeks.

For this paper, participants' answers to questions regarding wildlife conservation and use involving Australian Aborigines are considered.

3. RESULTS

3.1 Attitudes towards the role of different institutions or groups in conserving Australia's tropical wildlife

An assessment was made of who the survey participants thought should do more to conserve Australian tropical wildlife. The question was framed as follows:

Should more effort be made by any one of the following parties to conserve Australian tropical wildlife?

Government (State & Federal)	*Yes* □	*No* □	*Unsure* □
Voluntary Organisations	*Yes* □	*No* □	*Unsure* □
General Public	*Yes* □	*No* □	*Unsure* □
Aborigines & Torres Strait Islanders	*Yes* □	*No* □	*Unsure* □

Participants' responses reveal that most would like to see increased effort in conserving Australian tropical wildlife by the government and the general public (Table 1). While about slightly more than half of participants thought that Aborigines and Torres Strait Islanders and voluntary organisations should also put more effort into the cause, many (about a quarter) stated that they were unsure about this. In fact, the expectation that Aboriginal and Torres Strait Islanders should do more for wildlife conservation was least for all the parties considered. The results do not differ significantly at the 95% confidence level between surveys (tested using the McNemar's test); almost all

participants believe that the government should be putting more effort than any other group into conserving Australian tropical wildlife.

Table 1: Views about who should make more effort to conserve Australia's tropical wildlife (*n* = 204).

Institution/group	Survey I (%)				Survey II (%)			
	Yes	No	Unsure	No response	Yes	No	Unsure	No response
Governments (state & federal)	89	0.5	7.8	2.5	93	0	4.4	2.5
General public	85	2.5	7.8	4.9	86	0.5	8.3	4.9
Voluntary organisations	57	7.4	26	9.8	64	5.4	23	7.8
Aborigines & Torres Strait Islanders	54	3.9	32	9.8	61	2.5	27	9.8

3.2 Attitudes towards the use of wildlife species by Aborigines and Torres Strait Islanders for subsistence

Participants were posed two questions about the use of wildlife species for food by Aborigines and Torres Strait Islanders. They were asked:

Should governments limit the rights of Aborigines & Torres Strait Islanders to take common species for food?

Yes □ *No* □ *Unsure* □

Why?

Do you think Aborigines & Torres Strait Islanders should be permitted to take endangered species for food as well?

Yes □ *No* □ *Unsure* □

Responses were split about equally between participants who agreed that governments should limit the rights of Aborigines and Torres Strait Islanders to take common species and those who disagreed with government limitation of these rights (Table 2). No statistically significant differences were detected between the 'yes' and 'no' groups in both surveys using the chi-square test of independence (Survey I: $\chi^2 = 0.43$, $p = 0.51$, $n = 148$; Survey II: $\chi^2 = 0.16$, $p = 0.69$, $n = 161$). Using the McNemar's test, no statistically significant difference was found in the distribution of responses between surveys ($\chi^2 = 0.57$, $p = 0.45$). Around a quarter of participants stated in both surveys

that they were unsure about whether governments should limit the rights of Aborigines and Torres Strait Islanders to harvest common species for food.

Table 2: Distribution of participants' responses to the question of whether governments should limit the rights of Aborigines and Torres Strait Islanders to take common species for food (*n* = 204).

Response	Survey I (%)	Survey II (%)
Yes	34.3	38.0
No	38.2	41.0
Unsure	26.0	21.0
No response	1.5	0.5

Participants provided reasons for their answers. Those in favour of the government limiting the rights of Aborigines and Torres Strait Islanders to take common species for food provided comments of the following type:

Common species could become rare if not protected; to prevent overharvesting and prevent commercial overexploitation; like everybody else, their use of species should be monitored to keep populations sustainable; limits should be set so not too many common species are taken for food or else could become extinct; numbers that may have been once sustainable may not be today (need guidelines); modern pressures make such practices unsustainable for some species; only traditional methods should be allowed for taking species, e.g., guns and powerboats should not be used; it's a form of racism against other Australians if you don't [limit take]; they should be treated the same as everyone else; because they are people too and if they wish to have the same benefits, e.g., welfare, they should stick by the same rules; it's a sociological point: if living as natives should be able to gather food, but living as modern Australians [they] definitely shouldn't; all laws should be same no matter your race

Participants opposed to government limitation of Aboriginal use of common species for food gave the following reasons:

They have native title rights to do so, but species should be harvested within reason; traditional rights/owners; way of life, part of culture, done for many years without damage; traditional way for subsistence usually sustainable; they automatically look after their species for survival; they are responsible in their use of resources; their

population is not big enough to impact significantly on one common species if used as part of diet; preserve heritage

Participants who were unsure about their position stated that they do not have enough information or knowledge to answer the question, and would need to first know more about the consequences of various scenarios of such harvesting practices and its impact on the species.

On the other hand, most participants stated that Aborigines and Torres Strait Islanders should not be allowed to take endangered species for food in both surveys. The difference between the 'yes' and 'no' groups is found to be statistically significant at the 95% confidence level using the chi-square test of independence (Survey I: χ^2 = 83.88, $p < 0.01$, n = 166; Survey II: χ^2 = 115.53, $p < 0.01$, n = 177). A statistically significant increase at the 95% confidence level in the proportion of participants who stated 'no' between surveys was detected using the McNemar's test (χ^2 = 4.02, p = 0.045).

Table 3: Distribution of participants' responses to the question of whether they thought Aborigines and Torres Strait Islanders should be permitted to take endangered species for food (n = 204).

Response	Survey I (%)	Survey II (%)
Yes	11.8	8.3
No	69.6	78.4
Unsure	16.7	12.3
No response	2.0	1.0

3.3 Attitudes towards the commercial use wildlife by Aborigines and Torres Strait Islanders

In Survey II, participants were asked questions about the commercial use of wildlife on native land that could benefit native communities. These questions read as follows:

Should Aborigines & Torres Strait Islanders be allowed to earn money from limited hunting of common wildlife for trophies?

Yes □ *No* □ *Unsure* □

Why?

Do you think Aborigines should be able to utilise northern long-necked turtles for the pet trade?

Yes □ *No* □ *Unsure* □

Why?

For both questions, about half of the participants answered 'no', disagreeing with the proposals. The difference between the proportion of participants who answered 'yes' and 'no' was statistically significant at the 95% confidence level (trophy hunting question: $\chi^2 = 25.97$, $p < 0.01$, $n = 148$; question about long-necked turtle for pet trade: $\chi^2 = 5.56$, $p = 0.018$, $n = 162$). The proportion of participants in opposition is greater for allowing limited hunting of common wildlife for trophies than it is for the utilisation of the northern long-necked turtle for the pet trade. The difference is found to be statistically significant at the 95% confidence level using the chi-square test for homogeneity of proportions ($\chi^2 = 4.65$, $p = 0.03$). Still, a substantial proportion of participants (about a third) stated that they were in favour of the use of the northern long-necked turtle by Aborigines and Torres Strait Islanders.

Table 4: Distribution of responses of participants to questions about commercial use of wildlife by Aborigines and Torres Strait Islanders (Survey II) (*n* = 204).

Response	Should Aborigines and Torres Strait Islanders earn money from limited hunting of common wildlife for trophies? (%)	Do you think Aborigines should be able to utilise northern long-necked turtles for the pet trade? (%)
Yes	21.1	32.4
No	51.5	47.1
Unsure	25.5	18.6
No response	2.0	2.0

Main reasons given by participants for opposing limited hunting of common wildlife for trophies are as follows:

This is not a cultural practice; no animal should be hunted as a trophy; I don't think animals should be killed just for trophies but only if they are going to be for a real use such as for food; cruelty; we should all have respect for living wildlife; they should consider other ways of earning money, such as craft from flora; I worry greed would overtake common sense and it wouldn't be long before common species are endangered; the practice is not a survival issue and unnecessarily impacting on wildlife numbers where money is has the potential for crime and corruption

The participants who stated that they support limited hunting of common wildlife for trophies gave the following reasons:

This may protect more land, more species; if common and abundant they should be allowed the opportunity to earn from the tourist trade; provided that the hunting is sustainable and humane, why not?; if funds are used to maintain Aboriginal communities; only if done in tandem with monitoring of species numbers; if the species are common and the hunting is sustainable, the traditional owners of Australia should be able to earn money; if they are controlled by the government it could be a good source of income for them; it gives native people an opportunity to earn money from an activity closely related to their cultural heritage

The most common reason given by participants who opposed the utilisation of the northern long-necked turtle for the pet trade are:

Wildlife should stay in the wild not in tanks for humans to look at and play with; I am against wild creatures used as pets; only domestic [sic] animals should be used for the pet trade; I don't like animals taken from the wild to be someone's pet; no one should be able to benefit from cruelty to wildlife which the pet trade is; it is cruel to take them from their native habitats; many will make profit the prime motive rather than conservation

Those in favour if the utilisation of the northern long-necked turtle for the pet trade gave the following reasons for their support:

They are already utilized, not an endangered species; the scheme run by the University of Northern Territory is sustainable and can help to alleviate aboriginal poverty and unemployment; relatively common species and a traditionally important animal; so long as is controlled as currently operating; they are relatively common and hardy, should be monitored; creates employment; I think the project that the University of Northern Territory is carrying out to exploit commercially these turtles are bringing opportunities for local population; they are common and it brings money back to the

community; so long as operation is monitored and some of the profits are returned to conservation

Note the reference made by participants to the northern long-necked turtle ranching project conducted by the Aboriginal people of Arnhem Land, Northern Territory in collaboration with the Northern Territory University (now known as the Charles Darwin University) (Fordham *et al.*, 2004). The Aboriginal community involved in the project receives financial returns from the sale of these turtles in the pet trade. This information was conveyed in the booklet handed out to participants during the survey sessions. This information about the ranching of the northern long-necked turtle seems to have favourably influenced participants' attitude towards the venture.

4. DISCUSSION

Survey participants place the greatest responsibility of conserving Australian tropical wildlife on the government. The results may indicate the participants' expectations that governments and the general public itself should mainly be responsible of managing the conservation of Australian tropical wildlife. Although participants did state that voluntary organizations and indigenous people should also put more effort into conserving Australia's tropical wildlife, participants were unsure or not sufficiently informed about the roles these groups play or the impact they have in the conservation of Australian tropical wildlife.

Most respondents recognise and support the rights of Aborigines and Torres Strait Islanders to use common species for food, but many believe that some limits on harvesting should be imposed by governments, or some monitoring of take should be part of use. Results indicate that the participants are aware of and accept the fact that Aborigines traditionally live off wildlife, but participants would like to know that common species do not become endangered as a result of unsustainable use.

The majority of respondents believed that the use of endangered species by Australian Aborigines and Torres Strait Islanders for food should not be permitted. This disapproval by the majority of participants indicates little confidence in the hypothesis that use of wildlife in such tribal groups will foster the conservation of species, particularly endangered ones. Thus, there does not seem to be strong belief or

cautiousness amongst the Australian public that consumptive use of wildlife species will promote their conservation even in traditional hunter and gatherer societies. These beliefs run counter to the expectations expressed in IUCN's *Caring for the Earth: A Strategy for Sustainable Living* (IUCN-UNEP-WWF, 1991). Nevertheless, the results seem to suggest that there is little faith amongst the respondents in the ability of communal rules alone to conserve species that may be threatened. The controlled use of common resources in a communal structure is probably seen as less likely in this case than suggested by the writings of Ostrom (1990) and other institutionalists.

Reasons for the public's desire for government intervention in the use of wildlife by Australian Aborigines could be varied and would need more investigation. They include:

(1) lack of familiarity of participants with communities that have communal or customary rules (may tend to view all communities from the perspective of their own community),
(2) the belief that communal or traditional regulation is no longer effective, or that its effectiveness has eroded,
(3) traditional rules may still apply but adjustments to harvesting levels may have to be made due to changing technologies and circumstances (as in the case of the Torres Straits dugong hunters – Marsh *et al.*, 1997, pp. 1384-1385), and
(4) attitudes that may reflect racial prejudice.

It is possible that all of the above mentioned elements are present (as can be noticed from some of the comments given by participants about the use of wildlife by indigenous people). It may be pertinent to note that we found from another set of questions in our survey that the majority of respondents were *only* in favour of sustainable commercial harvesting of *abundant* species of wildlife (Tisdell *et al.*, 2005). Amongst 24 Australian wildlife species, a majority only favoured the harvesting of red kangaroos and saltwater crocodiles. However, the fact that a species was relatively abundant and secure was not sufficient in itself to ensure that a majority of respondents would favour its sustainable commercial harvesting. Other factors such as the likeability of the species also influence attitudes towards use (see for example, Tisdell *et al.*, 2005**)**. This general perspective of the public can be expected to be carried over

in relation to support for harvesting of wildlife by Aboriginal people for commercial or subsistence purposes.

It is relevant to observe that the majority of respondents did not support the idea that Australian Aboriginals should be allowed to be involved in limited trophy hunting of wildlife to obtain cash. The Northern Territory government is trying to obtain permission to allow rights to hunt saltwater crocodiles for trophies but needs Australian Federal Government approval for this. This would give landholders (including Aboriginal landholders) some extra income from rights to hunt crocodile on their land. Allowing managed recreational hunting of wildlife on native lands would bring Australia more into line with the Canadian practice where limited hunting of selected wildlife such as seals and polar bears on northern Inuit lands is permitted for a fee (Fisheries and Oceans Canada, 2003; Canadian Wildlife Service, 2003). Such hunting already occurs in Australia for feral animals such as the Asian water buffalo *Bubalus bubalis*, which unlike native wildlife is not protected by the state.

Support of participants for the utilisation of the northern long-necked turtle is greater than for the proposal to allow Aborigines to be involved in trophy hunting. Participants who expressed support for the harvest of northern long-necked turtles for the pet trade recognised that not only is the species common but that a project is underway for the sustainable use of the turtle involving and benefiting the Aboriginal community. Opposition to limited trophy hunting and the use of the northern long-necked turtle seems to arise mainly from an animal rights standpoint (see reasons given by participants), rather than from any particular concern about the sustainability of the ventures.

As pointed out above, IUCN-UNEP-WWF (1991) favours commercial use of wildlife by indigenous people as a means of providing incentives to conserve wildlife sustainably. However, sustainable harvesting does not guarantee public support for such a policy.

Furthermore, Swanson (1994) has argued that the main reason for loss of biodiversity has been the conversion of natural habitats of species to man-made uses, such as agriculture, resulting in loss of this habitat. If landholders obtain no income or

insufficient income from wildlife or their land, this encourages land conversion resulting in loss of natural habitat. If landholders can gain commercially from wildlife, this conversion may be halted or slowed. However, most land held by Australian Aborigines has no economic potential for commercial use, for example for agriculture. Hence, land conversion of the type described by Swanson (1994) has only a low probability of occurrence on Aboriginal lands, as could also be the case on many tribal lands elsewhere, e.g., in northern Canada.

Therefore, to analyse how harvesting of wildlife species by Australian Aborigines might in fact aid their conservation, Figure 1 can be used to illustrate the possible sources of their wildlife harvest for commercial markets. These sources of supply for the market would be:

(1) diversion of a wildlife species from their own subsistence use or consumption,
(2) extra harvesting from the wild,
(3) extra supplies from husbandry of wild stock harvested from the land.

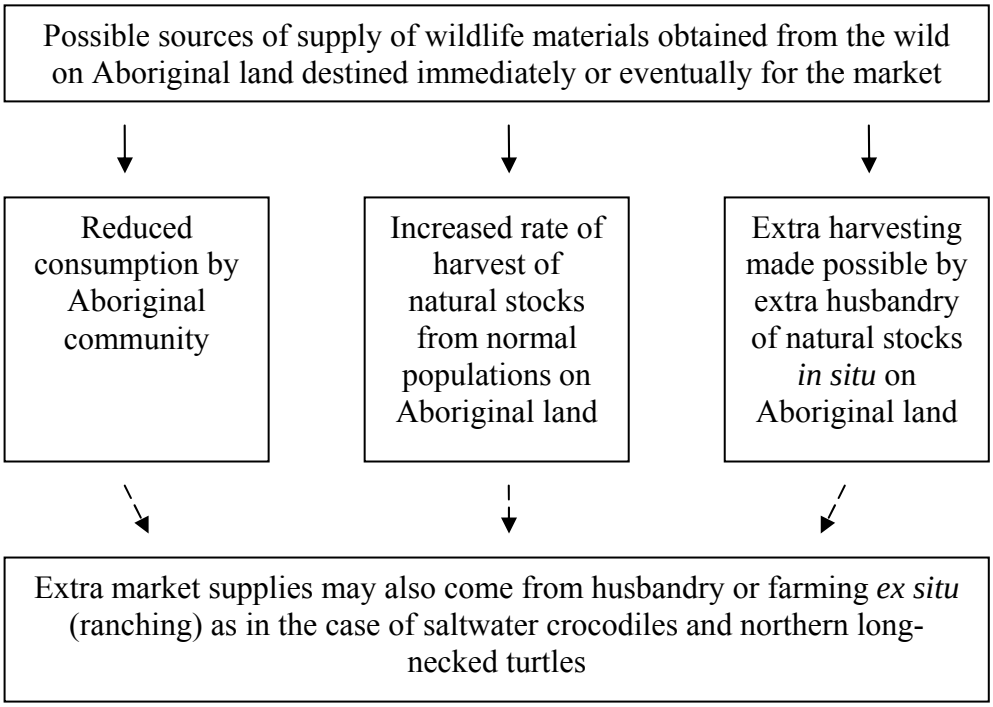

Figure 3: Schematic representation showing the possible links of harvesting wildlife, wildlife materials from Aboriginal land with supply of market. Note that in the case of saltwater crocodile farming, most crocodile farming is conducted by enterprises that do not have Aboriginal owners or managers.

Diversion case (1) could reduce the nutritional situation of indigenous people, e.g., if junk food is substituted for traditional foods. In case (2), the extra harvesting may reduce the standing stock (population) of the targeted species. This would depend on the extent of the harvest and age distribution of the harvest. In the case of saltwater crocodiles, the harvest is heavily skewed in favour of egg collection. Because in the wild the relative frequency with which saltwater crocodile eggs fail to hatch is high (Webb and Manolis, 1989, pp. 82-83) and the probability of survival of hatchlings to one year of age is low with further reduction in the probability of survival to maturity (normally three years of age), controlled harvesting of eggs of saltwater crocodiles only has a marginal impact on the population of saltwater crocodiles. More caution would be needed if the harvesting quota moves in favour of adult or more mature crocodiles. In case (3), husbandry of species taken from the wild (ranching) may supplement direct harvests and so reduce the pressure on wild standing stock. But the success of this often depends on the biology of the animal species, the technology, and expertise available for carrying out the husbandry of the wild species. So, therefore, it appears that economic incentives for Aboriginal people to conserve wildlife as a result of being able to engage in the commercial use of wildlife would be weak. However, on the other hand, there may be no threat to the existence of the species if the total harvest is regulated. At the same time, commercial harvesting would provide Australian Aborigines with some independent opportunity to earn cash income in remote regions where such opportunities are rare.

Note that the fact that a market exists for wild products from Aboriginal lands does not mean that harvesting of these is profitable on all Aboriginal lands where this may occur. Transport costs to processing or marketing centres may be too high from remote regions. The species to be exploited may be insufficiently abundant or difficult to access in some regions so that profitable exploitation may not be possible.

5. CONCLUDING COMMENTS

To summarise, the participants of this study mostly favour increased government effort as a means to conserve Australian tropical wildlife. Support for voluntary organisations such as conservation organisations (that may, or may not, employ sustainable commercial use strategies) is not as great. Although many participants stated that they believe that governments should limit the rights of Aborigines and Torres Strait

Islanders to take common species for food, most were not be opposed to the idea of these indigenous people taking common species for subsistence. They appear to want to ensure that harvests are sustainable. Nevertheless, the majority opposed the taking of endangered species for food by Aborigines. This may be an indication of risk aversion or protectiveness, or a 'better be safe than sorry' inclination. Most participants are opposed to limited hunting of wildlife for trophies as a way for Aborigines to earn money and to the utilisation of northern long-necked turtles for the pet trade to a lesser extent. Opposition seems to stem mainly from animal rights concerns, rather than fears of extinction of species. In the case of species taken for trophies, it is possible that the public would be more supportive if they could be assured that the meat of the animals taken for trophies would be eaten by indigenous people. Those supportive of these ventures recognise that these ventures have the potential to help the Aboriginal community to be more economically independent. On the whole, even if prospects for improved conservation as a result of indigenous use of wildlife may not be significant, social justice suggests that indigenous Australians should not be denied the opportunity to utilise wildlife for their benefit.

The results of this study may need to be cautiously interpreted because we only have a small sample relative to the Australian population from one city. But Australia has a high degree of homogeneity between the populations of its cities and is highly urbanised, and so it can be expected that similar results would be obtained from a geographically broader survey in Australia. Nevertheless, similar surveys of the public's attitudes towards allowing the use of wildlife by Aborigines and their concerns with regard to these done in other Australian cities and rural areas may be insightful. Surveys such as this could help provide momentum for government initiatives to help the indigenous community to fend for themselves and improve their welfare.

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CASES

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