

# DOES TOURISM CONTRIBUTE TO SEA TURTLE CONSERVATION?

## Is the Flagship Status of Turtles Advantageous?

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**ABSTRACT** Sometimes the flagship status of sea turtles is a liability for their conservation. In other cases, involving, for instance, certain ecotourism activities, its consequences can be positive. Case studies are provided of the consequences for sea turtle conservation in Australia, especially at Mon Repos; of hatchery-related turtle tourism in Sri Lanka; and of tourism based on the farming of sea turtles in the Cayman Islands. The benefits that turtle-based tourism provide to the conservation of these animals vary between each of these case studies. Although strict definitions of ecotourism require, among other things, that cultural elements be a part of such tourism, they are often given little attention in turtle-based tourism, as illustrated by the Australian situation. In practice, turtle tourism rarely satisfies all the ideals of ecotourism. Fortunately, it is unnecessary for tourism to satisfy all the ideal requirements of ecotourism for it to contribute to the conservation of sea turtles.

### **Introduction: Purpose, Method, and Coverage**

This article examines whether and how tourism based on sea turtles, hereafter referred to as turtles, contributes to their conservation. To study turtle-based tourism in all regions of the world would be too ambitious. Therefore, the case studies are restricted to Australia (mainly Mon Repos Beach), to tourism involving turtle hatcheries in Sri Lanka, and to tourism based on the farming of green turtles in the Cayman Islands. While particular attention is given to ecotourism based on sea turtles, the paper also examines other types of turtle-based tourism like turtle farming.

The Australian study draws heavily on the results of a survey of tourists at Mon Repos Beach conducted by Tisdell and Wilson (2002), as well as a recent investigation of relevant literature and cultural materials. The Sri Lankan study reports on primary data collected jointly by one of the authors and also relies on secondary data. The observations about tourism, conservation and turtle farming in the Cayman Islands draw on secondary sources. Note that socioeconomic and biophysical conditions often differ between regions and countries and care is needed in transferring the results reported here to other countries or regions. The effectiveness of policies for conserving turtles can vary greatly between countries and even regions in the same country (Reichart 1982:466).

This article begins by outlining the flagship status of turtles and the nature of ecotourism. This is important because some forms of turtle-based tourism do not accord with claims that they constitute ecotourism. In addition, some types of tour-

ism that are not ecotourism have had positive consequences for turtle conservation. After outlining and illustrating some possible negative consequences of turtle-based tourism, the main case studies are presented.

General tourism is shown to have played an important role in the development of turtle conservation in Australia and in the evolution of ecotourism based on turtles at Mon Repos Beach. Such tourism at Mon Repos Beach satisfies, or almost satisfies, the most demanding definitions of ecotourism. Tourism based on turtle hatcheries is well developed in Sri Lanka and is promoted as a form of ecotourism. But it does not satisfy most definitions of ecotourism and could have a negative impact on turtle conservation. The Sri Lankan situation is discussed, and the views about the hatcheries of a sample of tourists are summarised. A short discussion of tourism and turtle-farming in the Cayman Islands follows and the prospect is considered that this venture could, at least in part, have pro-conservation consequences.

### **Sea Turtles as Flagship Species and Definitions of Ecotourism**

Flagship species are those that capture the attention and imagination of the public and, therefore, often attract tourists (see Weddell 2002:243). Sea turtles satisfy this condition. This may be because as Ehrenfeld (1982:458) points out, most people find the life cycle of sea turtles to be mysterious and their ecology to be complex and puzzling. Furthermore, Tisdell, Wilson, and Swarna Natha (2004) concluded from survey they conducted of the Australian public that species of turtles are preferred over other wildlife species. In addition, Wilson and Tisdell (2001) found that turtles can play an important role in the evolution of tourism in a particular area by initially attracting specialist wildlife tourists who act as a precursor to mass tourism.

Some evidence of the importance of sea turtles as a tourist attraction is provided by the inclusion in Barron's Nature Travel Guides of a book on sea turtles by Devaux and De Wetter (2000). It provides information for tourists about the main sites for viewing sea turtles globally (which are mostly in tropical and sub-tropical areas), a little on the ecology and biology of sea turtles, and some information about relationships between humans and sea turtles (Devaux and De Wetter 2000:28-29). The publication of such books depends on their expected demand. Few wildlife species have travel guides devoted exclusively to them. It is, therefore, noteworthy that sea turtles do have such a travel guide. While there are no reliable estimates of how many tourists watch sea turtles each year, their numbers and their economic impacts must be considerable. This is a matter that merits future detailed investigation.

There are several ways in which ecotourism, or general tourism, can contribute to sea turtle conservation. It may directly contribute to their conservation because turtles and their habitats can be maintained in order to attract and satisfy tourists. Secondly, it may increase tourists' awareness of the plight of turtles and consequently increase their political support for their conservation and their willingness to pay for it. Thirdly, it may alter the subsequent behaviours of travellers who come to view sea turtles, for example, by making them more careful to avoid behaviours that may be damaging to sea turtles, such as inappropriate disposal of plastic bags. Fourthly, in as much as beaches and other areas are conserved to sustain turtle popu-

lations to satisfy tourists, other species may benefit as well. Thus, conservation measures arising from demands to satisfy turtle-watchers can have a beneficial umbrella effect on some other species and help to protect coastal areas.

While not all tourism based on turtles contributes to their conservation (and sometimes such tourism has proven harmful to their conservation) in theory, at least, ecotourism should be favourable to such conservation. While there are several definitions of ecotourism, it can be regarded as tourism that is careful of the environment, relies mostly on natural environments, but may also incorporate a cultural element (Boo 1990; Duff 1993). Some authors (for example, Wight 1993) believe that such tourism should also incorporate an educational component, if it is to be classified as ecotourism. Ideally, ecotourism should also provide economic benefit to local people (Ross and Wall 1999; Scheyvens 1999). Certainly, as discussed later, an educational component in ecotourism is desirable in order to develop positive attitudes in tourists (and others) towards wildlife conservation and to ensure supportive action for such conservation.

A widely reported and accepted definition of ecotourism is that of Ceballos-Lascurain. He defines it as:

...environmentally responsible, enlightening travel and visitation to relatively undisturbed natural areas in order to enjoy and appreciate nature (and any accompanying cultural features both past and present) that promotes conservation, has low visitor impact, and provides for beneficially active socio-economic involvement of local populations (Ceballos-Lascurain 1996:20).

Thus, ecotourism for Ceballos-Lascurain includes (1) enlightenment for the traveller (which presumably involves an educational element), (2) low impact on the natural environment, (3) appreciation of nature and associated cultural features, (4) benefits to the local population as a result of its involvement in this tourism, and (5) promotion of nature conservation.

Godfrey and Drif (2001:1) state that there is now widespread support for this type of tourism as a means for conserving turtles. They point to the endorsement of the Marine Turtle Specialist Group (MTSG) of the World Conservation Union (IUCN 1995) of this approach and to articles supporting its desirability, such as those by Drake (1996) and by Nichols, Bird, and Garcia (2000). Later they give particular attention to the Projeto TAMAR ecotourism project in Brazil, intended to conserve turtles by relying on local community participation and education (cf. Marcovaldi and Marcovaldi 1999). Nonetheless, the authors indicate that there is no single and easily transferable model of ecotourism for turtle conservation when they express doubts about the transferability of ecotourism/tourism methods used elsewhere (particularly in Brazil) to French Guyana. Their point is similar to that made by Reichart (1982).

We would also emphasise, that ecotourism projects need to be economically viable, if they are to be sustainable. However, there is always a risk that commercial or economic goals will compromise conservation goals because of human greed or necessity (see, for example, Tisdell 2001: chapters 6 and 7).

The fact that viewing nesting turtles and their hatchlings is attractive to tourists is a two-edged sword. Unless turtle-based tourism is carefully managed, it can

have negative impacts on turtle conservation, as demonstrated in the next section. On the other hand, if it is well managed with conservation in mind, is for instance a genuine form of ecotourism, it can contribute positively to turtle conservation, as demonstrated by studies in Tortuguero, Costa Rica (Jacobsen and Robles 1992; Troëng and Rankin 2005).

### **Possible Negative and Positive Effects of Turtle-Based Tourism on Turtle Conservation**

Turtle watching by tourists dates back more than a hundred years in some countries. For instance, turtle watching has been documented in Mon Repos, Queensland, Australia, since the late 1800s (Kay 1995). In Malaysia, it has been popular for several decades. Leong and Siow (1980) stated that in the 1970s, as many as 800 tourists visited Rantau Abang, Malaysia, each month during the peak season to watch leatherback turtles (*Dermochelys coriacea*). By 1982, the figure had increased to 50,000 tourists per year, that is, an average of over 4,000 per month. The number of tourists at this site continued to rise and Chan and Liew (1989) noted that around 300 tourists per night came to watch leatherback turtles there by the late 1980s. Although this nesting population has since crashed, tourism remained intense into the late 1990s (Chan and Liew 1996:199).

Although sea turtles attract many tourists and fascinate both adults and children, tourist visits to sea turtle beaches or encounters with turtles have not always been positive for the turtle. Negative conservation effects can result from turtle-based tourism mainly due to ignorance and lack of guidelines and supervision.

Tourists waiting to watch turtles on the beach can be noisy and sometimes build campfires and shine torches that frighten away turtles that come to nest (Chan and Liew 1989). When turtles come to the beach, tourists have been known to disturb the turtles by getting too close to them, touching them or climbing on them for photographs. Some tourists even prod the flippers of turtles and obstruct turtles from returning to the sea (Chan and Liew 1989). Such disturbances can prevent sea turtles from nesting on a preferred beach. As a result, they may go elsewhere and lay their eggs on unsuitable beaches or release eggs in the sea (Chan and Liew 1989). Hatchlings can also be disturbed by handling and be disoriented due to bonfires and flashing of torch lights. Any delays in baby sea turtles entering the sea increase the risks of predator attacks. Arianoutsou (1988) and Jacobson and Figueroa López (1994) discuss the impacts of tourism on sea turtle behaviour and biology.

Tourists other than those directly watching turtles can affect turtle populations adversely. Nests can be adversely affected by trampling and the use of beach umbrellas (Arianoutsou 1988). Driving of vehicles on beaches can destroy nests, harden beaches and create ruts, which make it difficult for hatchlings to enter the sea (Hosier, Kochhar, and Thayer 1981; Arianoutsou 1988). In many countries (for example Greece, Indonesia, Malaysia, Sri Lanka, and USA) hotels, guest houses and restaurants have been built alongside beaches where sea turtles nest. Their pollution, noise, and lights may prevent sea turtles from nesting, and disorient baby turtles (Arianoutsou 1988). Speedboats used by tourists can also injure turtles.

Sea turtle meat and eggs are offered in restaurants in some countries as part

of the local cuisine and experience, although they are usually prohibited by law. Tourists visiting areas where sea turtles nest may increase the demand for their products, including meat and eggs. Sometimes local tourists are served with turtle eggs because of their perceived aphrodisiac properties.

Surveys on sea turtle tourism, hatcheries, and conservation conducted in Sri Lanka by Wilson, Amarasooriya, and Mackensen (a survey of 257 foreign respondents)<sup>1</sup> and by Wilson and Amarasooriya (a survey of 207 local visitors)<sup>2</sup> in early 2002 found that one per cent of foreign tourists and five per cent of local tourists, respectively, were offered either sea turtle meat or eggs while holidaying in the south-western coast of Sri Lanka. This is the main tourist holiday destination in Sri Lanka and one of the prime nesting areas for turtles. In Sri Lanka, some local pubs serve sea turtle eggs for their patrons. However, in the absence of tourists, some of the sea turtle meat and eggs offered to tourists possibly would have been consumed locally. Furthermore, tourists including those who view turtles sometimes purchase curios and souvenirs made out of sea turtles, such as whole shells (especially of hawksbills, *Eretmochelys imbricata*), jewellery, combs and even sunglasses (DEFRA 2003). Although such items are banned from international trade by the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), turtle-based products continue to be sold in many countries, although it is increasingly becoming difficult to carry them into countries through airports. This may not mainly be because of the enforcement of CITES bans, but because of increased detection due to strict quarantine checks in some countries, such as Australia, and rigorous security checks implemented at airports after the terrorism events of September 11, 2001.

Nevertheless, not all tourism associated with turtles has negative consequences for their conservation and some positive trends are apparent. In recent years, there has been a gradual, but discernable shift in sea turtle watching in many countries, including Australia, Brazil, Costa Rica, Indonesia, Malaysia, and Sri Lanka, from destructive forms of tourism to those that are more in line with the basic tenets of ecotourism. As this form of ecotourism becomes more popular and successful, turtle-watching practices that are destructive may become less popular and could be replaced by those that are more beneficial to turtle conservation. One successful sea turtle-based ecotourism venture that is consistent with the basic goals of ecotourism is located at Mon Repos Beach in Australia.

### **The Evolution of Ecotourism at Mon Repos Beach near Bundaberg, Australia**

Mon Repos Conservation Park, located approximately fourteen kilometres north east of Bundaberg in Queensland (Figure 1), is the main destination for turtle-watching in Australia (in terms of number of annual visitors arriving during the turtle season). This park includes Mon Repos Beach which according to Kay (1995:3) supports '...the largest concentration of nesting marine sea turtles on the eastern Australian mainland and is one of the two largest loggerhead rookeries in the South Pacific region'. In addition to loggerhead turtles, *Caretta caretta*, some green turtles, *Chelonia mydas*, and some flatbacks, *Natator depressus*, also nest there, but their numbers are very small (Tisdell and Wilson 2002:5).

The evolution of Mon Repos Beach as an ecotourism site is interesting. This

can be considered in two ways. First, in the context of the history of changes in the general attitude of Queenslanders towards the conservation of sea turtles and, second, to provide insight into the historical process involved in the establishment of Mon Repos Conservation Park itself. Tourism is shown to be instrumental in both respects, that is: in changing public attitudes to turtle conservation and in protecting turtle habitat.

*European Settlers in Queensland and Marine Turtles – The Development of a Conservation Policy*

Indigenous Queenslanders (Australian Aborigines and Torres Strait Islanders), as well as all other indigenous Australians located in tropical and sub-tropical coastal areas, have had a long association with sea turtles. Turtles have been (and in some cases still are) an important food source and part of their cultural fabric. Prior to European settlement in Australia, indigenous people were probably not a threat to the survival of sea turtles, because the indigenous population level was low (probably around 200,000 at the time of European settlement). At this time passing European sailors also captured sea turtles for fresh meat, but this was not a serious threat in Australia to turtles. Turtles were often held aboard ship alive until needed for fresh meat.

In fact, Captain Cook, during his forced stopover at Cooktown in 1770 to repair his ship ‘Endeavour’, took on board sea turtles. Before leaving Cooktown, he invited local Aborigines on board to inspect his ship. They were alarmed to find six turtles on the deck. They believed these to be turtles taken without their permission. When the Aborigines wanted a few back and when the Endeavour’s crew refused, a skirmish followed (personal communication, by Eric Deeral, a local Aboriginal tribal elder, July, 2003).

Following European settlement in Australia, European technologies and economic markets provided the means and incentives to decimate turtle populations, and Europeans proceeded to exploit these stocks on a large scale as soon as it looked to be profitable. Factories for canning turtle soup were established in the 1920s – one on Heron Island and two on Northwest Island off the coast of Gladstone on the Great Barrier Reef (Figure 1). These operated into the early 1930s until they eventually went broke due to over-

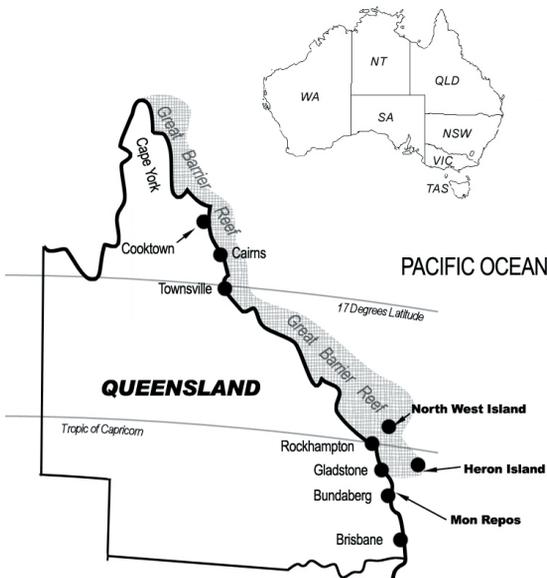


Figure 1. Map of Australia showing main locations of features in Queensland mentioned in this article.

exploitation of local turtle stocks. But the harvesting of sea turtles continued. Their carcasses were obtained by some mainland meat works from fishermen and sent 'overseas direct in the refrigerated holds of ships which transported export beef' (Bustard 1972:164).

In early 1950, a tourist group, consisting of influential persons, came upon sea turtles in Queensland destined for this commercial trade. They were so appalled by the cruelty to these animals that they took action through writing to newspapers to bring it to the attention of the public and politicians. The Queensland Government asked the Great Barrier Reef Committee to investigate the matter. As a result of its report, the Queensland Government in September 1950 prohibited the possession of green turtles and their eggs by other than indigenous Australians. However, this regulation only applied south of seventeen degrees latitude (approximately south of Cairns, Figure 1) and did not cover all species of marine turtle. But 1950 marks the first time government policy moved away from exploitative use of sea turtles by non-indigenous Australians. It is relevant to note that it was the above-mentioned tourists who played the pivotal role in this change.

It was not until 1968 that the taking of all species of sea turtles in Queensland, by other than indigenous Australians, was banned. Both changing world and local sentiment towards wildlife and growing marine-based tourism in Queensland contributed to this result. Since this time, proactive policies have been increasingly adopted in Queensland to protect marine turtles.

Such measures include the incorporation of more turtle rookeries into protected areas, measures to reduce accidental (or deliberate) strikes by boats on turtles and regulations to reduce the incidental take of sea turtles in trawl nets by introducing turtle excluder devices (TEDS). Some of these protective policies, however, took more than three decades to be implemented, and the political battles were far from easy. The establishment of Mon Repos Conservation Park provides an interesting example of lags and political obstacles involved in turtle conservation.

#### *The Politics and History of Conservation at Mon Repos Beach*

In 1968, (the same year in which the taking of sea turtles by non-indigenous persons was banned throughout Queensland) a group of citizens and organisations tried to have a national park established at Mon Repos Beach for the express purpose of protecting turtles nesting there. Robert Bustard was one of those supporting the idea. He stated that Mon Repos beach was:

...the site of an important loggerhead rookery, and under proper management the rookery could have been an important tourist attraction like the fairy penguins on Phillip Island in the Bass Strait. We needed only about 100 acres of coastal sand dune, consisting of a strip about one mile long, going far enough back from the beach so that lights could not prevent the orientation of hatchlings towards the sea or frighten adults coming out of the water to nest. However, some of the land was already owned by the Woongarra Shire Council and most of it was owned by a sugar cane grower who was not using it and was prepared to sell to the government at a fair price. However, there was a fly in the ointment. An individual had purchased between five and ten acres in the middle of the proposed National Park for real estate development

(beach-side houses). He was not prepared to sell at a reasonable price. Furthermore, it turned out that the local council had plans to build a scenic road right along the top of the unconsolidated sand dunes, and greatly favoured obtaining revenue through collecting rates from beach-houses instead of the establishment of a National Park (Bustard 1972:172).

The local Woongarra Shire Council was not convinced that the local area would gain from extra tourists coming to watch turtles and thought that most of the gains would go to Bundaberg (a different council) in a town much larger than the two villages in close proximity to Mon Repos Beach. The councillors preferred the extra rates (taxes) from the possible housing development at Mon Repos Beach to the prospects of increased turtle-based tourism. Although the Queensland Cabinet agreed in 1968 to create Mon Repos National Park, more than a decade passed before steps were taken to establish a suitable protected area at Mon Repos Beach.

Actually, it were scientists like Dr. Colin Limpus and those tourists with special interests in marine turtles, who were instrumental in the final process that culminated in the establishment of Mon Repos Conservation Park (a tourism development pattern described by Wilson and Tisdell 2001). In 1968, the Queensland Turtle Research Programme commenced at Mon Repos with a scientific and conservation agenda. The presence of this research programme helped to maintain public focus on the area. The programme often employed volunteers and also catered incidentally for some casual turtle-watching tourists. However, it was not until 1981 (about thirteen years after Cabinet had approved the idea in principle) that steps were taken to establish the Park by means of land purchases by the Queensland Government.

With growing crowds of turtle-watching visitors, research staff at Mon Repos decided in 1985 to establish a formal turtle-watching programme. It was felt that this would be the most efficient way of catering for the growing number of visitors to the site and would help with crowd control.

During the 1993-94 turtle watching season, there was a significant step forward in catering to turtle-watching tourists at Mon Repos: the Queensland Government completed the building of an information centre and amphitheatre. These were intended to educate visitors about sea turtles, especially their biology and ecology, as well as threats to their survival.

By this time, the Queensland Parks and Wildlife Services had assumed the major responsibility for catering for turtle-watching visitors at Mon Repos and had relieved researchers of this extra activity. However, scientific researchers' involvement (including volunteers) with tourists did not cease, because at the Park scientific information gathering is combined with showing nesting turtles and emerging hatchlings to tourists and providing explanations at the same time.

For the 1994-95 turtle season at Mon Repos (November to March), a seasonal service fee was introduced by Queensland Parks and Wildlife Services for turtle-watching. This marked the commencement of commercialised ecotourism at this site. The charging of a fee for entry to the Park in the evening or night during the turtle season continues. Its main purpose seems to be to raise money to help cover costs associated with visitors at the site. A subsidiary purpose may be to limit the number of visitors so that it is not greatly in excess of the limited opportunities available to view turtles.

### *The Features of Turtle-Based Tourism at Mon Repos Beach and its Contribution to Conservation*

Currently the type of tourism that occurs at Mon Repos Beach in connection with turtle-watching satisfies most of the basic conditions required for ecotourism. It is (1) nature-based; (2) educational; and (3) careful of the environment and conservation-oriented. Furthermore, (4) it involves local people and (5) it benefits the local community economically. However, its local cultural content is limited.<sup>3</sup> Therefore, it does not completely accord with the definition of ecotourism by Ceballos-Lascurain (1996).

This tourist experience is educational in several ways. Firstly, while visitors await their turn to go to the beach to view a nesting turtle or the emergence of turtle hatchlings, they are able to view information displays about the turtles and threats to them in the display centre. They are then invited outside to the amphitheatre where they are given presentations accompanied by film material. On the beach, guides provide further information and explanations to visitors about turtles as visitors see the nesting of a turtle or the emergence of hatchlings. In a survey of visitors to Mon Repos turtle rookery, ninety-nine per cent of respondents reported that their visit was informative and educational (Tisdell and Wilson 2002:49).

The type of tourism practiced is careful of the environment. During turtle-nesting season, tourists are only allowed on the beach at night under the supervision of officers of the Queensland Parks and Wildlife Service and trained volunteers, mostly from the local community. The maximum size of each group is seventy. Appropriate logistics and behaviour are adopted so as not to interfere with the natural behaviour of the sea turtles.

The ecotourism venture relies heavily for its viability on help from volunteers from the local community and elsewhere. This helps build local political support for the turtle conservation project and assists with crowd control and management. In addition, the direct economic injection to the local community is estimated to be AUS 0.8 million dollars annually (Tisdell and Wilson 2002). Assuming a regional multiplier of two, this generates a further indirect economic impact of AUS 1.6 million dollars. Therefore, the total estimated economic impact is AUS 2.4 million dollars annually (US 1.68 million dollars approximately at the exchange rate at 20 September 2004). This is a significant amount for this local community.

Furthermore, there is scientific spin-off. At the same time as tourists are viewing turtles, scientists and volunteers gather scientific data about the nesting of turtles or the nesters themselves, and about hatchlings. This is of assistance for determining whether or not population recovery of turtles is underway. It is also possible that this involvement of scientists makes visitors more appreciative of the importance of saving sea turtles and of the role played by Mon Repos rookery in helping to do that.

The presence of this tourism at Mon Repos has incidental conservation benefits. Predators, such as introduced foxes, are not likely to predate on turtles when the latter are accompanied by people. Programmes to control the presence of such predators in the Park have been instituted and these have been partly financed by visitor fees. In addition, extra trees have been planted on the foreshore to reduce light emissions from land sources, which could disorientate turtle hatchlings.

The land in the Park provides additional conservation benefits for other

native species, and preserves rock walls built by Kanakas (South Sea Pacific Islanders) brought to Queensland in the nineteenth century as indentured labourers to work on sugar cane fields. In 1991, a further conservation benefit was the declaration of the adjoining Woongarra Marine Park for the prime purpose of protecting sea turtles offshore, particularly in the breeding season.

It is interesting to note that the Burnett Shire Council, the local government successor to Woongarra Shire Council, keenly supports sea turtle conservation and the form of ecotourism associated with it. This is a complete turn around in attitude to that of 1968, when Woongarra Shire Council opposed the creation of a park of the present type at Mon Repos. In fact, the authors found on a visit to the local area at the end of 1999, that the coat-of-arms of the local council had incorporated four main symbols: sugar cane, a beef bull, a loggerhead turtle, and a whale, all indicative of economic activities deemed to be important in this region. In addition to turtle-watching, whale watching is today also important locally as a tourist activity.

Furthermore, in 1999 the local council promoted a painting competition amongst local school children to depict environmental concerns. Paintings involving threats to, and actions to conserve, sea turtles were prominent.

Similarly, the Bundaberg District and Tourism and Development Board has adopted a loggerhead turtle as its logo. An annual turtle festival is now also held in Bundaberg. Thus, it appears that local community support for the conservation of sea turtles is now well established.

Our survey (Tisdell and Wilson 2002) of visitors to Mon Repos rookery in the 1999-2000 season indicated that their experiences had several positive consequences for sea turtle conservation:

- Most believed after their experience that more should be done to conserve sea turtles;
- A large proportion said that after the event they were prepared to donate more for programmes to conserve sea turtles than if they had not visited Mon Repos;
- And many respondents said that they would alter their behaviour so as to be more considerate of sea turtles. For example, sixty-two per cent of respondents said they would be more careful in disposing of plastics, sixty-eight per cent said they would switch off lights near beaches, forty-seven per cent would take greater care with fishing gear, and seventy-three per cent said they would refrain from consuming turtle eggs, meat or soup while overseas;
- Changed behaviours in relation to several other factors affecting turtle conservation were also mentioned.

Therefore, the evidence is quite strong that the development of sea turtle ecotourism at Mon Repos Beach has contributed positively to the conservation of sea turtles. The flagship status of turtles has been an advantage. However, initially it was extremely difficult to have sea turtles accepted as a flagship species in Queensland. But now in the Burnett-Bundaberg region, sea turtles have become an icon. Hence, a return to the exploitative and sometimes thoughtless treatment of sea turtles by European settlers that prevailed in Queensland during most of the twentieth century seems most unlikely.

## Tourism and Turtle Hatchery Programmes in Sri Lanka

At Mon Repos Beach, humans interfere as little as possible with the natural life-cycle of sea turtles. The interference in their life-cycle is more marked in Sri Lanka. In Sri Lanka, a number of private operators maintain sea turtle hatcheries in conjunction with tourism. They purchase turtle eggs, bury them in a fenced sandy area near a beach to hatch, and hold hatchlings for a few days before releasing them to the ocean. Operators claim, that their activities involve ecotourism and contribute to the conservation of wild sea turtles (Gampell 1999).

Such programmes for sea turtles are quite common in many parts of the world (Wyneken 2000), and it is widely accepted that well-managed sea turtle hatcheries can play a positive role in turtle conservation when *in situ* conservation is not possible or practical (MTSG 1995). Hatcheries are often claimed to save eggs from human consumption. The consumption of turtle eggs can be high, as in Sri Lanka. In some countries, hatcheries for turtles were initially established by government agencies, but have increasingly shifted to private agents. Tourism-based hatchery operators claim, that they ensure more eggs hatch than otherwise, and that they increase the chances of hatchlings entering the ocean.

In Sri Lanka, five species of sea turtles nest in significant numbers throughout the year with two main seasons, namely from November to May, covering the south-western coast, and from May to August, covering the southern coast (Amarasooriya 2000). Hatcheries have been in existence in Sri Lanka since the 1970s (Fernando 1977). The first was started by an NGO with the cooperation of a villager, who was concerned by the high volume of extraction of sea turtle eggs for consumption. It initially involved purchasing eggs from collectors, who otherwise would have sold these in the local village market or elsewhere for human consumption. Although conservation was the prime reason for the establishment of the first hatchery, it soon attracted visitors, both local and foreign. Subsequently, a charge was levied on visitors, and most of the money was used to purchase more eggs from collectors to be buried and incubated in the hatchery.

Because of the high demand from tourists to view turtle hatchlings and the income generated, several hatcheries now operate and all receive fee-paying visitors. This form of viewing is promoted as a form of 'ecotourism' and the hatchery operators claim that the main objective is the conservation of sea turtles. However, Amarasooriya (2005) claims that only two hatcheries out of the nine in operation had conservation in mind as their main objective, and the rest were primarily operated for commercial gain.

The number of Sri Lankan sea turtle hatcheries, and their size, has fluctuated a great deal. For example, Richardson (1994) recorded sixteen hatcheries in the south-western and the southeastern coasts in the early part of the 1990s, but Amarasooriya and Dayaratne (1997) recorded only seven in 1996. In recent years, the number of hatcheries has remained at around nine (Amarasooriya 2005). Over a million eggs have been used in hatcheries during the last two decades, and the use of eggs has accelerated rapidly. The three hatcheries in existence in 1981/1982 used 48,934 eggs at the time (Wickramasinghe 1982), and in 2000 the nine existing hatcheries used around 300,000 eggs (Amarasooriya 2005), a 613 per cent increase.

Sea turtle hatcheries in Sri Lanka attract many tourists, both domestic

and foreign, and are part of the itinerary of many tour operators in Sri Lanka (cf. Responsible Travel 2003). Travel guides and tourist brochures list these hatcheries as part of the natural attractions of Sri Lanka (cf. Bradnock and Bradnock 1998). A survey conducted among foreign tourists holidaying in southwestern Sri Lanka by Wilson, Amarasooriya and Mackensen<sup>4</sup> in early 2002 found that eighty per cent of those surveyed were aware of sea turtle hatcheries in Sri Lanka. Only nineteen per cent did not know about their existence (one per cent did not answer this question). Of those who said 'yes', forty per cent said they knew about the presence of turtle hatcheries before their arrival in Sri Lanka. The study found that sixty-six per cent of those tourists who were aware of the hatcheries had either visited or intended to visit them during their stay in Sri Lanka. The reasons cited by those sixty-nine respondents (thirty-four per cent) who said that they were not visiting the hatcheries are shown in Table 1.

Reasons for not wanting to visit	Number of respondents	Percentage of respondents
No interest in turtles/have other preferences	29	42
No time	17	25
Animals should be free/heard the hatcheries were not good/only a business	8	11
Already seen in other countries	6	9
Did not know how to find hatcheries	3	4
Saw turtles on the beach/while surfing	2	3
Avoid tourist areas	2	3
No response	2	3
<b>Total</b>	<b>69</b>	<b>100</b>

Table 1. *Reasons given by foreign tourists holidaying in Southwest Sri Lanka who knew of turtle hatcheries but did not intend to visiting these (source: Wilson, Amarasooriya, and Mackensen, based on a survey of 257 foreign tourists conducted in southwestern Sri Lanka from mid-January to mid-March 2002 (see note 1).*

Of those who did not know about the presence of sea turtle hatcheries, fifty per cent said that they would consider visiting a hatchery. Almost one-third (thirty-one per cent) of those tourists who said that they had already visited or intended visiting a hatchery said that this was or would be an important part of the stay on the southwestern coast of Sri Lanka. However, twenty-two per cent of the respondents did not answer this question.

Hatcheries are dependent on tourist revenues (entrance fees, donations and sale of souvenirs) for their operations and some operate only during the main tourist

season (Hewavisenthi 1993). Amarasooriya (2005) suggests that this indicates that some hatchery operators may be driven by profit rather than conservation because the revenue generated during the main tourist season would be sufficient to finance the hatcheries' conservation activities during the tourist off-season. Data collected by Amarasooriya (2005) provides some evidence that sea turtle hatcheries operate mainly for profit, because the largest collection of eggs by the hatcheries coincides with the peak tourist season, which is approximately from November/December to April/May. The purchase of eggs by hatcheries declines during the low tourist season. About ninety-eight per cent of the turtle eggs utilised by hatcheries in Sri Lanka are taken by hatcheries in southwestern Sri Lanka and the remaining two per cent are utilised in the southern part of the island (Amarasooriya 2005). Thus, most eggs utilised by hatcheries are acquired by hatcheries where the majority of foreign tourists also holiday (Figure 2).

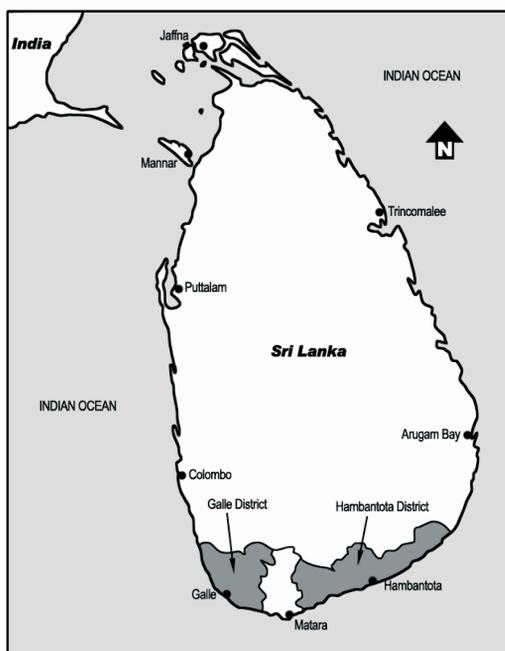


Figure 2. Map of Sri Lanka showing (in shading) main areas in which turtle hatcheries associated with tourism are found.

Sea turtle hatcheries are a lucrative cottage industry, financially supporting many families in areas where they operate. Amarasooriya (2005) estimates that the annual gross income from hatcheries in Sri Lanka is more than twenty-seven million Sri Lankan rupees, or approximately 340,562 us dollars per year.

Wilson, Amarasooriya and Mackensen found from their 2002 survey that the majority of responding foreign tourists were supportive of sea turtle-based tourism hatcheries and thought they involved a better form of turtle use than consumptive use. Of those who answered this question, seventy-seven per cent said it is a better form of turtle use than their consumptive use, while eighteen per cent said they did not think that hatchery-based tourism is a better form of turtle use. Five per cent of the respondents failed to answer 'yes' or 'no' to this question. The frequency of reasons for saying 'yes' and 'no' are summarised in Table 2.

Reasons for supporting sea turtle hatchery-based tourism	Number of respondents	Percentage of respondents
Support conservation/ensures some survival	77	39
Better than consumption/prevent killing	48	24
Turtles are endangered	15	8
They are educational	11	5
Provides employment/income	8	4
There is enough other food	4	2
Ecotourism is good	1	0.5
Protecting turtles is good	1	0.5
No reply	33	17
<b>Total</b>	<b>198</b>	<b>100</b>
Reasons for not supporting sea turtle hatchery-based tourism		
It is a business	2	4
Turtles should be left alone	1	2
No reply	42	94
<b>Total</b>	<b>45</b>	<b>100</b>

Table 2. *Reasons given by a sample of foreign tourists holidaying in Southwest Sri Lanka for supporting or opposing sea turtle hatchery-based tourism as a better form of sea turtle use than consumptive use of eggs (source: as for Table 1). (Note: 13, or five per cent, of the respondents failed to answer the question 'Do you think that sea turtle hatchery-based tourism is a better form of sea turtle use than their consumptive use?')*

Most tourists surveyed were supportive of hatcheries, although some had reservations about them. In situations where sea turtle hatcheries are the only practical solution to protecting eggs, as may be mostly so on the southwestern coast of Sri Lanka, tourism based on hatcheries can make a valuable contribution to the conservation of sea turtles provided they are well-managed.

Despite turtle hatcheries being on the itinerary of many tour operators and being listed in tourist guides, such hatcheries are, strictly speaking, illegal in Sri Lanka, because the eggs are strictly protected by law. However, because the operators of hatcheries have convinced the public and tourists that they make a positive contribution to the conservation of sea turtles, their presence is 'unofficially' sanctioned and the collection of eggs for hatcheries is 'justified'. Surprisingly, there are few, if any, prosecutions for illegally collecting turtle eggs.

The effectiveness of hatcheries in conserving turtles in Sri Lanka is unclear (Tisdell and Wilson in press). Moreover, the Sri Lankan operations are further compounded because nearly all of them keep turtles in captivity for variable periods of time, ostensibly as a conservation measure. Some conservationists have negative views about sea turtles raised in hatcheries (especially those involving tourists) rather than in the wild. Some of the negative effects of hatcheries and captive rearing operations are summarised in Donnelly (1994) and Tisdell and Wilson (in press). These include the possibility that hatchlings may be held in tanks for too long and therefore be weak and/or disoriented when released; furthermore the captive turtles can injure one another due to crowding in tanks. As pointed out by Amarasooriya (2005), tourism-based sea turtle hatcheries that mainly operate for profits may sacrifice conservation objectives. If tourism-based sea turtle hatcheries are to make a greater contribution to conservation by taking advantage of increased numbers of tourists and their support, it is important that they adopt appropriate management strategies for conserving sea turtles. Otherwise, tourism-based sea turtle hatcheries could do more harm than good for the conservation of sea turtles (cf. Frazer, 1992).

Turtle hatcheries in Sri Lanka do not satisfy the definition of Ceballos-Lascurain (1996) of ecotourism. For example, turtle hatchlings are held in tanks for tourists to see. Hence, an artificial built environment rather than a natural setting is involved. Furthermore, the educational element is limited and little attention is given to accompanying cultural features. Most important, it is dubious whether these sorts of hatcheries directly contribute to the conservation of turtles and if so, to what extent. While in some instances, it may be true that the eggs used in turtle hatcheries would otherwise be eaten; in other cases demand of hatcheries for eggs may increase the collection of turtle eggs from the wild. It is possible that if hatcheries are poorly managed that hatching and survival rates of hatchlings could be lower than in the wild. In cases where this happens, the flagship status of turtles becomes a conservation liability for them.

### **Tourism and the Farming of the Turtles**

The question of whether the farming of wild species is an appropriate method for conserving them is controversial. Such farming is often accompanied by tourism, even though it is clearly not ecotourism. Nevertheless, it is possible for tourism associated with such farming to be educational and to be presented in such a way that it has relevance to the conservation of wild populations of turtles. This could at least in principle have positive nature conservation outcomes via its impact on visitors. Furthermore, it would be a fallacy to believe that the only possible type of tourism that can have positive conservation outcomes is ecotourism.

As for sea-turtle farming itself, opinions amongst conservationists are sharply divided about its potential to contribute to the conservation of wild turtle stocks (Ehrenfeld 1974; Donnelly 1994; Mrosovsky 2000). Some of the economic arguments about whether such farming favours or is detrimental to the conservation of stocks of wild sea turtles are analysed in Tisdell (1991:chapter 6) and possible environmental impacts of aquaculture generally are considered in Tisdell (2003). Given the space limitation, those factors cannot be listed here.

The long-term economic viability of farming sea turtles is uncertain, particularly because the operation of CITES restricts opportunities for exporting products from such farms. In particular, any form of utilisation of wild stocks by farms (for example, reliance, or partial reliance, on eggs of wild turtles, or capture of broodstock for use in farming), would result in banning of farm exports under CITES (Wold 2002). In fact, there are today no legal, international exports of farmed turtle products, although green turtles are farmed in the Cayman Islands.

In 1968, a turtle farm was established in the Cayman Islands by Mariculture, Ltd. by investors from the USA and the UK to farm green turtles for commercial use. This company, however, became bankrupt in 1975, partly as a consequence of bans on the export of its products to the United States and other countries. It was then taken over by a group of German investors and renamed Cayman Turtle Farm, Ltd (Fosdick and Fosdick 1994). According to the present owner of this farm:

The new owners intended to operate the farm more as a non-profit organisation, funnelling any products back into sea turtle conservation and protection projects, using the site as an international sea turtle research facility. However, export restrictions continued, resulting in cash flow problems, a scaling back of operations and imminent closure of the farm in 1983 (Cayman Islands Turtle Farm 2002a:1-2).

It was then purchased by the Cayman Islands Government and has since been operated as a private company, Cayman Turtle Farm (1983) Ltd. According to Fosdick and Fosdick (1994) and to the reports of the Cayman Turtle Farm (2002a:2), the reproductive life-cycle of turtles at the farm is a closed one – no broodstock have been taken from the wild since 1975, and no eggs since 1976.

However, exports of meat and other products continue to be banned under CITES. Hence, the economic viability of the farm depends on local sales of meat and visits by tourists. In addition, ‘head started’ turtles (animals raised in captivity for varying periods of time) are released around the Cayman Islands.

Admission fees from tourists make an important contribution to the viability of the company. The farm has become one of the largest tourist attractions in the Cayman Islands. It attracted over 340,000 visitors during 2000 (Cayman Islands Turtle Farm, 2002a:2). The cost of entry is reported to be six US dollars for adults and three US dollars for children (aged six to twelve), with younger children free. Thus, assuming visits by twice as many adults as children, its gross revenue from tourism appears to be around 1.7 million US dollars annually. Following destructive hurricanes in 2001 and 2004, the Cayman turtle farm has been undergoing redevelopment and has an associated ‘marine park’. Thus, the emphasis on tourism seems to be increasing. We cannot assess the nature of the information and education provided to visitors at this turtle farm without a visit. The farm however reported:

Cayman Turtle Farm has been engaged in the education, conservation through utilisation, research and rehabilitation of the marine turtle for over thirty years. As an integral part of this effort, the farm has released over 30,000 green sea turtles to help in replenishing the wild population since 1980 (Cayman Islands Turtle Farm 2002b).

While there are intense debates among conservationists about the merits of the farm's education and release programmes (Donnelly 1994; Fosdick and Fosdick 1994; Mrosovsky 2000; Bell and Parsons 2002), it is clear that the principal attraction for tourists is the captive turtles. Hence, because of the flagship status of these reptiles the Cayman Turtle Farm is able to rely on an income from tourism, and undertake in the activities that it does -- whether or not these are beneficial in the end to sea turtle conservation.

### **Concluding Assessment**

The flagship status of sea turtles for tourism purposes can be, depending upon the circumstances, an advantage or a disadvantage for the conservation of sea turtles and nature generally. The growth of inadequately controlled tourism to take advantage of the nesting habits of sea turtles can, as outlined above, both directly and indirectly result in the decimation or demise of local turtle populations. On the other hand, there is strong evidence from our observations at Mon Repos Conservation Park in Australia that turtle-based tourism conducted according to the basic principles of ecotourism contributes positively to the conservation of sea turtles and to the conservation of nature generally. However, much turtle-based tourism that is claimed to involve ecotourism or to have positive consequences for the conservation of nature may involve a hoax. We considered that this could be so for claims of some Sri Lankan turtle hatcheries that they help save sea turtles and are engaged in ecotourism. None actually meet the standard basic criteria for ecotourism and the contribution of some (but not all) to saving sea turtle populations may be problematic (cf. Frazer 1992). Furthermore, often enterprises offered as ecotourism do not meet in practice the theoretical requirements for ecotourism (cf. Ross and Wall 1999). Although tourism on at least one turtle farm in the Cayman Islands does not meet the usual criteria for ecotourism, such tourism could still be an effective force for the conservation of sea turtles in the wild if appropriately conducted.

There appear to be very few cases in which turtle-based tourism strictly satisfies all the requirements for ecotourism listed by Ceballos-Lascurain (1996). However, turtle-based tourism at Tortuguero may do so<sup>5</sup> (Jacobsen and Robles 1992; Troëng and Rankin 2005) and that at Mon Repos Beach, Australia, must come very close to doing so. However, all the conditions for ecotourism do not need to be satisfied for turtle-based tourism to contribute positively to turtle conservation, either directly or indirectly. Nevertheless, this does not imply that all forms of turtle-based tourism are favourable to turtle conservation. The fiscal viability of ecotourism depends on demand and cost considerations, that is, on economic factors. The flagship status of sea turtles boosts demand by tourists to view turtles and increases the likelihood of turtle-based ecotourism being economic. But it is not economic in all areas where turtles nest. Therefore, encouragement of turtle-based ecotourism cannot be more than a partial strategy for conserving sea turtles. Furthermore, the type of turtle-based tourism that is economically viable can be expected to vary between countries, and even regionally within countries. A successful type of turtle-based ecotourism in one region may be a complete failure in another. Each situation involving turtle-based tourism has to be individually assessed to determine its net impact on the conservation of sea turtles (cf. Campbell 1998).

Even tourism that cannot be classified as ecotourism may help conserve turtles, as illustrated above. Again, it should not be assumed that only non-consumptive use of turtles, such as that associated with ecotourism, can contribute to the conservation of turtles. Consumptive use of turtles can do so if it is combined with appropriate local governance of turtles as common property (cf. Ostrom 1990). There is a need to assess each case individually.

Local communities will be more supportive of the development of turtle-based tourism if they obtain economic benefit from it, as they do at Mon Repos and in Sri Lanka. If these benefits exceed those from the consumptive use of turtles, they will be even more supportive of such development. However, ecotourism is not economic in all places where turtles occur. For example, large portions of northern Australia where turtles nest (but not Mon Repos) belong to Aboriginal Australians. However, many of these areas are remote and difficult for tourists to access, and Aboriginal Australians are allowed to harvest turtles for their own use. Hence, in many Aboriginal areas, ecotourism is uneconomic and unable to provide sufficient income to substitute for consumptive use of turtles by Aboriginal Australians. Therefore, the type of supposedly successful ecotourism practised in Tortuguero and discussed for example by Jacobson and Robles (1992), Place (1991), and by Troëng and Rankin (2005) seems unlikely to be applicable to all areas of Australia where turtles nest. As pointed out by Godfrey and Drif (2001), appropriate methods of conserving turtles vary with local circumstances.

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## **Notes**

1 This survey of 257 foreign tourists was conducted by A. Mackensen from mid-January to mid-March, 2002, on beaches and in hotel precincts in southwest Sri Lanka. The sample was one of convenience, an approach commonly adopted in marketing research (Bradburn and Sudman 1988). The questionnaire was designed by C. Wilson and K. Amarasooriya. The number of persons interviewed by area were: Hikkaduwa, 187; Bentota, 31; Unawatuma, 22; Midigama, 13; and Mirissa, 4. One survey form was misplaced. Further research would be required to determine how representative this sample is of all tourists to this part of Sri Lanka.

2 The second survey was conducted from mid-January, 2002 to mid-July, 2002, by a student from a Sri Lankan university together with an employee attached to the National Aquatic and Resources Agency

(NARA). The NARA employee had considerable experience in conducting surveys of this nature and was able to supervise the university student. The face-to-face interviews using a standard questionnaire were conducted in four hatcheries in southwest Sri Lanka during weekends and weekdays. In decreasing order, the number of Sri Lankans interviewed at each hatchery was 73, 58, 45 and 30, plus one person for whom the hatchery is unrecorded. Convenience sampling was used for this survey (Bradburn and Sudman 1988). This was the only possible method given the impracticality of other methods described in textbooks.

3 While lack of attention to similar cultural aspects is widespread globally, it is unclear to what degree giving greater prominence to this theme would promote pro-conservation attitudes to sea turtles (J. Frazier pers. comm.). Nevertheless, Australia has a rich, but underutilised, indigenous cultural background (Haddon *et al.* 1901-1935; Groger-Wurm 1973; Fraser 1978; Isaacs 1980; Ellis 1994a, 1994b; Buku-Larrngay Mulka Centre 1999) that could be drawn on in developing turtle-based ecotourism.

4 See note 1 for explanation.

5 While Jacobson and Robles (1992) paint a positive picture of economic benefits to the local community of ecotourism in Tortuguero, Place (1991) provides a more critical perspective. Even in this case, the consequences of tourism are complex and controversial, and point to the divergent policy opinions held by many scientists (cf. Campbell 2002).

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