



# Convention on the Conservation of Migratory Species of Wild Animals

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### Aquatic Bushmeat

*Document prepared by the Aquatic Mammals Working Group (AMWG)*

#### Summary:

This document has been prepared by the Aquatic Mammals Working Group of the Scientific Council. It seeks to provide introductory information on the impact of aquatic bushmeat on CMS-listed species in three regions: West and Central Africa, South/Southeast Asia and Latin America (as directed by CMS Resolution 10.15).

It recommends that the ScC propose a specific CMS Resolution for CMS COP12 on aquatic bushmeat, including points on the establishment of a CMS Family Aquatic Bushmeat Working Group, collaboration with CBD, CITES and IWC and the Collaborative Partnership on Sustainable Wildlife Management, and seeking to broaden the definition of and discussion on bushmeat to encompass aquatic bushmeat.

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## **Aquatic Bushmeat**

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1. Hunting for the meat of wild animals is a significant and immediate threat to the future of wildlife in many regions around the world (e.g. Brashares *et al.* 2004). Policy effort to date has focused mainly on terrestrial bushmeat, and while the concept of bushmeat applied to aquatic wildlife was introduced some years ago (Alfaro & Van Waerebeek, 2001; Van Waerebeek *et al.*, 2002) it has yet to receive the attention it requires given the perceived scale of the issue. In fact, there is emerging evidence of a conservation problem on a scale similar to that documented for terrestrial bushmeat now affecting aquatic wildlife species, including cetaceans, sirenians, turtles, crocodiles and even seabirds.
2. This briefing seeks to provide introductory information on the impact of aquatic bushmeat on CMS-listed species in three regions: West and Central Africa, South/Southeast Asia and Latin America (as directed by CMS Resolution 10.15). Aquatic bushmeat is a broader issue and consideration of other regions is warranted including, *inter alia* Central America, the Western Indian Ocean and the Pacific Islands Region.
3. The briefing recommends how the CMS Family should initially progress with this issue. These recommendations will develop as the species and scope work continues.

### **DEFINING AQUATIC BUSHMEAT**

4. Bushmeat hunting of marine or aquatic species has not been formally named. Van Waerebeek and others have used the name 'marine bushmeat' to draw attention to the need to investigate and manage marine mammal harvests. This paper uses the term 'aquatic bushmeat' instead and focuses on the aquatic species that are listed on the CMS Appendices, including at this preliminary stage: cetaceans, sirenians, sea turtles and crocodiles. The ScC members will continue to work on this briefing in the coming months, and will endeavour to include all the CMS-listed species that should be covered, including seabirds and other species not yet profiled in this briefing.
5. Within the scope of this paper, aquatic bushmeat is defined as the products derived from aquatic megafauna (e.g., mammals, sea turtles and crocodiles) that are used for food and non- food purposes, including traditional uses. Aquatic bushmeat is obtained through illegal or unregulated hunts as well as from stranded (dead or alive) and/or bycaught animals.
6. Increased demand for aquatic bushmeat is considered to be a developing, significant and immediate threat to aquatic wildlife in many regions around the world (Alfaro & Van Waerebeek, 2001; Robards & Reeves, 2011). In some areas there is evidence that the opportunistic use of bycaught animals has developed into directed catch. (Van Waerebeek & Reyes, 1994; Clapham & Van Waerebeek, 2007). This trend may reflect general declines in fish stocks, as several studies have demonstrated correlations between the availability and price of fish in markets and the demand for terrestrial bushmeat (Brashares *et.al.*, 2004; Nasi *et al.*, 2008) with increasing evidence of similar links to aquatic species (e.g. Van Waerebeek & Reyes, 1994).

7. For sea turtles bushmeat trade is both domestic and international. Domestic markets provide meat, eggs and other products within and to neighbouring countries. The Coral Triangle region of Southeast Asia is a hotspot for sea turtle poaching, often involving hundreds of dead animals in a single operation. Intensive poaching at sea appears to be mainly conducted by Chinese and Vietnamese operations focusing on waters of Indonesia, Malaysia and the Philippines (Lam *et al.*, 2011; Stiles, 2008; Pilcher *et al.*, 2009). Concerns over the scale of this illegal trade was recently submitted as an Information Paper at the 66<sup>th</sup> meeting of the CITES Standing Committee, January 2016 (CITES, 2016).

8. While the documentation surrounding sea turtles is relatively well developed, identifying the scale and impact of other aquatic bushmeat trade is difficult given that many of the processing occurs illicitly, offshore or away from centralized food markets. Additionally, research so far was mainly focused on documenting prevalence rather than estimating the extent to which species and populations are impacted. There is an urgent need to develop methods to assess the impact of this type of aquatic bushmeat to better understand the issue and set priorities. For many species, mortality is higher than previously thought and the concern is greater in West and Central Africa, Latin America and South/Southeast Asia.

## **AQUATIC BUSHMEAT: IMPACT ON CMS LISTED SPECIES**

9. Annex A includes, by region, the species listed in CMS Appendixes I and II that are likely to be subject to utilization as aquatic bushmeat.

### **West and Central Africa**

10. Many West and Central African countries have large coastal communities with limited protein supplies, which have grown in recent decades as people move from other regions to coastal areas seeking employment opportunities. There is evidence of the use of small cetaceans in most countries in the region, with meat and other body parts used both for human consumption and as shark bait. Ghana currently is responsible for most captures in West Africa, with 16 cetacean species affected and over a thousand animals landed each year (e.g., Debrah *et al.*, 2010; Ofori-Danson *et al.*, 2003; Van Waerebeek *et al.*, 2009, 2014). As an example, the most affected species in Ghana during the period 1998-2010 were (in decreasing order) Clymene dolphin (*Stenella clymene*), pantropical spotted dolphin (*Stenella attenuata*), melon-headed whale (*Peponocephala electra*) and common bottlenose dolphins (*Tursiops truncatus*). Other important species include short-finned pilot whale (*Globicephala macrorhynchus*), a long-beaked form of common dolphin (*Delphinus* sp.) and rough-toothed dolphin (*Steno bredanensis*). Another nine species are landed occasionally (each <5%) (Van Waerebeek & Ofori-Danson, 1999; Debrah *et al.*, 2010; Van Waerebeek *et al.*, 2014). Dolphins are landed as bycatch from drift gill-nets and occasionally other fisheries but directed captures also occur. In some cases the meat is used as shark bait and contributes to the economic viability of the shark fishery (Van Waerebeek & Ofori-Danson, 1999; Ofori-Danson *et al.*, 2003; Weir *et al.*, 2008; Van Waerebeek *et al.*, 2009, 2014; Debrah *et al.*, 2010). There are recent records from several countries in the region where cetaceans are commonly consumed, e.g. Togo (Segniagbeto *et al.*, 2014), Benin (Sohou *et al.*, 2013), Cameroon (Ayissi *et al.*, 2014), Nigeria (Uwagbae & Van Waerebeek, 2010). Moreover, smoked cetacean bushmeat is traded as far away as northern Togo, Burkina Faso, Niger and Mali (Segniagbeto *et al.*, 2014). The likelihood of cetaceans regularly being utilised as aquatic bushmeat throughout the region appears high (Van Waerebeek *et al.*, 2003; 2015; Clapham & Van Waerebeek, 2007; Robards & Reeves, 2011; Leeney *et al.*, 2015; Weir *et al.*, 2014; Collins, 2015).

11. At least 20 countries across West and Central Africa also record trade of the West African manatee (*Trichechus senegalensis*) for food and other uses with a high incidence noted in a few countries (Powell, 1996; Dodman *et al.*, 2007; Reeves *et al.*, 1988; Ayissi *et al.*, 2014; Bachand *et al.*, 2015). Direct capture of manatees is usually done by specialised hunters, whilst incidental catch in fishing nets occurs widely, both in coastal regions and far inland, noting the wide distribution of this species into the upper reaches of main rivers.

### **Latin America**

12. At least 12 countries in Latin America record the use of cetaceans for food and non-food purposes both from targeted hunts and opportunistic catch or strandings (Van Waerebeek & Reyes, 1994; Crespo, 2009; Dawson, 2009; Flores & Da Silva, 2009; Goodall, 2009). Species of concern include botos (*Inia geoffrensis*), dusky dolphins (*Lagenorhynchus obscurus*), long-beaked common dolphins (*Delphinus capensis*), Burmeister's porpoises (*Phocoena spinipinnis*) and common bottlenose dolphins (*Tursiops truncatus*). The use of dusky dolphins as bait in long-line and gillnet shark fisheries in the Pacific appears prolific and is increasing (Van Waerebeek & Würsig, 2009; Mangel *et al.*, 2010). Peale's dolphins (*Lagenorhynchus australis*) are hunted as aquatic bushmeat for use as crab bait, although changes in the dynamic of this fishery may have lessened this pressure (Lescrauwaet & Gibbons, 1994; Goodall, 2009).

13. At least eight countries note the directed take of sirenians, both the West Indian manatee (*Trichechus manatus*) and the Amazon manatee (*Trichechus inunguis*), for food and non-food purposes (Braga Ferreira *et.al.*, 2011; Luna *et.al.*, 2008).

### **South/Southeast Asia**

14. There is a long history of the use of aquatic mammals for food and non-food purposes in Asia (CMS 2015). More recently bycatch has evolved into directed and commercial hunting of cetaceans and sirenians (Leatherwood & Reeves, 1989; Leatherwood, 1994; Guissamulo & Cockcroft, 1997; Reeves *et.al.*, 2003; Tun, 2006; Clapham & Van Waerebeek, 2007). Although there is little information documented on the extent and impact of aquatic bushmeat utilisation in South and Southeast Asia, declines in dugong numbers have been linked to hunting (Marsh *et.al.*, 1997; Heinsohn *et.al.*, 2004; Marsh *et.al.*, 2004; Mustika, 2006). Some catch data from non-discriminant fisheries, such as "experimental nets" in southern Asia, indicate that single net sets may take thousands of cetaceans, including baleen whales, which are subsequently used for human consumption and the pet food industry (CMS, 2015). Some countries have well publicised hunts for small cetaceans and catch data is available although the impact on local populations is unknown. Given that the little available data indicates population decline and large scale take in fisheries, the impact on cetacean and sirenian populations should be considered high.

15. Bushmeat hunting for local illegal trade is a serious threat for saltwater crocodiles (*Crocodylus porosus*) and crocodiles in the Indo-Myanmar biodiversity-hotspot complex are particularly vulnerable (Meganathan *et.al.*, 2010; Meganathan *et.al.*, 2013; Velho *et.al.*, 2012).

16. Marine turtle poaching in the Coral Triangle (South-east Asia) is thought to be on the increase (Lam *et.al.*, 2011) for trade in China and Viet Nam. In addition, to the deliberate harvest of turtles, there is an estimated 4,000 turtles being caught annually along the coast of Viet Nam as incidental bycatch (Hamann *et.al.*, 2006). Approximately 1,115 green turtles (*Chelonia mydas*) are said to be poached annually in south-east Sulawesi (IOSEA, 2008) which was thought to have been the main location for hawksbill turtle (*Eretmochelys*

*imbricate*) exploitation in 2001 (Profauna Indonesia, 2003). Although it has been warned that some local populations could become extinct due to unsustainable harvest (Dethmers & Baxter, 2011), the level of poaching occurring in Sumatran waters for local consumption has not decreased (IOSEA, 2011; 2010). Warrior Reef in the Gulf of Papua New Guinea is an aggregation point for green turtles to forage and there are report of local boats coming in at night to poach turtles (IOSEA, 2011b). Local fisherman in the Philippines are known to retain bycaught turtles (Lam *et al.*, 2011) but also target them while migrating (ASEAN-WEN, 2008).

17. Sea turtle egg collection appears to be pronounced in Indonesia (west Kalimantan) and Malaysia (Borneo) (WWF, 2005a), and large-scale egg collection likely also occurs elsewhere in Indonesia (IOSEA, 2013). In Malaysia, there is evidence of high egg take in Sabah (IOSEA, 2013; 2013b; ASEAN-WEN, 2008), Terengganu (Chan, 2006), and Rantau Abang (Troeng & Drews, 2004). In fact, the collection of leatherback (*Dermochelys coriacea*) eggs at Rantu Abang is estimated to have resulted in a decrease in nests from 10,000 per year to just 3 in 2002 (Troeng & Drews, 2004).

18. In the Philippines, up to 70 per cent of eggs laid in the Tawi-Tawi Islands were subject to harvest in the past (Chan & Shepherd, 2002), and the harvests continue to recent times (IOSEA, 2010). In Papua New Guinea, leatherback egg collection was still widely practised along the Huon coast until recently (Kinch, 2006). Anecdotal reports indicate that illegal egg collection still occurs along the coast of Myanmar (Win & Lwin, 2012) despite a decrease in nesting.

19. Chinese turtle poachers (mainly from Hainan province) are reported to have turned to Malaysian waters for their supply of entire animals (Lam *et.al.*, 2011). Green and hawksbill turtles caught by fishers in Philippine waters also appear to be traded directly with Chinese buyers in South China and Sulu Sea, in order to evade enforcement controls (Lam *et.al.*, 2011). Following the contraction of a large-scale wholesale export market in Viet Nam – as a result of a domestic ban enacted in 2002 – much of the Vietnamese turtle catch was subsequently reported to be traded directly at sea in exchange for commodities brought on vessels from Hainan (Chan *et.al.*, 2009). Numerous seizures in Viet Nam, including hawksbill turtles, suggest that Indonesia and Malaysia could still be a source of raw scutes to use in bekko (tortoise shell) manufacture (IOSEA Mtg SS.7/Doc. 10.1).

20. Historically, Bali has been one of the world's largest markets for green turtles, mostly supplied by people from other parts of Indonesia (notably South-East Sulawesi and Java), and intended to mainly provide to national markets, but also to satisfy international demand (Troeng & Drews, 2004). Though annual volumes of turtles trade, formerly estimated in the tens of thousands (Animal Conservation for Life, 2001) appear to have greatly declined in recent years, domestic trade to supply restaurants in Bali continued to thrive in 2012 (Jakarta Globe, 2012). As of 2013, the trade of live green turtles has been reported as a change from processed meat, which had been disguised to try to avoid detection by law enforcement authorities (Jakarta Post, 2013).

21. Information available on trade in turtle eggs in South-east Asia suggests that it may be limited to the Coral Triangle countries, especially Indonesia (East and West Kalimantan) and Malaysia (Sabah, Sarawak and Terengganu), between which exchanges appear intense. In recent years large numbers of eggs have been reported for sale in cities of Kalimantan, supplied by various Indonesian islands and elsewhere (ProFauna Indonesia, 2010). Individual confiscation of eggs numbering the thousands have also been reported recently (IOSEA Mtg SS.7/Doc. 10.1).

22. In Malaysian Borneo eggs were reportedly sold openly without controls in Sabah and Sarawak, even though both states prohibit egg collection. Additionally, a number of confiscations in recent years provide an insight on smuggling patterns. In Peninsular Malaysia, Terengganu is reported to have historically been a major centre for egg trade, supplied in part by eggs imported from neighbouring countries and from other Malaysian states where egg collection is illegal – attracting buyers from as far away as Indonesia (The Star, 2015; TRAFFIC Southeast Asia, 2009).

23. Additional turtle bushmeat information for the western Indian Ocean region is provided in Annex B.

### **CMS Family agreements**

The CMS Family agreements that this briefing is directly relevant for include:

- a. Aquatic Mammals of West Africa
- b. Dugongs and their Habitats
- c. Indian Ocean and South-East Asia Marine Turtles and their Habitats
- d. Marine Turtles of the Atlantic Coast of Africa
- e. Pacific Cetaceans and their Habitats

## **COLLABORATIVE PARTNERSHIP ON SUSTAINABLE WILDLIFE MANAGEMENT**

24. At the tenth meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD COP10, 2010) Parties took note of the recommendations of the Bushmeat Liaison Group, including the definition of bushmeat (or wild meat) hunting as the harvesting of wild animals in tropical and sub-tropical forests for food and for non-food purposes, including medicinal use. CBD COP12 (2014) endorsed a draft Action Plan for Article 10c, which focuses on enhancing the role of customary laws, traditional knowledge and community protocols for sustainable use and management of wildlife. COP12 also agreed to progress an analysis of the impacts of subsistence use of wildlife on the survival and regeneration of wild species.

25. In March 2015 the Collaborative Partnership on Sustainable Wildlife Management (CPW) Bushmeat Sourcebook was launched and included information about the contribution of bushmeat to food security and local livelihoods and how unsustainable harvesting can affect the ecological stability of ecosystems.

26. Aquatic bushmeat has not been considered in these CPW discussions, however, the increasing demand for aquatic bushmeat is both a conservation threat, (Clapham & Van Waerebeek, 2007) and also may indicate a reduction in fish stocks, which has a direct consequence to human health. There is also the risk of contaminants and pathogen transference from aquatic bushmeat with subsequent implications for human health (Tryland *et al.*, 2014).

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**RECOMMENDATIONS FOR CMS FAMILY CONSIDERATION**

27. Noting the recommendations of the first meeting of the Bushmeat Liaison Group and the focus of the forthcoming agenda of the second meeting focus on terrestrial bushmeat, the AMWG urges the Scientific Council to:

Propose a specific CMS Resolution for CMS COP12 on aquatic bushmeat and to seek the following:

- a. A CMS Family Aquatic Bushmeat Working Group is established, including science and policy participation, to coordinate an approach to the aquatic bushmeat issue;
- b. The CMS Secretariat is mandated to represent the aquatic bushmeat issue in forthcoming meetings of the Convention on Biological Diversity (CBD), the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES), and International Whaling Commission (IWC) and, in consultation with members of the Collaborative Partnership on Sustainable Wildlife Management, to seek agreement to broaden the definition of bushmeat to formally encompass aquatic bushmeat; and
- c. The CMS Secretariat is mandated to present to the Collaborative Partnership on Sustainable Wildlife Management to request detailed discussion about the rational assessment and management of aquatic bushmeat in order to prioritize work on this issue and ensure that work will complement and add to that already occurring under other organizations and bodies.

***Action Requested:***

- i. Take note of the report
- ii. Respond to the recommendations made by the Aquatic Mammals Working Group

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**ANNEX A: CMS SPECIES OF CONCERN BY CMS APPENDICES AND REGION**

	<b>West Africa</b>	<b>Latin America</b>	<b>South and South East Asia</b>
<b>CMS Appendix I</b>	<p>Atlantic humpback dolphins (<i>Sousa teuszii</i>)</p> <p>Green turtle (<i>Chelonia mydas</i>)</p> <p>Hawksbill turtle (<i>Eretmochelys imbricata</i>)</p> <p>Kemp's Ridley turtle (<i>Lepidochelys kempii</i>)</p> <p>Leatherback turtle (<i>Dermochelys coriacea</i>)</p> <p>Loggerhead turtle (<i>Caretta caretta</i>)</p> <p>Olive Ridley turtle (<i>Lepidochelys olivacea</i>)</p> <p>West African manatee (<i>Trichechus senegalensis</i>)</p>	<p>Franciscanas (<i>Pontoporia blainvillei</i>)</p> <p>Green turtle (<i>Chelonia mydas</i>)</p> <p>Hawksbill turtle (<i>Eretmochelys imbricata</i>)</p> <p>Leatherback turtle (<i>Dermochelys coriacea</i>)</p> <p>Loggerhead turtle (<i>Caretta caretta</i>)</p> <p>Olive Ridley turtle (<i>Lepidochelys olivacea</i>)</p> <p>South American River Turtle (<i>Podocnemis expansa</i>)</p> <p>West Indian manatee (<i>Trichechus manatus</i>)</p>	<p>Ganges River dolphins (<i>Platanista gangetica gangetica</i>)</p> <p>Gharial (<i>Gavialis gangeticus</i>)</p> <p>Green turtle (<i>Chelonia mydas</i>)</p> <p>Hawksbill turtle (<i>Eretmochelys imbricata</i>)</p> <p>Leatherback turtle (<i>Dermochelys coriacea</i>)</p> <p>Loggerhead turtle (<i>Caretta caretta</i>)</p> <p>Olive Ridley turtle (<i>Lepidochelys olivacea</i>)</p>
<b>CMS Appendix II</b>	<p>Atlantic humpback dolphins (<i>Sousa teuszii</i>)</p> <p>Green turtle (<i>Chelonia mydas</i>)</p> <p>Hawksbill turtle (<i>Eretmochelys imbricata</i>)</p> <p>Kemp's Ridley turtle (<i>Lepidochelys kempii</i>)</p> <p>Leatherback turtle (<i>Dermochelys coriacea</i>)</p> <p>Loggerhead turtle (<i>Caretta caretta</i>)</p> <p>Olive Ridley turtle (<i>Lepidochelys olivacea</i>)</p> <p>West African manatee (<i>Trichechus senegalensis</i>)</p>	<p>Amazon manatee (<i>Trichechus inunguis</i>)</p> <p>Boto (<i>Inia geoffrensis</i>)</p> <p>Burmeisters porpoise (<i>Phocoena spinipinnis</i>)</p> <p>Commerson's dolphins (<i>Cephalorhynchus commersonii</i>)</p> <p>Dusky dolphins (<i>Lagenorhynchus obscurus</i>)</p> <p>Franciscanas (<i>Pontoporia blainvillei</i>)</p> <p>Green turtle (<i>Chelonia mydas</i>)</p> <p>Guiana dolphins (<i>Sotalia guianensis</i>)</p> <p>Hawksbill turtle (<i>Eretmochelys imbricata</i>)</p> <p>Leatherback turtle (<i>Dermochelys coriacea</i>)</p> <p>Loggerhead turtle (<i>Caretta caretta</i>)</p> <p>Olive Ridley turtle</p>	<p>Dugong (<i>Dugong dugon</i>)</p> <p>Flatback turtle (<i>Natator depressus</i>)</p> <p>Ganges River dolphins (<i>Platanista gangetica gangetica</i>)</p> <p>Green turtle (<i>Chelonia mydas</i>)</p> <p>Hawksbill Turtle (<i>Eretmochelys imbricata</i>)</p> <p>Indo-Pacific bottlenose dolphins (<i>Tursiops aduncus</i>)</p> <p>Indo-Pacific humpback dolphins (<i>Sousa chinensis</i>)</p> <p>Leatherback turtle (<i>Dermochelys coriacea</i>)</p> <p>Loggerhead turtle (<i>Caretta caretta</i>)</p> <p>Olive Ridley turtle</p>

		<p><i>(Lepidochelys olivacea)</i>                  Peale's dolphins  <i>(Lagenorhynchus australis)</i>                  South American river turtle (<i>Podocnemis expansa</i>)                  Spectacle porpoise (<i>Phocoena dioptrica</i>)                  Tucuxis (<i>Sotalia fluviatilis</i>)                  West Indian manatee (<i>Trichechus manatus</i>)</p>	<p><i>(Lepidochelys olivacea)</i>                  Salt-water crocodile (<i>Crocodylus porosus</i>)                  Spinner dolphins (<i>Stenella longirostris</i>)</p>
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**ANNEX B: TURTLE BUSHMEAT IN THE WESTERN INDIAN OCEAN**

Marine turtle poaching in the Western Indian Ocean, especially in Kenya (Nzuki, 2005), Madagascar and Mozambique (Louro *et al.*, 2012)) seems to mostly be undertaken by local fishers. In South-west Madagascar in particular, the direct take of marine turtles is well documented notwithstanding national decrees prohibiting exploitation. Poaching at sea appear to be on the increase in other areas of the country (Muttenger, 2007; Gough *et al.*, 2009). (Rakotondrazafy & Andrianasolo, 2012; Poonian & Whitty) both through incidental and intentional catches, locally and internationally (IOSEA 7th Meeting Doc. 10.1).

There is limited information on turtle takes in the northern Indian Ocean. It is believed that olive ridley turtles have been targeted by fishermen for their meat in the Sundarbans, Cox's Bazar, and around St Martins and Sonadia Islands (IOSEA, 2011), although egg collection is reportedly decreasing (Hasan 2009). Most of the information around India is anecdotal, and based on arrests (e.g. of fishermen operating in Sri Lanka and Tamil Nadu) (IOSEA, 2010c). Egg take is extremely high in some places, for example nearly all olive ridley nests along a section of coastline in Tamil Nadu were poached in the Jan-Mar nesting season in 2011 (IOSEA, 2011c). Also in Sri Lanka, it is believed that locals have collected all turtle eggs laid in the past 40 years on Rekawa beach (Ekanayake *et al.*, 2002) with indications that it is still occurring (Rajakruna 2009).

Turtle poaching occurs in varying intensities in the Maldives (IOSEA, 2012c; 2013c). It is believed that a turtle fishery exists in Pakistan territorial waters and has been supplying neighbouring countries with turtle meat since 2011 (IOSEA, 2011d). Surveys indicate that up to 62% of people in villages along the southern and western coasts may consume turtle meat and eggs (Rajakruna *et al.*, 2009). On the west coast, the butchery and open sale of live turtles has been observed (Kapurusinghe 2006).

There have been reports of high rates of turtle poaching for meat on offshore islands of Eritrea and Iran. Egg poaching has been documented in Eritrea and Saudi Arabia. Small-scale poaching of green turtles by trawling and gill nets is thought to have affected turtle populations, but this is to be quantified. An illegal market for turtle meat in the town of Assab remains with products being sold nationally and to Yemen. (IOSEA NR 2014)

In Comoros, green and hawksbill turtles caught by local fishermen are largely consumed or sold, are rarely released (Poonian & Whitty unpublished). Turtle poaching is reportedly widespread in the Moheli Marine Park as of 2009 (Moheli Marine Park 2009). In Kenya, it has been estimated that between 10% and 50% of turtles nesting on beaches and their nests (i.e. eggs) are poached to supply underground markets (Nzuki 2004). Illegal trade was identified as occurring in back street houses and fish markets (Zanre 2005). About 10% of turtle products in Tana Delta and Malindi were provided by foreign fishermen – mostly from Somalia and Tanzania (Nzuki 2005). In Tanzania, egg collection persists although ecotourism schemes may be having some effect (Sea Sense 2012), for example egg harvest fell from 100% (2001) to 1% (2004) and 4% (2005) (Ferraro 2007).

In south-west Madagascar, a study estimated between 10,000 and 16,000 turtles were being caught per year by Vezo fisherman (IOSEA 2010d; 2010e). In addition, another study found that the incidental fisheries bycatch of turtles in the same area was about 3,656 per year (Frontier-Madagascar 2003). In 2003, sale of turtle meat was thought to be common, involving an integrated chain of fisherman, dealers and traders (Walker *et al.*, 2004), although

by 2011 turtle products had proportionally declined in the curio markets (Gibbons and Remaneva 2011). Poaching has been confirmed in northern Madagascar, with over 40% of the green and hawksbill turtles caught being consumed or sold (Poonian and Whitty unpublished). In January 2012, an important traffic of plastron (bottom of the turtle shell) was identified leading to the arrest of five people (Hamitra 2012). It was estimated that up to 40kg/week was being shipped to Toliara. A new smuggling network was also uncovered in north-west Madagascar in 2012, supplying traders in Mahajanga, but the final destination has not been identified (IOSEA NR 2014).

While unquantified, there is concern over the extent of poaching occurring in Mozambique based on observations of discarded turtle carapaces found along the beach (Louro *et al.*, 2012; Williams 2012). Turtle meat used to be freely shared among villagers (Pascal 2008), but it was reported in 2013 that the fishery had become commercial (Stein-Rostaing, 2013). In Tanzania, a survey found that turtle products were being sold openly and in secret at main landing sites in the Dar es Salaam (West 2008). There are also concerns about cross-border poaching in South Africa re-emerging as a problem (IOSEA 2014).