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Positive conservation outcome from religious teachings: changes to subsistence turtle harvest practices at Cocos (Keeling) Islands, Indian Ocean

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Abstract. We document and describe the change in attitudes, hunting behaviour and historic subsistence use of sea turtles by Cocos Malay people of Islamic faith in the Cocos (Keeling) Islands, Indian Ocean over the last 180 years. We used several lines of evidence including historical documents, scientific journals, archived records and interviews with current and former residents. The results are grouped in two time categories: 1) use of turtles prior to mid-1980s and 2) use of turtles after mid-1980s. Prior to the mid-1980s, turtle meat was popular with Muslim residents and was consumed when available and was particularly appreciated during times of ceremony. After the mid-1980s, external influences and improved communication modified Islamic teachings and sea turtles were reclassified from halal (permitted as food) to haram (prohibited as food). After the mid-1980s, harvest and the use of turtles decreased to negligible numbers. Although a combination of various events and circumstances may have contributed to this change in harvest practices, changes to Islamic teachings were likely to be the main factor. These changes in use appeared to have had a dramatic positive effect on the resident green (*Chelonia mydas*) and hawksbill (*Eretmochelys imbricata*) turtle populations, from what appeared to be harvest-related depressed numbers prior to the 1980s, recovering to abundant numbers after 1999. From a management perspective, this is a positive conservation outcome for sea turtles, at both local and regional (Indian Ocean) scales.

Key words. turtles conservation, religion

INTRODUCTION

Environmental sustainability is often intricately linked with traditional customs and belief systems (Gadgil et al., 1993; Mukamuri, 1995; Cooper & Palmer, 1998; Sharma, 1999; Berkes et al., 2000; Turner et al., 2000; Colding & Folke, 2001; Kula, 2001; Yibarbuk et al., 2001; Kamla et al., 2006; Azlan & Gulam Azad, 2012; Bickford et al., 2012; Northcott, 2012). In many cases, traditional practices are beneficial or in synergy with the environment (Gadgil et al., 1993; Berkes et al., 1995; Subrat Sharma, 1999; Berkes et al., 2000; Turner et al., 2000; Yibarbuk et al., 2001), but as societies develop and adopt technologies and change some of these practices, this often causes controversy and ignites debate because of overlapping and mixed issues such as biodiversity conservation, religion, culture, perceived stakeholder rights or animal welfare issues (Mukamuri, 1995).

Globally, the use of sea turtles by Muslims is sparsely documented in the literature. In locations where Islam is the dominant religion and has a long history of establishment, there is dichotomy of practices in relation to the consumption of sea turtle meat, with it either consumed or not consumed (Hendrickson, 1958; Frazier, 1980; Mortimer, 1993; Shanker, 2004; Muir, 2005; Rieser, 2012). Throughout the Indian Ocean and Southeast Asia there are examples where Islamic communities consume turtle meat (Frazier, 1980; Mortimer, 1993; Muir, 2005), and if not consumed directly, sea turtles are harvested by Muslim fishers and traded (Islam, 2001; Nada, 2001). In some Islamic teachings, turtle meat is "Haram" as food, which is an Islamic term meaning 'prohibited or unlawful'. Haram foods and drinks are absolutely forbidden for every Muslim (Regenstein et al., 2003). All aquatic animals are halal unless, like sea turtles, they exist on both land and in the water (Regenstein et al., 2003). The same arguments apply for other species such as frogs, crocodiles and seals (Regenstein et al., 2003). There are contradicting views in the literature and debates on blogs and websites as to whether sea turtle meat is halal or haram (http://forums.islamicawakening.com/f16/permissibilty-of-turtle-meat-11662/). Sea turtle eggs under Islamic teaching are halal (Al-Qardawi, 1997; Regenstein et al., 2003). Despite not being targeted for the meat, intense egg collecting in Indonesia and Malaysia caused turtle populations to collapse (Harrison, 1958; Hendrickson, 1958; Eckert, 1995; Shanker & Pilcher, 2003; Northcott, 2012).

The Cocos (Keeling) Islands group is situated at 12°12"S, 96°54"E. The main atoll, known as the southern atoll, is

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a low laying coral atoll formed over a dormant volcanic seamount and has a relatively shallow (12–20m) internal lagoon. A series of small islands fringes the lagoon in a horseshoe-shape formation. North Keeling Island, which is a Commonwealth reserve under the Environment Protection and Biodiversity Conservation Act 1999, is a single island atoll located 26 km north of the main atoll. The nearest neighbors to the Cocos (Keeling) Islands are Christmas Island (900 km) and Indonesia (1100 km).

The permanent settlement in Cocos (Keeling) Islands commenced in 1826 by Alexander Hare and a year later by the Clunies-Ross family who brought in workers for the coconut (*Cocos nucifera*) plantations and later became the owner of the islands (Gibson-Hill, 1947a). The settlers or workers were predominately Malay and of Islamic faith with a small number of Chinese, Papuan and Indians also among the earlier settlers. In later years, Javanese were also brought to the islands as contract workers (Gibson-Hill, 1947a). The term Cocos Malays refers to the residents of Malay descent but generally refers to the descendants of all original Asian descendants who speak Malay, most of whom are Muslims. The island group officially became a Territory of Commonwealth of Australia in 1955 (Director of National Parks, 2004). The Australian government bought the islands from the Clunies-Ross family in 1978 and in 1984, the Cocos Malays voted to integrate with Australia though a United Nations supervised Act of Self-Determination (ASD) (Bunce, 1988). Geographic location, political or governance structures and language barriers had isolated the community to the outside world for over seven generations (Bunce, 1988). Throughout the years the Clunies-Ross family maintained regular contacts with the outside world to manage their affairs, but for the Cocos Malays outside contacts were very few and highly controlled.

Both green (*Chelonia mydas*) and hawksbill turtles (*Eretmochelys imbricata*) are resident and forage on the southern atoll of the Cocos (Keeling) Islands (Whiting et al., 2014; this volume). Both species occur in significant numbers and have been easily captured for study since 1999 with up to 50 turtles captured by hand by jumping from a boat and hand-capturing in a three-hour period. Green turtles nest in low to moderate numbers, mostly at North Keeling Island. Olive ridley turtles (*Lepidochelys olivacea*) have been washed ashore stranded in discarded nets (ghost nets) indicating an oceanic existence and one loggerhead turtle (*Caretta caretta*) has been photographed in the lagoon by a local photographer (Whiting et al., 2014; this volume).

The purpose of this paper is to document the change in attitudes, hunting behaviour and historic subsistence use of marine turtles by Cocos Malay Muslims at the Cocos (Keeling) Islands.

METHODS

We used several methods to create lines of evidence that describe the change in subsistence use of marine turtles by Cocos (Keeling) Island Cocos Malay Muslim residents. Published reports, books and peer-reviewed journal articles provided a background to the living conditions, economic and religious environment and the subsistence use of marine turtles at various periods since settlement. Surveys on 16 anonymous Muslim households in 2001 provided a current and recent account of use. These questions were designed for male and females with ages greater than 45 and to illicit responses in relation to the use and abundance of marine turtles from their recollections over the past 25 years. The categories of questions were 1) foraging/in-water turtles on the southern Atoll, 2) nesting turtles, 3) harvest, and 4) use of turtles. Further targeted surveys conducted in 2013 were directed to two previous residents of the islands: Pauline Bunce (educator, author and resident 1982–1983 and 1987–1988) and John Clunies-Ross (resident 1946–1983). In addition, records including unpublished documents relating to Cocos Keeling Islands were viewed both online through the Australian National Archives website and in person at the Australian National Archives repository in the Australian Capital Territory.

RESULTS AND DISCUSSION

All lines of evidence, including the household interviews (Table 1) and targeted interviews, established that sea turtle meat was regularly consumed at Cocos (Keeling) Islands until the 1980s when major cultural changes caused cessation or at least a severe reduction in hunting.

Use of turtles prior to 1980. Islam, one of the world's younger religions, reached Southeast Asia by the 13th and 14th centuries (Hooker, 1983) and was present on the Malayan Peninsula for at least 500 years (Hendrickson, 1958). Islam is likely to have arrived at the Cocos (Keeling) Islands with the first settlers in 1826 with the first reference to a "Mohammadan Priest" in the settlement in 1897 (Slocum, 1899). Historic records indicate that turtles were consumed on a regular basis, but at varying levels of intensity, by Muslim and non-Muslim residents of Cocos (Keeling) Islands between 1826 and the 1980s (Gibson-Hill, 1947b). One of the earliest accounts of hunting is described by Charles Darwin and Robert Fitzroy during an 11-day visit on the Beagle in 1836 (Fitzroy et al., 1839; Fitzroy, 1966; Armstrong, 1992a). An account in the 1940s indicates few turtles are present in the lagoon due to harvest (Gibson-Hill, 1947b).

Although earlier workers were considered to be devoted Muslims, turtle meat and eggs were a part of the diet and was mainly dependent on the availability of turtles and of the permissions provided by the governance of the Clunies-Ross family (Smith, 1960). Turtle meat was highly prized and used for special occasions such marriage ceremonies (Archbold, 1941; Armstrong, 1992b). Hunting persisted through the war years of the 1940s where nominated turtle hunting areas of the locals were off limits to military personnel (National Archives of Australia, 1998). A turtle pond was also created adjacent to West Island to keep turtles (Gibson-Hill, 1950), but this appears to be for the exclusive use by the Clunies-Ross family and not the Cocos Malay residents. The household surveys (Table 1) indicated that both green

Table 1. Household surveys: summaries of responses to questions asked to the residents of 16 Cocos Malay houses. The questions relate to the period between 1950s and 1980s unless otherwise specified.

Questions	Summary of Responses
Abundance	*Abundance*
1. Generally, are there more or less turtles that years ago (20–30 years ago)?	1. More today (87.5), less today (6.3%) and same today (12.5%)
Harvest	*Harvest*
2. Was one species of turtle hunted in preference to the other (e.g., greens, hawksbill, any)?	2. No difference (75%), greens preferred (25%)
3. Was there preference for size (e.g., big, medium, small, any)?	3. Medium (75%), small (12.5%), big (6.3%), no preference (6.3%)
4. What was the method of hunting (spearing, leaping from boat, captured while nesting, etc)?	4. Spearing (100%)
a. How many turtles were caught per trip (one or several per outing)?	a. One (18.8%), one to two (12.5%), two (37.4%), two to three (18.8%), three (12.5%), four (0%)
b. How often were the catching trips (once a week, once a month, etc)?	b. Weekly (6.3%), monthly (6.3%), bi-monthly (12.5%), dependent on weather (75%)
Use of Turtles	*Use of Turtles*
5. How were the turtles used (e.g., hawksbill for shell, greens for meat)?	5. Meat and shell (87.5%), meat (6.3%), shell/jewellery (6.3%)
6. How were the nesting turtles used (e.g., eggs, adult females for meat)?	6. Adults taken (50%), adults and eggs (37.5%), nesting turtles not used (6.3%), don't know (6.3%)
7. Were products used locally or were they traded to ships or exported (e.g., to Singapore etc.)?	7. Sold to locals, tourists and travellers by yacht (93.8%), sell to Air Force (6.3%)

and hawksbill turtles were commonly hunted prior to the 1980s and that they were less abundant than in 2001 when the survey was conducted. Green turtles were used for food while hawksbill turtles were sometimes consumed but mainly used for jewellery.

Spearing was the preferred capture method with medium sized turtles the preferred size (Table 1). Trips were mostly opportunistic based on the weather but multiple turtles were captured if available. Turtles were captured for both meat and shell and products were traded locally, mostly with boat travellers passing through (Table 1).

The targeted surveys showed that between 1981 and 1983 turtles and eggs were regularly harvested, although the general community view was that turtle numbers were declining and the size of harvested turtles were smaller (Bunce survey response 2013). During the early eighties, green turtles were scarce and the catch was primarily hawksbill turtles. Turtle harvest appeared to be opportunistic based on the scarcity of the turtles (Bunce survey response 2013, Clunies-Ross survey response 2013) which meant turtle meat was not a staple food source (Clunies-Ross survey response 2013) but turtles were appreciated as a delicacy and used for celebration (Bunce survey response 2013). Turtles were uncommon in the lagoon in the 1980s (Bunce survey response 2013). The National Archives has several references to turtle hunting particularly around rules for service people to stay away from turtle hunting areas.

In 1984, one of the authors (IM) saw the taking of a large green turtle for meat on a barge that travelled to North Keeling Island to harvest seabirds. This was probably the last few cases of turtles harvested by Cocos Malay in the open view of the public.

Use of turtles after mid-1980s. Few turtles were harvested by Cocos Malays after the mid-1980s. This is confirmed by recollections that by the late 1980s turtles were not hunted mainly due to religious reasons and there was a feeling of guilt if turtles were hunted (Bunce survey response 2013). This change in thinking was assisted by outside influences from Malaysia and Indonesia as well as a local ranger linking religion and conservation (Bunce survey response 2013). The senior author (IM) has lived within the community for almost 30 years and confirms a reduction in harvesting during the mid-1980s.

There is anecdotal evidence within the Muslim community that some individuals continued to harvest turtles from the southern lagoon, albeit in low numbers (in the order of less than five per year for the community). This was not common and not widely publicised within the community (IM, pers. obs.). In 2010, the authors found the carapace of an adult-sized green turtle with a spear wound consistent with being hunted (Whiting et al., 2014; this volume) but is unknown who may have hunted this animal. Between 1999 and 2012, no other evidence was observed of sea turtles being hunted. Turtle eggs remain halal and anecdotal reports indicate that

clutches of turtle eggs are taken opportunistically to the present day. Turtle eggs were collected between 1987 and 1988 (Bunce survey response 2013).

Despite some suspected minor hunting since the mid-1980s, there appears to be a decisive point in time for a cessation of juvenile and adult turtle harvest.

Potential reasons for changes in harvesting behaviour pre- and post-1980s. In many locations, it is generally accepted that Islamic teachings advise that turtle meat is non-halal or haram because turtles exist both on land and in water. However, there are also divergences from this both in practise and theory which may have led to the Muslims of Cocos (Keeling) Islands having a different philosophy to eating turtle compared to different parts of Asia, at least in the earlier period.

Prior to the late 1980s, there are a number of reasons that may have led to the consumption of turtle meat including:

1. Early teachings differed from contemporary teachings – The teaching of Islamic faith during the period of settlement of Cocos (Keeling) and into the 20th century differed from those of present day teachings. For instance, turtle meat was already consumed by some Muslim communities in Malaya (Peninsula Malaysia) and Sarawak and an enquiry to an authority of the Shafi school of Islamic teaching in Malaysia in the 1940s revealed no evidence in the Koran to indicate that turtle meat is either forbidden or undesirable (Hendrickson, 1958). In addition, during the 1800 and 1900s in Malaya, turtle eggs were regularly harvested (Harrison, 1958). They continue to be collected for food even today (Shyuji, 2009), are consumed in large numbers by the population, and sometimes eaten during special ceremonies. Islamic theology underwent changes in its transmission from the Middle East to Southeast Asia and these sometimes produced local adaptations which meant periods of renewal and reform (Riddell, 2001).

2. Low levels of education and literacy – Low general education and literacy levels may have resulted in variations in understanding of Islamic teachings that may have led to an acceptance of turtle meat as halal. As with any religious group, in depth knowledge sometimes requires additional specialised face to face learning or through printed materials. Other than the Koran, additional materials were lacking until recent times and local elder's contact to the outside world was limited or non-existent. The level of literacy was expected to be low in the decades after settlement and it was not until 1891 that a Cocos Malay received training as school teacher in Singapore (Hunt, 1989). Up to 1930, the Cocos people retained a sense of Islam but this was not orthodox in many respects. A turning point was in 1972 when voice-cassettes were being exchanged between Cocos Malays on Cocos (Keeling) Islands and relatives living in places such as Christmas Island. Family news and standards of living were the most frequent topics, but information about Islam was also exchanged through the tapes (Hunt, 1989).

3. Unpredictable and irregular food supply at Cocos (Keeling) Islands – In the early days, food provision was overseen by the Clunies-Ross family and residents relied on food obtained from the islands or provisioning from Singapore and other Asian ports. With small isolated islands such as Cocos (Keeling), the choices for food were often limited and Cocos Malays may simply have had to forego their religious restrictions in order to have enough food for themselves and their dependents. Necessity dictates exception and haram food is permitted in times of need (Al-Qardawi, 1997) which may have been the case during many years. Under Clunies-Ross, hardship was experienced during the periods between 1930 to 1941, and 1946 to 1949 (Hunt, 1989). In the 1930s, the copra price fell while economic pressures and social issues during the Second World War limited the importation of food and clothing (Hunt, 1989). Also by December 1947 the population of Home Island reached record levels of 1802 (Hunt, 1989).

Reasons for cessation of harvest – Post-1980s. There are several plausible scenarios that may have led to a severe reduction in harvest of turtles by local Muslims at Cocos (Keeling) Islands. These scenarios include:

1. Reinterpretation of the halal and haram laws based on an inflow of information from outside sources including Islamic teachings from Singapore, Malaysia and Java. This is the most plausible scenario and is corroborated by many local residents and those interviewed. By early 1980s, the movement of people and information to and from Cocos (Keeling) to Australia and neighbouring countries increased (Feyrel, pers. comm. 2013; Bunce, pers. comm 2013). Cocos Malays who had resettled on mainland Australia started to return to Cocos (Keeling) Islands, some for a visit and some families returning permanently. Additionally, there was regular contact with Singapore, Peninsular Malaysia and Sabah, Malaysia. Around this period the community learned that Muslims are prohibited from eating turtle meat which was the beginning of gradual acceptance by the majority of Cocos Malays (Feyrel, pers. comm. 2013). The diminishing of Clunies-Ross' powerbase and the ensuing changes in the socio-political landscape were the catalyst for communication opportunities to the outside world for the Cocos Malays. Flows of learning media provided opportunities for the Cocos Malay community to broaden their existing religious knowledge base. By the mid-1980s, the influence of the Clunies-Ross family had declined and Islam was becoming more "up-to-date", with outsiders having an increasing influence on the community (Bunce, pers. comm. 2013).

2. The political and legal regime on the islands changed with the integration under Australian law. This meant the Cocos (Keeling) Islands came under the same law of Australia which meant that turtles could not be harvested

legally. Turtle harvest was illegal by the early 1970s with only customary harvest by Aboriginal and Torres Strait Islanders exempt under the provisions of the Native Title Act (1993). The descendants from the original settlers of the Cocos (Keeling) Islands were not recognised under this Act. The introduction of Australian law is unlikely to be the cause of reduction in turtle harvest as legal frameworks are usually slow to produce behavioural change on their own, as evident by the persistent red-footed booby harvest on North Keeling despite legal regulation (Stokes et al., 1984; Baker et al., 2004).

3. In the late 1980s, the economic structure of the islands would have changed with the integration with Australia and the necessity for consuming turtles may also have been removed. This economic stability and reliability of food supply may have played an integral role in easing any hardship in the transition of turtles as from halal to haram.

CONCLUSIONS: IMPACT FOR CONSERVATION

The Environmental Protection and Biodiversity Conservation Act (1999) provided legal protection for marine turtles and both species are listed as vulnerable in Australia. However, legal frameworks represent only one tool in managing and conserving any species. In practice, on-ground actions, attitudes and perceptions play major roles in conservation. The abandoning of turtle harvesting served as a significant element for the conservation and management of turtles at (Cocos Keeling) Islands, by removing the direct mortality of resident turtles. In reality, most of the reduction in turtle numbers may have occurred in the late 1800s and the smaller scale harvest throughout the 1900s may have kept resident populations low until harvest was relaxed in the mid-1980s. It could be argued that it was not religious teachings alone that led to this outcome, but a combination of unconnected events. These circumstances may have played a role, but the driving force behind the total shift in behaviour was clearly led by religion.

Religion and reinterpretation of the law around halal and haram food under the Islamic faith has had major implications to the conservation of turtles at Cocos (Keeling) Islands with potential flow-on benefits to surrounding rookeries. The abundance of both green and hawksbill resident turtles on the southern lagoon has been evident since 1999 when dedicated studies were initiated (Whiting et al., 2014; this volume). The mixed stock genetics of resident turtles (from the southern atoll) mean that the conservation benefit is spread to both local (North Keeling) (Whiting et al., 2008) and distant (mainland, Scott Reef and Browse Island, Western Australia) rookeries. Regular research and associated educational activities since the late 1990s have shared marine knowledge and reinforced conservation messages across the Cocos (Keeling) community emphasizing all threats, including those external to the Cocos (Keeling) Islands.

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