CONVENCIÓN SOBRE EL COMERCIO INTERNACIONAL DE ESPECIES AMENAZADAS DE FAUNA Y FLORA SILVESTRES

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Septuagésima reunión del Comité Permanente
Rosa Khutor, Sochi (Federación de Rusia), 1-5 de octubre de 2018

Cuestiones específicas sobre las especies

TORTUGA CAREY (*ERETMOCHELYS IMBRICATA*) Y OTRAS TORTUGAS MARINAS (CHELONIIDAE Y DERMOCHELYIDAE): INFORME DE LA SECRETARÍA

1. El presente documento ha sido preparado por la Secretaría.

2. En su 17ª reunión (CoP17, Johannesburgo, 2016), la Conferencia de las Partes adoptó las Decisiones 17.222 y 17.223 sobre *Tortuga carey* (Eretmochelys imbricata) *y otras tortugas marinas (Cheloniidae y Dermochelyidae),* como sigue:

Dirigida a la Secretaría

17.222 La Secretaría deberá colaborar con la Secretaría de la Convención Interamericana para la Protección y la Conservación de las Tortugas Marinas (CIT), la Secretaría de la Convención sobre la Conservación de las Especies Migratorias de Animales Silvestres (CMS), en particular su Memorando de Entendimiento sobre la Conservación y la Gestión de las Tortugas Marinas y su Hábitat en el Océano Índico y Asia Sudoriental y otras organizaciones y acuerdos multilaterales pertinentes cuyos mandatos se relacionen con la conservación, gestión y uso sostenible de las tortugas marinas a nivel regional y mundial a los efectos de:

a) sujeto a la disponibilidad de financiación externa, llevar a cabo un estudio sobre el comercio internacional legal e ilegal de tortugas marinas, entre otras cosas, para investigar su estado, alcance y tendencias, los efectos sobre la conservación y las opciones de gestión, así como para identificar las áreas en las que pueden requerirse esfuerzos de mitigación inmediatos;

b) alentar la comunicación y coordinación entre la CITES, la CMS, la Convención de Ramsar, la CIT y el Protocolo relativo a las Áreas y Flora y Fauna Silvestres Especialmente Protegidas (Protocolo SPAW) y otros acuerdos, según proceda, para abordar las recomendaciones pertinentes formuladas en el estudio "Estado de Conservación de la Tortuga Carey en las Regiones del Gran Caribe, Atlántico occidental y Pacífico oriental", publicado en 2014, y para garantizar que las actividades sean compatibles, optimizar recursos y aumentar las sinergias; e

c) informar acerca de la aplicación de la presente decisión al Comité Permanente, según proceda, y a la Conferencia de las Partes en su 18ª reunión.

Dirigida al Comité Permanente

17.223 El Comité Permanente deberá examinar la información y las recomendaciones sometidas por la Secretaría en cumplimiento de la Decisión 17.222 y formular sus propias recomendaciones según proceda.

Aplicación de la Decisión 17.222, párrafo a): Estudio sobre el comercio de tortugas marinas

3. La Secretaría informó al Comité Permanente en su 69ª reunión (SC69; Ginebra, noviembre de 2017) de que se había obtenido apoyo financiero de los Estados Unidos de América y de Australia para el estudio solicitado en la Decisión 17.222, párrafo a) [a través de la Secretaría de la Convención sobre la Conservación de las Especies Migratorias de Animales Silvestres (CMS)][1]. Desde entonces, la Unión Europea ha aportado otra fuente de financiación [a través de la Secretaría del Grupo de Estados de África, el Caribe y el Pacífico (ACP)] para aplicar esta decisión. En consecuencia, la Secretaría quisiera expresar su agradecimiento a estos donantes.

4. De conformidad con la decisión 17.222, el estudio se ha llevado a cabo en estrecha colaboración con la Convención Interamericana para la Protección y la Conservación de las Tortugas Marinas (CIT) y la CMS y su Memorando de Entendimiento sobre la Conservación y la Gestión de las Tortugas Marinas y su Hábitat en el Océano Índico y Asia Sudoriental. El estudio se centra en evaluaciones *in situ* en países de tres regiones (la región interamericana, la región de África oriental y la de Asia sudoriental/Triángulo de coral), que han sido señaladas por la Secretaría como zonas posiblemente importantes para el comercio de tortugas marinas a partir de un examen de las publicaciones recientes y consultas con expertos [incluidos el Grupo de Especialistas en Tortugas Marinas de la Comisión de Supervivencia de las Especies de la Unión Internacional para la Conservación de la Naturaleza (CSE/UICN)]. La Secretaría ha contratado al Fondo Mundial para la Naturaleza (WWF), la Marine Research Foundation y TRAFFIC para realizar estas evaluaciones nacionales. Además, ha llevado a cabo investigaciones internas complementarias sobre el comercio de tortugas marinas en otras regiones.

5. Dado que el inicio de las evaluaciones *in situ* se atrasó considerablemente por dificultades administrativas imprevistas, la Secretaría no ha podido finalizar el estudio a tiempo para presentarlo a la presente reunión. No obstante, los resultados preliminares de las evaluaciones e investigaciones *in situ* se incluyen en el Anexo 2 (en el idioma en el que fueron preparados). El estudio se completará y finalizará a tiempo para su examen en la 18ª reunión de la Conferencia de las Partes, con arreglo a la Decisión 17.222, párrafo c). Las recomendaciones provisionales del estudio también se incluyen en el Anexo 1 del presente documento para que las pueda estudiar el Comité Permanente. Algunas de estas recomendaciones van más allá del alcance de la Convención y tienen la finalidad de fundamentar la labor de las organizaciones asociadas mencionadas en la Decisión 17.222. Se han subrayado las recomendaciones más pertinentes para la CITES.

Aplicación de la Decisión 17.223: Presentación de informes por el Comité Permanente

6. En la 69ª reunión del Comité Permanente (SC69), este estableció un grupo de trabajo entre sesiones sobre tortugas marinas con el siguiente mandato:

   a) examinar la información y las recomendaciones contenidas en el estudio emprendido por la Secretaría con arreglo a la Decisión 17.222 a); y

   b) formular sus propias recomendaciones a la consideración de la 70ª reunión del Comité Permanente, para que informe a la Conferencia de las Partes, en su 18ª reunión, según proceda.

7. Se acordó que la composición del grupo de trabajo entre sesiones sería la siguiente: Estados Unidos (Presidencia), Australia, China, Indonesia, Japón, Organización de las Naciones Unidas para la Alimentación y la Agricultura, Humane Society International, Unión Internacional para la Conservación de la Naturaleza, TRAFFIC y el Fondo Mundial para la Naturaleza.

8. Por las razones explicadas en el párrafo 5 anterior, la Secretaría solo ha podido compartir los resultados preliminares del estudio (presentados en el Anexo 2) con el grupo de trabajo entre sesiones poco antes del plazo límite para la recepción de documentos para la presente reunión. Por este motivo, el grupo de trabajo no ha podido presentar un documento con sus propias recomendaciones para que lo examine el Comité Permanente.

Aplicación de la Decisión 17.222, párrafo b): Comunicación y coordinación para abordar las recomendaciones pertinentes del estudio de la CIT

9. El estudio mencionado anteriormente contribuirá directamente a la aplicación de las recomendaciones contenidas en el estudio de la CIT "Estado de Conservación de la Tortuga Carey en las Regiones del Gran

[1] *Véase el documento SC69 Doc. 53.*

Caribe, Atlántico occidental y Pacífico oriental", al que se hace referencia en la Decisión 17.222, párrafo b)[2]. En junio de 2018, la Secretaría se puso en contacto con la CMS, la CIT, la Convención de Ramsar sobre los Humedales (Convención de Ramsar) y el Protocolo relativo a las Áreas y Flora y Fauna Silvestres Especialmente Protegidas (Protocolo SPAW) para entender qué otros avances se han hecho para responder a las recomendaciones del estudio de la CIT. Los apartados siguientes resumen los avances pertinentes señalados por estas organizaciones.

CMS:

- En la 11ª reunión de la Conferencia de las Partes de la CMS (Quito, 2014) se adoptó un *Plan de Acción de especies individuales para la Tortuga Boba (Caretta caretta) en el Océano Pacífico Sur*. Actualmente hay proyectos en curso en el Ecuador, el Perú y Chile para mitigar la captura accidental de esta y otras especies de tortugas en pesquerías artesanales de la costa del Pacífico.

- En la 12ª reunión de la Conferencia de las Partes de la CMS (Manila, 2017) se adoptó la Decisión 12.17 de la CMS sobre las tortugas marinas, en la que se pide un examen de la información científica relevante relativa a la conservación y las amenazas que pesan sobre las tortugas marinas y también el desarrollo de un borrador de plan de acción para especies individuales para la conservación de la tortuga carey que aborde el comercio, uso y otras amenazas para su conservación en Asia sudoriental y el Pacífico occidental, teniendo en cuenta los resultados de la Decisión 17.222 de la CITES.

CIT:

- La Convención ha colaborado con la Secretaría CITES en la realización del estudio solicitado en la Decisión 17.222 de la CITES.

- En su 8ª Conferencia de las Partes (Buenos Aires, 2017), se realizaron enmiendas en la Resolución CIT-COP8-2017-R2 sobre *Conservación de la Tortuga Carey* (Eretmochelys imbricata) para abordar mejor el comercio de esta especie, así como la colaboración de la Convención con la CITES en este sentido.

- Se han realizado campañas de sensibilización con el apoyo del Comité Científico de la CIT para aumentar el cumplimiento de la normativa de protección existente. Se ha prestado atención especial a la formación de organismos locales de observancia en materia de identificación de productos de tortuga carey.

- El Comité Científico de la CIT también ha elaborado orientaciones para las Partes sobre la obtención de parámetros ambientales para hacer un seguimiento de los efectos del cambio climático sobre las tortugas marinas, y varias Partes de la CIT están aplicando estas orientaciones en sus protocolos de vigilancia de las playas.

Convención de Ramsar:

- Se presentará a la 13ª reunión de la Conferencia de las Partes en la Convención de Ramsar (Dubái, octubre de 2018) la versión definitiva de un proyecto de resolución sobre el *Fortalecimiento de la protección y gestión de las zonas de reproducción, alimentación y crecimiento de las tortugas marinas y sobre la designación como sitios Ramsar de los lugares importantes*.

Protocolo SPAW:

- El Programa Regional sobre Áreas y Flora y Fauna Especialmente Protegidas en la Región del Gran Caribe había identificado la colaboración con WIDECAST (Red para la Conservación de las Tortugas Marinas en el Gran Caribe) sobre la conservación de las tortugas marinas como una actividad para su plan de trabajo para el bienio 2017-2018. WIDECAST está realizando una cartografía de todas las playas de anidación conocidas de la tortuga carey en la región del Gran Caribe (una actualización de Dow *et al*., 2007) y recopilando la información más actualizada sobre la legislación que protege a la especie y a sus hábitats críticos en cada país. Cuando el trabajo esté finalizado tiene previsto divulgar públicamente los resultados.

[2] *Véase el Anexo 1 del documento CoP17 Doc. 59.*

Recomendaciones

10. Se invita al Comité Permanente a:

    a) examinar el estudio preliminar contenido en el Anexo 2 y sus recomendaciones provisionales incluidas en el Anexo 1 del presente documento;

    b) basándose en ese examen y teniendo en cuenta las posibles sugerencias del grupo entre sesiones sobre tortugas marinas presentadas verbalmente en la presente reunión, formular observaciones y comentarios a la Secretaría, según proceda, para que las examine al finalizar el estudio y sus recomendaciones a fin de presentarlos a la 18ª reunión de la Conferencia de las Partes (CoP18); y

    c) pedir a la Secretaría que presente decisiones nuevas o revisadas, según proceda, sobre las tortugas marinas (Cheloniidae y Dermochelyidae) para su examen en la CoP18, basándose en las recomendaciones revisadas que surjan del estudio finalizado.

Recomendaciones provisionales resultantes del estudio sobre el "Estado, alcance y tendencias del comercio internacional legal e ilegal de tortugas marinas, sus efectos sobre la conservación, las opciones de gestión y prioridades en materia de mitigación"

(Nota: Se han subrayado las recomendaciones más pertinentes para la CITES)

1. Mejorar el cumplimiento de la normativa existente

a) Aplicar estrategias regionales en cooperación con interesados locales, gobiernos, ONG y otros para reducir el uso o la demanda de productos de tortugas marinas. En los casos en los que ya existan estrategias nacionales, fomentar y apoyar su ejecución (p. ej., mediante actividades de capacitación o recursos humanos y/o financieros);

b) Mejorar el seguimiento, la detección y la observancia en los mercados, las zonas marítimas donde haya embarcaciones de pesca, los puertos y los aeropuertos. Es necesario identificar los principales métodos, rutas comerciales, volúmenes y puntos críticos en materia de comercio;

c) Realizar un examen exhaustivo de la legislación que protege a las tortugas marinas y de sus incoherencias dentro de los propios países y de las regiones, teniendo en cuenta no solo los compromisos y normas nacionales sino también los internacionales;

d) Dar formación y capacitar a las autoridades pertinentes en el plano nacional, particularmente en materia de aplicación y observancia de las normas nacionales e internacionales sobre tortugas marinas, y de identificación y seguimiento. Los mecanismos y ONG internacionales podrían desempeñar un importante papel en este sentido;

e) Plantearse la ampliación y/o creación de programas de seguimiento comunitario para apoyar la aplicación de los marcos jurídicos nacionales cuando los recursos nacionales sean factores limitantes;

f) Realizar actividades de educación y sensibilización a distintos niveles (comunidades, comerciantes, consumidores, turistas, líderes, el sector pesquero, los gobiernos, etc.) sobre la conservación de las tortugas marinas y las normas nacionales e internacionales al respecto;

2. Hacer frente a las amenazas

a) Promover una mayor relación de la investigación y conservación de las tortugas marinas con las ciencias sociales. Se necesita investigación sobre los aspectos socioeconómicos asociados a la extracción y el consumo de las tortugas marinas, por ejemplo evaluaciones de la sostenibilidad de opciones de medios de vida alternativos (p. ej., actividades de ecoturismo) para las comunidades que dependen de las tortugas marinas. La conservación comunitaria debe desempeñar un papel importante y se debería plantear la aplicación de proyectos para pescadores artesanales a fin de mejorar sus artes de pesca, reduciendo la necesidad de capturar tortugas marinas;

b) Fomentar las investigaciones que establezcan un valor de referencia sobre el estado y la distribución de las tortugas marinas en los distintos países o regiones y alentar a los investigadores a publicar sus resultados. Para facilitar la evaluación de los cambios poblacionales a lo largo del tiempo, examinar y ampliar los esfuerzos de seguimiento, en los casos necesarios, a fin de obtener datos compatibles en las playas índice y en otros lugares, utilizando estándares de datos mínimos (SWOT Scientific Advisory Board, 2011) en toda la región. El seguimiento debería incluir esfuerzos para estimar los intervalos de remigración y las frecuencias de puesta de las poblaciones anidadoras, así como los cambios, el estado y la abundancia de las agregaciones de alimentación;

c) Es necesaria una evaluación exhaustiva y cuantitativa (en la medida de lo posible) de las amenazas para las tortugas marinas en las distintas regiones donde se encuentran para entender la escala del consumo nacional o el comercio de tortugas marinas (para ello, es importante entender los factores impulsores a fin de preparar intervenciones de gestión homogéneas). A escala nacional, es importante determinar si existen vínculos entre el comercio nacional e internacional o transfronterizo;

d) Investigar las dimensiones del comercio de tortugas marinas en línea para entender mejor el nivel de gravedad de la amenaza que representa;

e) Mejorar la legislación que protege a las tortugas marinas en los países o territorios en los que la captura es legal y no incumple acuerdos como SPAW y la CMS. Es necesario realizar esfuerzos para garantizar que toda explotación legal sea controlada utilizando los principios de sostenibilidad, tales como planes de gestión con base científica y el seguimiento de los niveles de capturas y las poblaciones de tortugas, y que los ejemplares no lleguen a entrar en el comercio internacional;

f) Mejorar la rendición de cuentas de los Estados sobre las prácticas que realizan las embarcaciones que enarbolan su pabellón y mejorar el seguimiento y control de especies incluidas en la CITES en los lugares de desembarque, en particular para las embarcaciones extranjeras y las que pescan en zonas más allá de la jurisdicción nacional. Los Estados deben aplicar mayor rigor a su observancia de las normas sobre la pesca (p. ej., la utilización de dispositivos excluidores de tortugas o DET y la comunicación de los cuadernos de pesca). A escala regional, aún se necesitan datos empíricos sobre capturas accidentales de tortugas marinas (pero también de otras especies) para fundamentar las acciones concertadas.

g) Identificar los hábitats críticos para la conservación de las tortugas marinas y aplicar y hacer cumplir una protección adecuada en esos sitios. Cuando proceda, plantearse la designación de áreas protegidas teniendo también en cuenta las características de la biología de las especies, tales como los desplazamientos migratorios;

3. Orientación para la formulación de políticas, los administradores y otros actores pertinentes

a) Promover un mayor grado de cooperación regional, esfuerzos y comunicaciones en pro de la conservación de las especies de tortugas marinas, particularmente entre la CITES, la CIT, la CMS, el IOSEA, el Protocolo SPAW (y WIDECAST), Ramsar y cualquier otro órgano relevante para compartir información, identificar medidas de conservación y optimizar sinergias y recursos;

b) Mejorar la colaboración intra e interregional y el intercambio de información confidencial útil sobre la captura y el comercio ilegales de tortugas marinas. Esto se podría hacer mediante la creación de una base de datos central que facilite el acceso y el intercambio de información y la identificación de lagunas en el conocimiento para los profesionales de la conservación, científicos, administradores, OROP, Estados del área de distribución y cualquier otro actor pertinente. Esta base de datos podría incluir, entre otras cosas, información nacional y regional sobre el comercio ilegal y se podría recopilar mediante los requisitos de presentación de informes de la CITES;

c) Coordinar los esfuerzos a escala regional, implicando a las Partes y los organismos que tengan mandatos pertinentes, para abordar las interacciones entre las pesquerías y las tortugas marinas (particularmente la captura accidental).

Status, scope and trends of the legal and illegal international trade in marine turtles, its conservation impacts, management options and mitigation priorities

Implementation of CITES Decisions 17.222 and 17.223 on *Hawksbill turtle (*Eretmochelys imbricata*) and other marine turtles (Cheloniidae and Dermochelyidae)*

Preliminary report by the CITES Secretariat

Key partners:

Implementing agencies:

Donors:

Australian Government

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Executive summary

This report stems from the implementation of CITES Decision 17.222, under which the CITES Secretariat was requested to, in collaboration with IAC and CMS/IOSEA Marine Turtle MoU, undertake a study on the legal and illegal international trade in marine turtles, *inter alia* to research its status, scope and trends, conservation impacts, management options and mitigation priorities. This report aims to contribute to the enhancement of conservation, management and sustainable use of marine turtles through improved knowledge on their legal and illegal international trade, as well as through stronger coordination among relevant intergovernmental instruments dealing with marine turtles.

This report presents the findings of assessment efforts regarding the Mediterranean, West African, East African, Southeast Asian/Coral Triangle, and Inter-American regions. The assessment of the former two regions was based on a literature review and that of the latter three on *in-situ* assessments by implementing agencies contracted by the CITES Secretariat (i.e. the Marine Research Foundation, TRAFFIC and WWF).

While the findings presented in this report are still preliminary [final results will be available in time for consideration at the 18th meeting of the CITES Conference of the Parties (Colombo, May-June 2019)], it is clear that illegal take and domestic trade in marine turtles are still widespread across the regions assessed. Evidence of the prevalence of international trade, on the other hand, has been harder to identify.

In the Inter-American, East African, West African and Mediterranean regions, harvest seems to be mainly sourcing for a local market demand generally fuelled by tradition or by dependency either on the food or income that marine turtles provide. So far, it has not been possible to identify, neither in the field nor in literature, solid evidence of linkages between these domestic markets and large scale, international trafficking networks involving these regions. When anecdotal evidence is available, however, it is suggestive that illegal international trade is occurring amongst countries at the regional level (e.g. between Caribbean countries; those in the Gulf of Guinea; Mozambique and Tanzania). In the Southeast Asian/Coral Triangle region, evidence of international trade fuelled by international demand is more apparent, being further supported by seizure data. Local consumption and trade are also prevalent within the Asian countries assessed.

So far, based on the data collected in the context of this report, it has not been possible to quantify and subsequently compare illegal trade amongst regions. It is relevant to acknowledge the extreme difficulty in doing so given the generally scarce availability of documented data and individuals' unwillingness to share information on an activity illegal in nature. Based on the information presented in this report - sourced from literature, *in-situ* observations, seizure records, and oral reports by relevant stakeholders and locals - it seems possible that the illegal (domestic and international) trade in marine turtles is currently occurring at lower levels than it has in the past, and more so, that it may be declining in some regions (e.g. in western Africa), although further results are needed to fully assess this possibility. From the analysis of global marine turtle seizure records it could be suggested that a general decline in international trade in marine turtles could be taking place since 2008.

Nevertheless, it is important to reflect that while the difficulty in locating evidence of large-scale international trade in marine turtles could be supportive of a decrease in the prevalence of these activities, findings in literature and on the ground suggest also that online trade is still understudied and requires further attention.

Still, when investigating the trade in marine turtles, it is inevitable to discuss fisheries interactions with these species, particularly as they are considered a "welcome bycatch" in some regions. Moreover, it has been widely suggested in literature that the impacts of fisheries bycatch on marine turtles are likely to be of much greater conservation concern to populations than take/trade levels themselves, even when specimens are not typically retained.

Based on the preliminary information presented in this report, a set of provisional recommendations have been drafted (see pages 51 and 52). In general, across all five regions discussed there is a great need to improve compliance with existing laws and regulations protecting marine turtles, which could be achieved through developing compliance strategies in close cooperation with relevant local stakeholders and governments. While increased site protection and market surveillance are also needed, conducting a thorough review of protective legislation and its inconsistencies within countries and regions is of noted importance (e.g. Inter-American region and East and West African regions).

Educating locals and training authorities on marine turtle conservation and on the respective applicable laws is widely necessary. Conservation research needs to engage with social sciences to better understand the socio-economics associated to the harvest and trade in marine turtles. This will guide the development, in collaboration with local communities, of sustainable livelihood alternatives for those who depend on marine turtles (e.g. coastal communities in the assessed nations in the Inter-American, East and West African regions). More research is also needed into understanding the severity of the conservation threat posed by current take/trade levels, as well as investigating the linkages (if any) between what appear to be very localized markets for marine turtle products and larger scale, international trade networks.

Concerning fisheries interactions with marine turtles, collective efforts must be put into better comprehending the dimension and impacts of bycatch. It is important to understand to what extent this may be contributing to illegal trade as to inform on how fisheries regulations may be able to assist in combating illegal activities.

Lastly, efforts are needed to promote further regional cooperation and communication for marine turtle conservation, particularly among CITES, IAC, CMS, IOSEA, SPAW Protocol (and WIDECAST), Ramsar and any others relevant bodies to share information, identify conservation activities and optimize synergies and resources. The intra- and interregional collaboration and exchange of actionable intelligence on illegal trade in marine turtles, particularly among the countries involved in trade, must also be improved.

Key words: illegal trade; legal trade; sustainable use; marine turtle; sea turtle; bekko; tortoishell.

Background

In 2014, the Secretariat *Pro Tempore* of the Inter-American Convention for the Protection and Conservation of Sea Turtles (IAC) published a study co-financed by the CITES Secretariat on the "Conservation Status of Hawksbill Turtles in the Wider Caribbean, Western Atlantic and Eastern Pacific Regions"[1]. Several recommendations arose from that study, highlighting the need for an updated assessment to determine the actual extent of the (international) trade in hawksbill turtle products.

Later on, in January 2016, IAC and the Secretariat of the Memorandum of Understanding on the Conservation and Management of Marine Turtles and their Habitats of the Indian Ocean and South-East Asia (CMS/IOSEA Marine Turtle MoU) submitted an information document entitled "A report on illegal take of and trade in marine turtles"[2] to the CITES Standing Committee at its 66th meeting, expressing concern about the levels of illegal trade in marine turtles around the globe.

The information brought forward by these documents rendered clear the need for robust scientific research to help determine the current status, scope and trends of the international trade in marine turtles. Thus, aiming to

[1] The study was referred to in CITES Decision 16.127 (2013) (https://cites.org/sites/default/files/eng/dec/valid16/E16-Dec.pdf).
[2] CITES Document SC66 Inf.7 (https://cites.org/sites/default/files/eng/com/sc/66/Inf/E-SC66-Inf-07.pdf).

address knowledge gaps, the CITES Conference of the Parties adopted at its 17th meeting (CoP17; October 2016) the interrelated Decisions 17.222 and 17.223 on Hawksbill turtle (*Eretmochelys imbricata*) and other marine turtles (Cheloniidae and Dermochelyidae).

The present study directly stems from the implementation of CITES Decision 17.222[3], under which the CITES Secretariat was requested to, in collaboration with IAC and CMS[4]/IOSEA Marine Turtle MoU[5], undertake a study on the legal and illegal international trade in marine turtles[6].

Introduction

Seven species of marine turtles currently inhabit the world's oceans: the loggerhead turtle (*Caretta caretta),* the green turtle *(Chelonia mydas), the leatherback turtle (Dermochelys coriacea), the hawksbill turtle (Eretmochelys imbricata), the Kemp's ridley turtle (Lepidochely kempii), the olive ridley turtle (Lepidochelys olivacea), and the flatback turtle (Natator depressus).* Despite marine turtles being the least diverse chelonian group in species number (Segniagbeto *et al.,* 2016), they are circumglobally distributed (Wallace *et al*., 2011) across tropical and temperate seas (Segniagbeto *et al.,* 2016; and references therein), exhibiting intra-specific variation in population sizes, trends and reproduction (Wallace *et al*., 2011; and references therein).

All seven species of marine turtles are listed under CITES Appendix I. *Dermochelys coriacea* was listed in 1977 (a reservation currently applies to Suriname (1981)) and all Cheloniidae species became listed as of 1981 (reservations apply to Cuba (1990), Palau (2004) and Suriname, excluding the Australian population (1981) for *C. mydas*; and to Cuba (1990), Palau (2004), and Saint Vincent and the Grenadines (1989) for *E. imbricata*) (Lopes, *in prep*.). CITES Appendix I lists species that are threatened with extinction which are or may be affected by trade. These species are subject to particularly strict regulations, and trade is only authorized in exceptional circumstances, being prohibited for commercial purposes. Moreover, all but one species of marine turtle (*Natator depressu*s, CMS Appendix II) are also listed on CMS Appendix I since 1979 (*C. mydas*, *D. coriacea* and *L. olivacea*) or 1985 (*C. caretta*, *E. imbricata* and *L. olivacea*), requiring their strict protection by Parties.

Most species of marine turtles are adversely affected by human activities at all life stages, with severe negative impacts at the local level that produce deleterious effects on population viability at the global scale (Segniagbeto *et al.,* 2016; and references therein). Threats to marine turtles vary across regions, but general categories include fisheries bycatch, coastal development, pollution and pathogens, climate change and take (Wallace *et al*., 2011; and references therein).

Take is thought to have, in the past, severely depleted marine turtle populations in some regions of the world (Bräutigam *et al*., 2006; Humber *et al*., 2014; and references therein; Mazaris *et al*., 2017; Velez-Zuazo *et al*., 2017). Despite more recent studies appearing to suggest that populations are recovering in some areas of the globe (e.g. Mazaris *et al*., 2017) and that take/trade levels may be undergoing a declining trend (e.g. Casale *et al*., 2010; Boura *et al*., 2016; Hancock *et al*., 2016), understanding the actual extent of the legal and illegal (international) trade in marine turtles is of extreme relevance to guide present and future (local to international) efforts for ensuring the conservation of these unique seven species.

Objective of the study

Researchers have, over the years, worked to capture the real extent of the legal and illegal international trade in marine turtles, as well as its sustainability and conservation implications. Existing literature frequently suggests that (current) trade levels are of concern, however, and understanding the difficulty in quantifying take/trade as well as population sizes, there is often a gap between such statements and solid, supporting data.

It would appear that, to date, no assessment of the extent of the legal and illegal international trade in marine turtles, as well as of its sustainability and conservation implications has been undertaken at the global level. As

[3] The implementation of Decision 17.222 was facilitated by the generous funding from the European Union (through the ACP Secretariat), the Australian Government and NOAA.
[4] www.cms.int.
[5] www.cms.int/iosea-turtles.
[6] The full text of CITES Decisions 17.222 and 17.223 is available at https://cites.org/sites/default/files/eng/dec/valid16/E16-Dec.pdf.

concern for the potential unsustainability of take and trade in marine turtles has regained momentum amongst the scientific and CITES communities, the present report aims to:

> (a) provide a global overview of the status, scope and trends of the legal and illegal international trade in CITES-listed species of marine turtles; (b) to achieve a better understanding of the current and potential conservation impacts associated to current trade levels; (c) to identify management options; and (d) to identify areas (geographical and operational) where immediate mitigation efforts may be needed.

The present report shall contribute to the enhancement of regional and global conservation, management and sustainable use of marine turtles through improved knowledge on the legal[7] and illegal international trade in these species, as well as through stronger coordination among relevant intergovernmental instruments dealing with marine turtles. Importantly, the information collected through this report will form the basis for the development of recommendations directed to relevant bodies to address the take and (international) trade in marine turtles.

Methods

The present report, which assesses the status, scope and trends of the legal and illegal international trade in marine turtles, its conservation impacts, management options and mitigation priorities is the result of three major work components, centrally coordinated by the CITES Secretariat but involving close collaboration with the IAC and CMS Secretariats:

I. *In-situ* country assessments

Eight countries were assessed *in-situ* in this study within a total of three regions (Figure 1): Colombia, Nicaragua, Panama (in the Inter-American region); Madagascar and Mozambique (in the East African region); and Indonesia, Malaysia and Viet Nam (in the Southeast Asia/Coral Triangle region). These countries were selected based on the evidence of the existence of most significant illegal trade markets in marine turtles, collected through the review of most recent published literature and also through advice by researchers and other experts in this field.

To undertake these country assessments, the CITES Secretariat contracted WWF, the Marine Research Foundation, and TRAFFIC for the assessment of the Inter-American, the East African, and the Southeast Asian/Coral Triangle regions, respectively. To this end, the Secretariat developed a common approach for these agencies to follow to ensure that obtained results become comparable.

Based on their research, the three agencies delivered interim results which are summarised in the relevant sections of this report. Final results will be available later in 2018 and will be brought to the attention of the 18th meeting of the CITES Conference of the Parties (CITES CoP18).

II. Analysis of marine turtle legal trade and seizure data

An analysis of available global data on legal trade in marine turtles and on marine turtle specimens' seizures from 2000 to present was conducted. The results of this analysis, which was based on CITES Trade Data, on CITES Annual Illegal Trade Reports data, and data made available to the CITES Secretariat through UNODC[8] and EU-TWIX[9] (following authorization from the relevant agencies), are presented in this report.

III. Literature review

To complement the *in-situ* assessments mentioned above, as well as to ensure a broader global overview of the status of the legal and illegal trade in marine turtles, a literature review focusing particularly on recent publications on the regions (and respective countries) that were not assessed *in-situ* was conducted (Figure 1). The relevant

[7] Clarification note: *Legal international trade* in specimens of CITES-listed marine turtles is limited to non-commercial transactions conducted in accordance with Article III of the Convention.
[8] Only data reported by non-EU countries, as data reported by EU Member States in WorldWISE are sourced from EU-TWIX.
[9] **E**uropean **U**nion **T**rade in **W**ildlife **I**nformation e**X**change (www.eu-twix.org).

findings on marine turtle conservation (needs) and international and domestic trade resulting from this review are presented in this report.

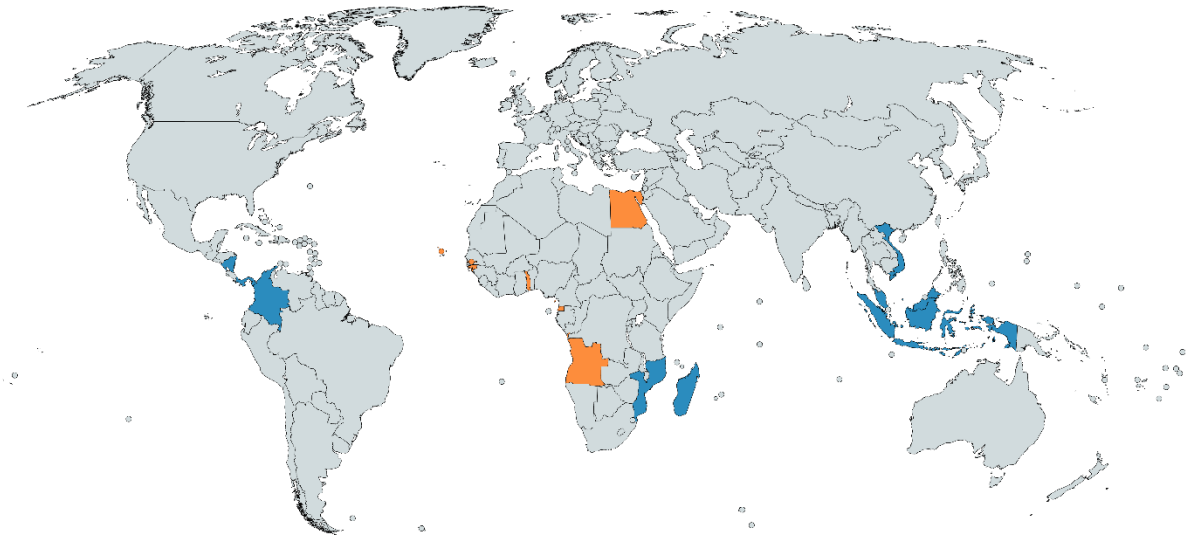

Figure 1 – Depiction of the region wise assessment efforts (Inter-America, West Africa, East Africa, Mediterranean, Southeast Asia/Coral Triangle) to understand the current status, scope and trends of the legal and illegal international trade in marine turtles in the present report. Highlighted countries depict those for which information is presented in the present report. Blue highlights those assessed *in-situ* and orange those only assessed through literature review.

Results

Conservation status of marine turtles and the challenges in assessing it

Conservation status and threats

Currently, all seven species of marine turtle are of conservation concern according to *the IUCN Red List of Threatened Species*™ ((www.iucnredlist.org; Table 1). While the flatback is considered data deficient (Red List Standards & Petitions Subcommittee, 1996), the other six species are considered globally threatened: the loggerhead (Casale *et al*., 2017), olive ridley (Abreu-Grobois *et al*., 2008) and leatherback (Wallace *et al*., 2013) are vulnerable; the green (Seminoff, 2004) is endangered and the hawksbill (Mortimer *et al*., 2008) and Kemp's ridley (Marine Turtle Specialist Group, 1996) are critically endangered. Despite globally assessed as vulnerable, the leatherback and the loggerhead also possess several subpopulations assessed as endangered and critically endangered.

Table 1 – Global conservation status of the seen extant species of marine turtle according to *IUCN Red List of Threatened Species*™.

Species	Global conservation status	Date of the assessment
Caretta caretta	Vulnerable	2017
Chelonia mydas	Endangered	2004
Dermochelys coriacea	Vulnerable	2013
Eretmochelys imbricata	Critically endangered	2008
Lepidochely kempii	Critically endangered	1996
Lepidochelys olivacea	Vulnerable	2008
Natator depressus	Data deficient	1996

Wallace *et al.* (2011) suggests, however, that these global-level extinction risk assessments do not adequately assess the conservation status of spatially and biologically distinct marine turtle populations, specifically because of specific population traits and environmental conditions, which vary geographically. For this, the current global *IUCN Red List of Threatened Species*™ assessments of marine turtles may not capture the conservation status of these species at more regional or local levels.

Still, assessing the status and threats to distinct marine turtle population segments (or Regional Management Units, RMUs[10]) is a critical step towards building comprehensive frameworks for setting conservation priorities for these species (Wallace *et al*., 2011). Thus, through developing a "conservation priorities portfolio" system using categories of paired risk and threats scores[11] for all global marine turtle RMUs (n=58), Wallace *et al.* (2011) found that nearly two thirds of scored RMUs were categorized as highly threatened and twelve were categorized as having critical data needs. RMUs in the Pacific Ocean had the highest average risk[12], while those in the Atlantic Ocean (including the Mediterranean) had the highest average threats. RMUs in the Indian Ocean had the highest average data uncertainty scores for both risk and threats, which are reflective of the general absence of long-term monitoring initiatives in the basin (excluding the Southwest Indian Ocean). Conservation portfolio categories of RMUs for each species are mapped in Figure 3 and are considered as warranting urgent conservation interventions because of their combined high risk and threats. Furthermore, Wallace *et al.* (2011) identified "the world's 11 most endangered marine turtle RMUs" which they considered to merit the most immediate attention (Table 2).

Table 2 – The world's 11 most endangered RMUs (grouped by ocean basin) based on highest risk and threats scores. Adapted from Wallace *et al*. (2011).

Regional Management Unit (RMU)
Lepidochelys olivacea, West Indian Ocean
Caretta caretta, Northeast Indian Ocean
Lepidochelys olivacea, Northeast Indian Ocean
Lepidochielys olivacea, Northeast Indian Ocean (arribadas)
Eretmochelys imbricata, Northeast Indian Ocean
Eretmochelys imbricata, East Atlantic Ocean
Caretta caretta, Northeast Atlantic Ocean (Cape Verde)
Eretmochelys imbricata, East Pacific Ocean
Dermochelys coriacea, East Pacific Ocean
Caretta caretta, North Pacific Ocean
Eretmochelys imbricata, West Pacific Ocean

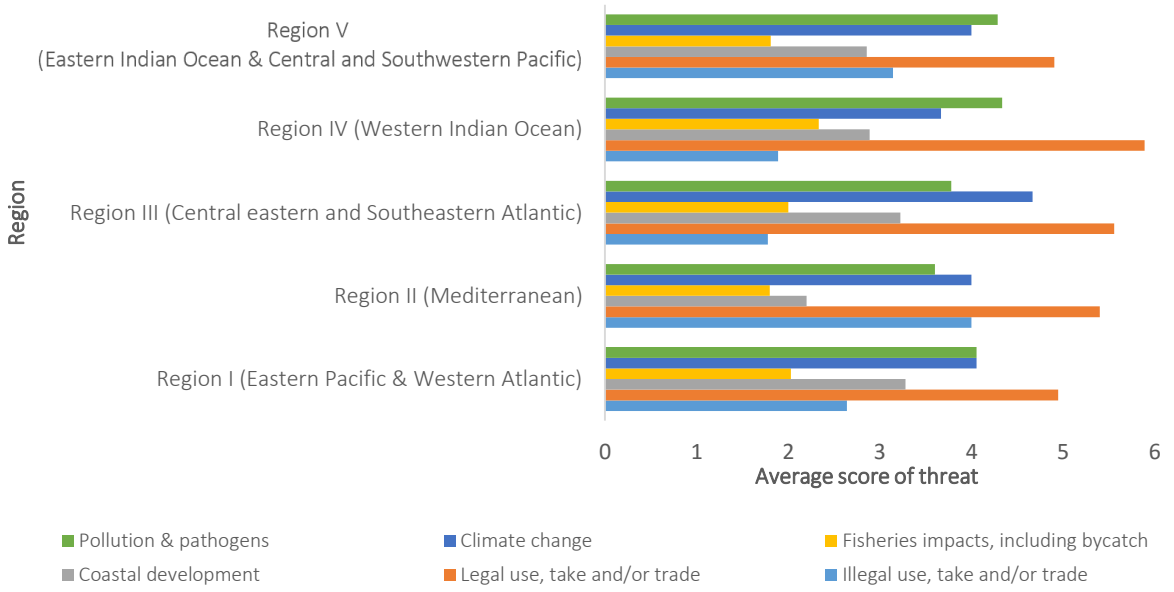

Figure 2 - Global importance of the different threats to marine turtle conservation according to experts across regions (n=94). Average scores of 1 indicate highest and most urgent threats to be addressed. Average scores of 6 indicate lowest and least urgent threats to address. Global averages are presented in Figure I, Appendix 1. Source: Lopes (*in prep*.).

[10] Spatially explicit population segments defined by biogeographical data of marine turtle species (Wallace *et al*., 2011). RMUs have been recommended as the unit for population management (Mazaris *et al*., 2017).

[11] Risk evaluated the criteria population size, recent trend, long-term trend, rookery vulnerability and genetic diversity according to relative conservation risk to each RMU. A 'low-risk' score was attributed to large, increasing, genetically diverse RMUs; and a 'high-risk' score to small, decreasing, and low diversity RMUs. Similarly, threats evaluated the criteria fisheries bycatch, take, coastal development, pollution and pathogens and climate change according to their relative impact to each RMU. Threat criteria was classified as low, medium or high according to their relative impact to each RMU.

[12] When considering ocean basins. Basins considered were the Atlantic Ocean and Mediterranean Sea, Indian Ocean, and Pacific Ocean.

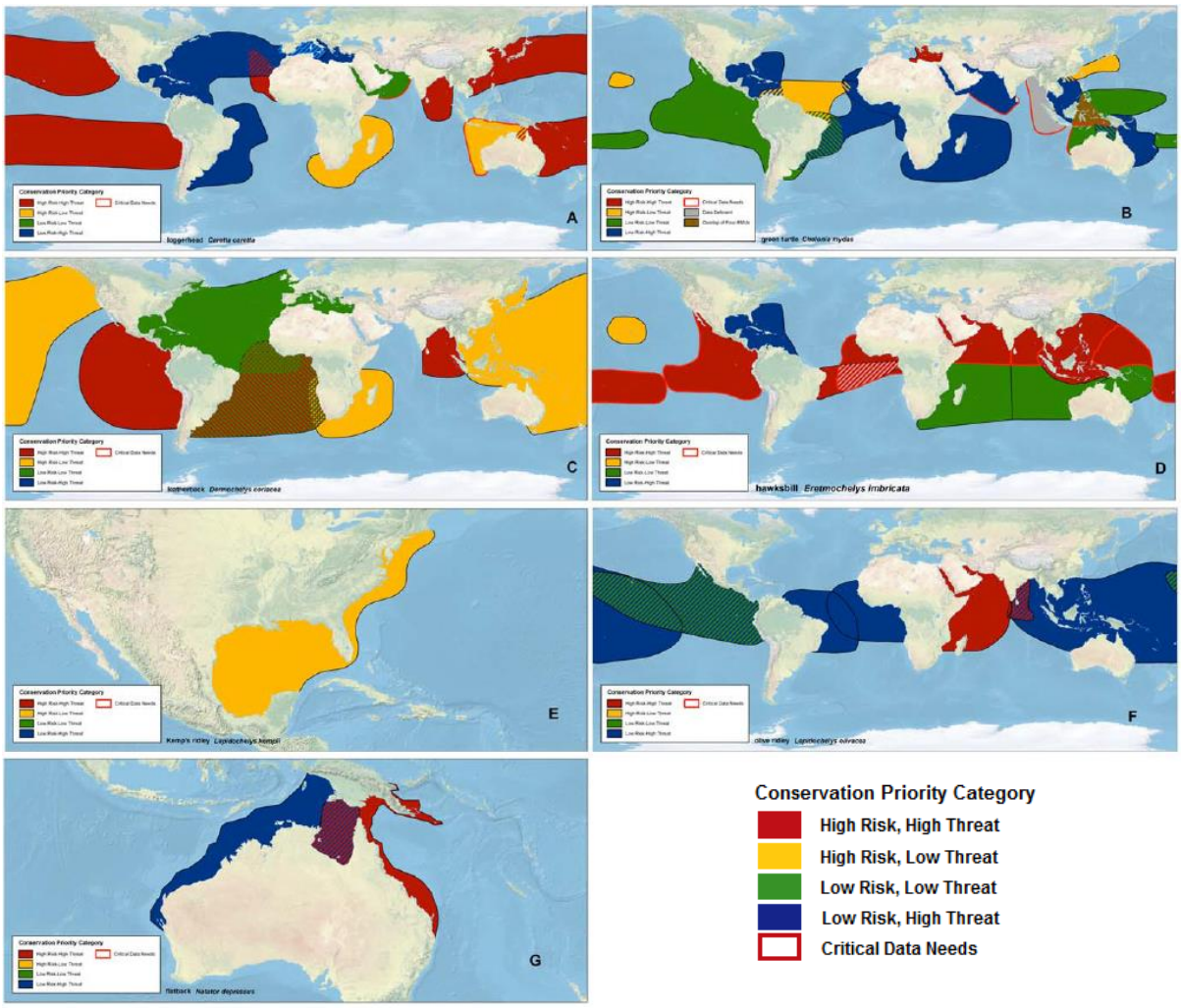

Figure 3 - Conservation priority portfolio categories for RMUs of each marine turtle species warranting the most urgent conservation intervention because of the combination of high risk and high threats. (A) loggerheads (*Caretta caretta*), (B) green turtles (*Chelonia mydas*), (C) leatherbacks (*Dermochelys coriacea)*, (D) hawskbills (*Eretmochelys imbricata*), (E) Kemp's ridleys (*Lepidochelys kempii*), (F) olive ridleys (*Lepidochelys olivacea*), (G) flatbacks (*Natator depressus*). RMUs classified as critical data needs to assess risk and threats to RMUs conservation are outlined in red. Hatched areas represent spatial overlaps between RMUs. The brown area in Fig. 3B highlights an overlap of four RMUs, while the grey area in Fig. 3B represents the *C. mydas* Northeast Indian Ocean RMU, which had excessive data deficient scores and was not included in overall calculations and categorization. Adapted from Wallace *et al.* (2011).

Across all RMUs, fisheries bycatch and climate change were considered the highest threat criteria[13]. Take scored third position, followed by coastal development. Pollution and pathogens ranked lowest among threats[14].

In 2010, through expert elicitation (N=212), Donlan *et al.* identified fisheries bycatch and coastal development as the most often ranked top hazards to marine turtles in different geographic regions; nest predation followed as second greatest threat and direct take as third. More recently (2018), through surveys to marine turtle experts (n=94), Lopes (*in prep*.) found that fisheries impacts (including bycatch) and illegal use, take and/or trade are generally perceived as the two highest and most urgent threats to be addressed for ensuring marine turtle conservation globally[15] (Figure 2; Figure I, Appendix 1).

[13] Although climate change was scored only in a third of RMUs.
[14] Although it was scored in less than half of RMUs.
[15] Noting that it is possible that since the survey focused on illegal take, use and trade, and that respondents often had particular expertise on this topic, respondents may have been biased to mention this threat as highest, as hazard-based expertise bias has been reported to occur in similar surveys (e.g. Donlan *et al*., 2010).

Challenges in assessing population trends and the impacts of threats

Shifts from subsistence use to the commercial exploitation of marine wildlife stocks have led to the local or global extinction of many species, and declines of others (Hancock *et al.*, 2016; and references therein). Historically, the take of marine turtle eggs and adults is believed to have contributed to population declines (Bräutigam *et al.*, 2006; Catry *et al.*, 2009; Kinch, 2009; Nada *et al.*, 2009; Casale *et al.*, 2010; Tomás *et al.*, 2010; Revuelta *et al.*, 2012; Humber *et al.*, 2014; and references therein; Mazaris *et al.*, 2017; and references therein; Velez-Zuazo *et al.*, 2017). However, recent studies suggest that marine turtle populations are increasing in many regions of the world[16] (e.g. McGowan *et al.*, 2008; Revuelta *et al.*, 2012; Girondot *et al.*, 2017; Mazaris *et al.*, 2017; and references therein; Veley *et al.*, 2017; and references therein), and that trade/take levels may be decreasing (e.g. Casale *et al.*, 2010; Boura *et al.*, 2016; Hancock *et al.*, 2016).

Recent research focused on sustainable harvest levels of marine turtles tends to suggest that any harvest level will cause population declines that endanger the survival of the species in the wild, even if there has been no documented decline in all the study populations (Rees *et al.*, 2016; including examples therein). Still, it remains extremely relevant to monitor marine turtle population trends, as this enables a better understanding of the effects that the different threats (may) have on these species.

However, quantifying the effects of regional hazards (such as take/use/trade) is particularly challenging for marine turtles (Donlan *et al.*, 2010). To date, no study appears to have been undertaken that directly correlates a quantified decline in marine turtle population sizes with a quantified increase in take, use or trade, and the difficulties in doing so must therefore be acknowledged:

- Marine turtles are wide-ranging, long-lived, highly migratory species with long and complex reproductive cycles (Donlan *et al.*, 2010) – these factors, together with others make it hard to understand population size variation, particularly linking it to harvest levels.
- Marine turtles face multiple anthropogenic threats (Donlan *et al.*, 2010). For example, climate change may also influence nesting patterns, adding to the difficulty in correlating a decrease in nesting numbers with increased take elsewhere.
- Because they have long reproductive cycles, there may be long lag periods between observed increased mortality at certain life stages and the reduction in nesting numbers. Low hatchling success may potentially take several decades to be detected through low nesting numbers (Mazaris *et al.,* 2017; and references therein).
- Marine turtles nest in 2-3 year cycles, hence recorded decreases in nesting density over short monitoring periods (e.g. three years) may only be representative of natural abundance cycles or a change in nesting conditions or site use, rather than necessarily a decrease in the population (Weir *et al.*, 2007; and references therein). Different nesting patterns do not necessarily represent declines in population, and may instead only represent altered nesting distributions (Weir *et al.*, 2007; and references therein).
- High levels of inter-annual variation in nesting numbers are normal in certain species (Wallace *et al.*, 2010; and references therein), such as green turtles and leatherbacks, and preclude robust trend analysis over short time periods (Tomás *et al.*, 2010; and references therein).
- Tag loss is an ongoing problem in certain species, such as green turtles (Tomás *et al.*, 2010; and references therein).

Global trends in legal take

According to Humber *et al.* (2014), 42 countries in the world permitted the direct take of marine turtles as of 1 January 2013 (see Table I, Appendix 2 for a description of the legal status of take by country); four had a moratorium on take (Anguilla, Chile, the Maldives and Fiji, although permits for traditional purposes could be granted in Fiji); and four had legislation that could not be verified (Algeria, North Korea, Panama and Somalia)[17].

[16] Often potentially in association to reduced take (and bycatch) due to conservation efforts and to international conservation agreements prohibiting international trade (i.e. CITES) (Mazaris *et al.*, 2017).
[17] Numbers do not account for legalized egg harvest.

Based on data made available between 2010 and 2013, Humber *et al.* (2014) estimated that more than 42,000[18] marine turtles are annually caught as legal take in those 42 countries, with 88.5% being green turtles (37,339), 8.2% hawskbills (3456), 2.5% loggerheads (1051), 0.6% olive ridley (263), and 0.1% leatherbacks (62) (Figure 4).

The estimated annual take of flatbacks was of 18[19] individuals, and no data were found on legal take of Kemp's ridley[20]. Legal take was considered to be mainly concentrated in two global regions: the Indo-Pacific, accounting for 63,3% of estimated take (26,675 turtles/year; 17 countries); and the wider Caribbean, accounting for 34.6% of estimated take (14,640 turtles/year; 16 countries)[21]. According to Humber *et al.* (2014), the three countries with the highest annual legal take of marine turtles include Papua New Guinea (36.1%; 15,217), Nicaragua (22.3%; 9413), Australia (15.7%; 6638), followed by Colombia (Atlantic coast), Solomon Islands, Palau, Haiti, Tonga, São Tomé and Príncipe and Saint Vincent and the Grenadines (Figure 4).

Legal take has further been estimated to have decreased more than 60% from the 1980s to the 2000s (from 116,420 to 45,387 turtles/year; Figure 5) (Humber *et al.*, 2014). Despite this, it is relevant to mention what appears to be a commonly reported relationship between legal take and illegal take and take/trade: the existence of a legal fishery has been suggested as providing cover for continued illegal take of turtles (Humber *et al.*, 2014; and references therein). More recently, through surveying marine turtle conservation and trade experts, Lopes (*in prep*.) found that while it there is no consensus among experts whether a legalized take alleviates the pressure to engage in illegal activities involving marine turtles, the majority of surveyed participants who indicated the existence of a legalized take in marine turtles in their country of expertise perceived this as masking illegal take, use and/or trade (Figure 7).

The threat posed by legal take must, however, be considered in the context of the other existing threats to marine turtles[22]. As already suggested above, fisheries bycatch is thought to potentially be a source of greater concern to marine turtle conservation than legal take, as for example Humber *et al.* (2014) pointed out that the relative impact of legal take on mortality could be less than the bycatch for the Mediterranean alone[23]. The global conservation threat posed by legal take is thus likely to be low when compared to the combined threats of bycatch and illegal take (Humber *et al.*, 2014).

[18] Although this study provided the first global synthesis of the reported legal take of marine turtles, it must be noted that estimates often relied on patchy data, and that the lesser availability of data on legal take for more recent years in comparison to that of previous years may have led to biases in data estimation.

[19] Estimate based on scarce data.

[20] From 1980 to 2014.

[21] Although take was legal in Bosnia and Herzegovina, Niue, Pitcairn Islands and Wallis and Futuna, none was found to occur in these countries. Moreover, amongst the countries where legal take is permitted, it remains unquantified in three countries where it is known to occur but no estimate is available (Kiribati, Nauru and Syria), and in nine where only illegal take data was available (Belize, Cayman Islands, Dominica, Indonesia, and Atlantic coast of Mexico), including four where a moratorium exists (Anguilla, Chile, Fiji, and Maldives).

[22] Through its Burning Issues assessment, the IUCN SSC Marine Turtle Specialist Group (MTSG) has identified five major hazards to sea turtles: fisheries impacts, direct take, coastal development, pollution and pathogens, and global warming (https://iucn-mtsg.org/about-turtles/hazards/).

[23] E.g. Casale (2011), estimated that 44,000 turtles/year are bycaught in the Mediterranean alone. Other examples of this relative importance include: Wallace *et al.* (2010) estimated a minimum global bycatch of 85,000 turtles/year (likely underestimated); and Mancini *et al*. (2011) estimated that over 1000 turtles/year were bycaught within one fishery in a lagoon in northwest Mexico.

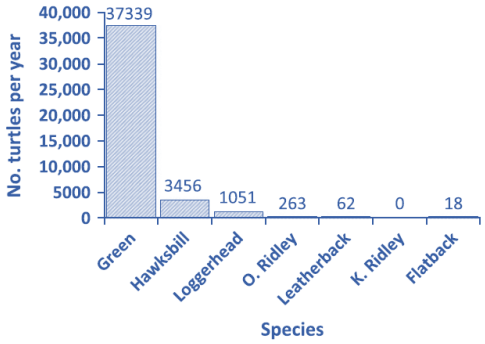

Figure 4 – Global annual legal take of marine turtles (excludes egg harvest) as estimated by Humber *et al.* (2014) and based on data from 1 January 2010 to 1 January 2013 (n=42 countries). O. Ridley = Olive ridley; K. ridley = Kemp's ridley. Source: Humber *et al.* (2014).

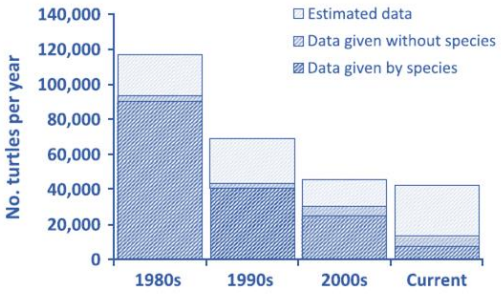

Figure 5 - Annual legal take of marine turtles since 1980 as estimated by Humber *et al.* (2014) for 42 countries and based on data from 1 January 2010 to 1 January 2013. Source: Humber *et al.* (2014).

Figure 6, 6(a) and 6(b) – Global annual legal take of marine turtles by country or territory as estimated for 2014 by Humber *et al.* (2014) with data from 1 January 2010 to 1 January 2013. Data for the Caribbean (CAR) and Pacific (PAC) regions have been grouped and are shown in further detail. No take = no known legal or illegal take; Unquantified take = illegal take data found only or take known to occur but no data available. *Country with moratorium. Country abbreviations (countries in brackets indicate dependency): ALB = Albania; AND = Andaman and Nicobar Islands (India); AUS = Australia; BOS = Bosnia and Herzegovina; CHI = Chile; COP = Colombia (Pacific coast); GUY = Guyana; IND = Indonesia; JAP = Japan; KIR = Kiribati; MAL = Maldives; MAR = Marshall Islands: MIC = Federated States of Micronesia; MXA = Mexico (Atlantic coast); MXP = Mexico (Pacific coast); PAL = Palau; PAP = Papua New Guinea; PIT = Pitcairn Islands (UK); SAO = São Tomé and Príncipe; SYR = Syria. Take is shown for counties with unverified legislation (ALG=Algeria; NKO=North Korea; PAA= Panama (Atlantic coast); SOM=Somalia; take for Panama was not included in the grouped take CAR in Figure 6. Note: Position of symbols is not representative of locations of take data. Source: Humber *et al.* (2014).

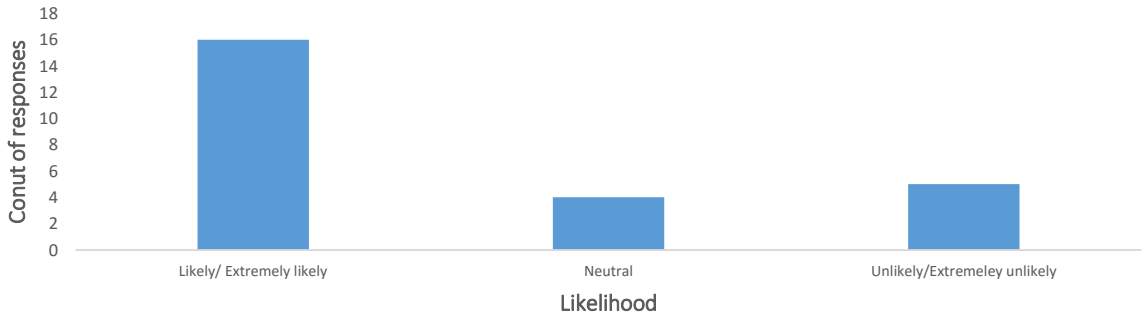

Figure 7 – Experts' perceptions (n=25) on the likelihood of the stated existence of a legalized take in marine turtle specimens in their country of expertise masking illegal activities such as illegal use, take and/or trade in marine turtles. Source: Lopes (*in prep.*).

Global trends in legal trade

Based on CITES Trade Data for marine turtle specimens (family Dermochelyidae and Cheloniidae; data extracted on 5th May 2018), 3993 legal trade transactions occurred between 2000 and 2016 (or 6415 if including pre-Convention specimens and 2017 data). The CITES Trade Data indicates a declining trend in the total number of legal trade transactions reported by CITES Parties since 2008 (Figure 8). This decline may be suggestive of a decrease in the total volume of specimens being illegally traded, as 'confiscated or seized specimens' (source code I) and 'specimens taken from the wild' (source code W) have persistently been major sources of specimens legally traded between the year 2000 and 2016 (Figure 9).

Caution must, nevertheless, be taken when withdrawing conclusions from CITES Trade data, as poor reporting compliance by CITES Parties is a well-known, ongoing issue (D'Cruze *et al.*, 2016; and references therein). Moreover, being illegal in nature, the activities in question are often not caught by authorities, making the absence of data is itself an important factor challenging conclusions on declines of illegal traded volumes from CITES Trade Data.

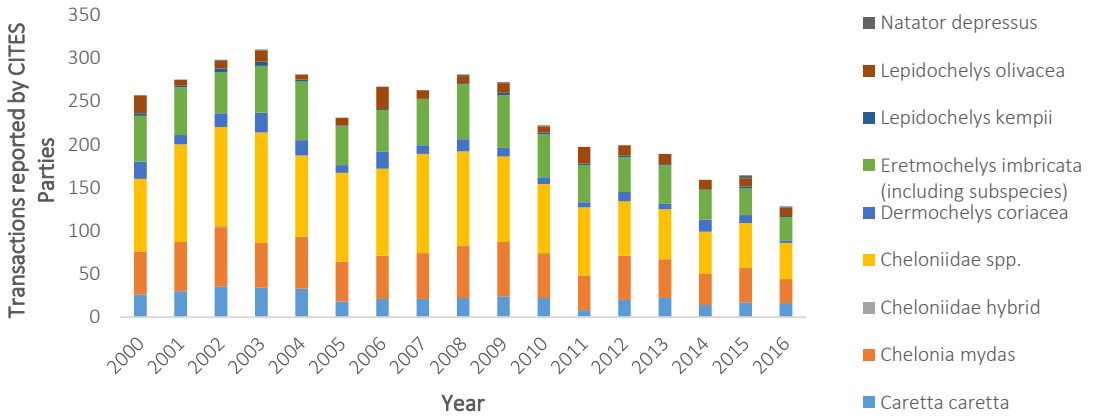

Figure 8 – Legal trade transactions in marine turtle specimens (family Cheloniidae and Dermochelyidae) between 2000 and 2016, as reported by CITES Parties. The graphic represents 3993 transactions, which exclude pre-Convention specimens (CITES source code O; n=2420 transactions) and transactions in 2017 (n=2). Data source: CITES Trade Database, data extracted on 5-2-2018.

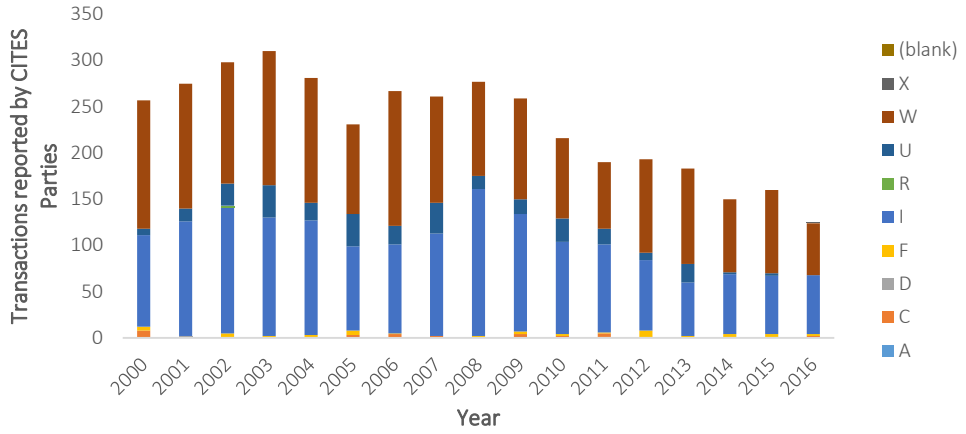

Figure 9 – Source of marine turtle specimens (family Cheloniidae and Dermochelyidae) traded legally between 2000 and 2016, as reported by CITES Parties. The graphic represents 3993 transactions, which exclude pre-Convention specimens (CITES source code O; n=2420 transactions) and transactions in 2017 (n=2). The letters in the legend refer to CITES source codes (description available in Appendix 1, ii). Data source: CITES Trade Database, data extracted on 5-2-2018.

Global trends in illegal take

Humber *et al.* 2014 estimated that the scale of the global illegal take in marine turtles is likely to be severely underreported due to the inherent difficulty in collecting data on such activity. They estimated that between 2010 and 2012 some 13,900 turtles/year were illegally taken within the 46 countries assessed (referred to above; number includes those countries with a moratorium on take), with the Pacific coast of Mexico accounting for 47.8 % of recorded illegal take (6644 turtles/year), followed by Indonesia (23.6%; 3279) and Fiji (23.4%; 3261).

Global trends in illegal trade

Based on the compilation of CITES Annual Illegal Trade Reports data (period 2015-2017), UNODC WorldWISE[24] Data (period 2000-2017) and EU-TWIX[25] Data (period 2000-2017), a total of 1453 seizures of marine turtle specimens occurred globally between 2000 and 2016 (Figure 10). The compiled data indicates an increase in the number of global seizures taking place between 2005 and 2012, and a decrease from 2012 to 2016. The latter could be indicative of a decrease also in the volume of marine turtles specimens being illegally traded.

It is relevant to note that the results from the analysis of wildlife seizure data are not necessarily indicative of the actual dimensions of illegal trade trends for particular species, but they may, nevertheless, provide relevant insights about such trends, particularly in the absence of other, better records. Moreover, the inherent difficulties in recording illegal trade already referred to in the section *Global trends in legal trade* above, also apply here.

The high number of cases reported for 2016 reflects the novel availability of data from the CITES Annual Illegal Trade Reports, a reporting system only adopted in 2016 (Figure III, Appendix 1). This sharp increase in data available on seizures may, on the other hand, also be indicative of a large under-representativeness of seizures in previous years (presented in Figure III, Appendix 1).

[24] Only data reported by non-EU countries, as data reported by EU Member States in WorldWISE are sourced from EU-TWIX.
[25] **E**uropean **U**nion **T**rade in **W**ildlife **I**nformation e**X**change (www.eu-twix.org).

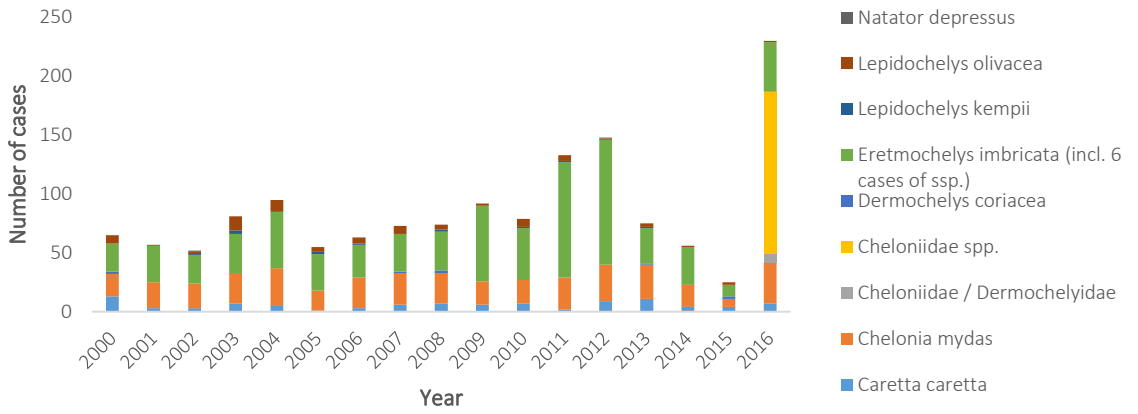

Figure 10 – Number of global seizures involving marine turtle specimens between 2000-2016. The graphic represents 1453 instances, and does not include three cases reported for 2017, as well as one case with unspecified date. Note that the large number of cases in 2016 is largely due to the implementation of CITES Annual Illegal Trade reporting system in 2016 (see Figure III, Appendix 1). Source of data: CITES Annual Illegal Trade Reports' data (period 2015-2017; data available by 15-2-2018); UNODC WorldWISE Data (period 2000-2017; data available by 28-9-2017); EU-TWIX[26] Data (period 2000-2017; data available by 23-11-2017).

Lopes (*in prep*.) consulted 94 marine turtle experts on their perceptions on the trend in illegal trade in these species within their countries of expertise. Responses suggest that in the last five years illegal trade in marine turtles may have decreased (Figure 11), as among the five studied regions an increasing tendency was not frequently indicated. When inquired about the trend in online trade, while a considerable number of participants across regions suggested that online trade has generally been inexistent, results suggest that not much is known about the trends (and the occurrence itself) of this type of trade (Figure 12), which could be an indicator that this is an emerging and increasing trend, as has also been suggested by some experts (*pers. comm*., November 2017).

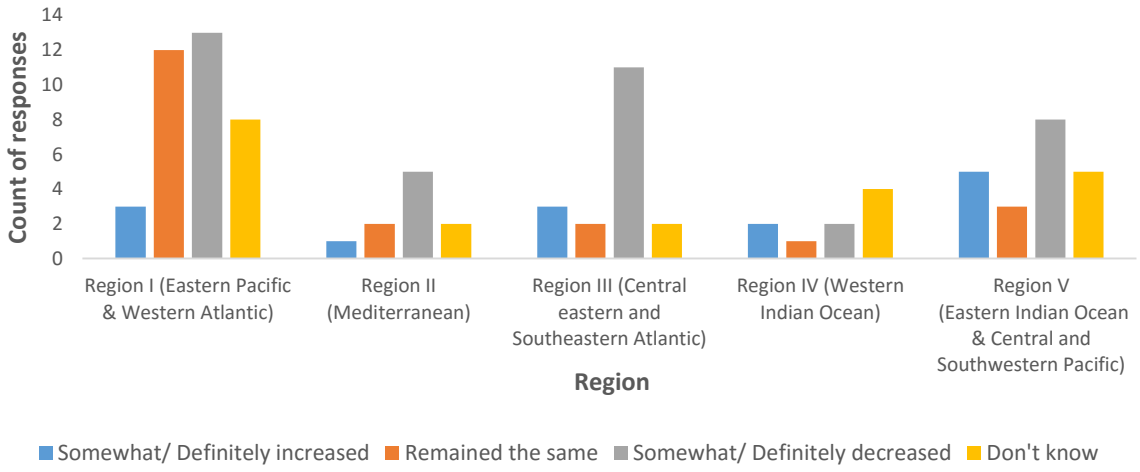

Figure 11 - Participants' perceptions (n=94) on the evolution of illegal trade in marine turtles in their country of expertise in the last five years. Source: Lopes (*in prep*.).

[26] **E**uropean **U**nion **T**rade in **W**ildlife **I**nformation e**X**change (www.eu-twix.org).

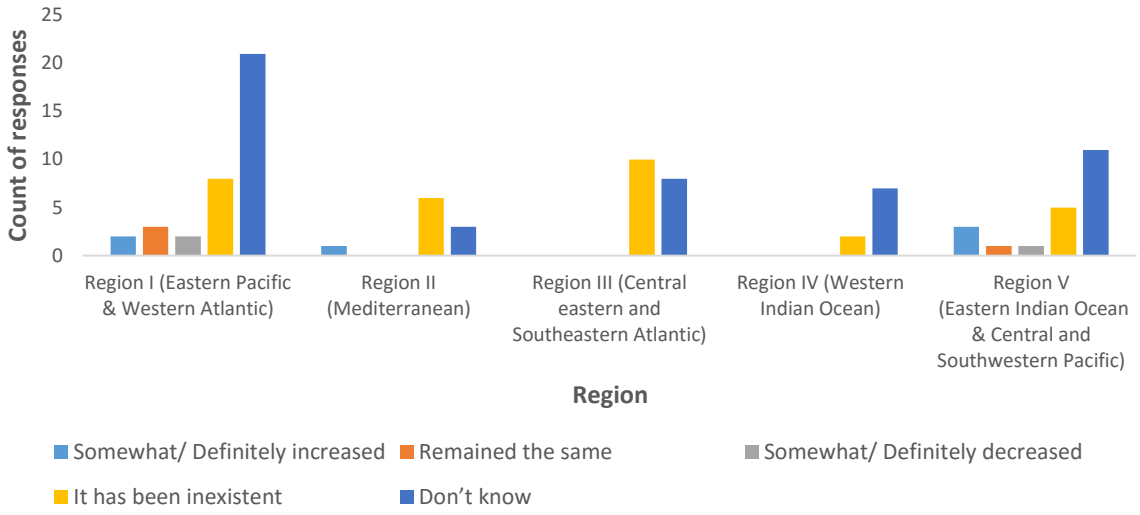

Figure 12 - Participants' perceptions (n=94) on the evolution of online trade in marine turtles in their country of expertise in the last five years. Source: Lopes (*in prep*.)

Relevant findings from the *in-situ* assessments in the Inter-American region

Figure 13 – Countries assessed *in-situ* by WWF: Colombia, Nicaragua and Panama.

In the first half of 2018, WWF assessed the availability of marine turtle products at locations in Colombia, Nicaragua and Panama (Figure 13) where trade in marine turtles was suspected to exist. The researchers investigated specimens' availability at local markets, touristic places and online, interviewing also local inhabitants to better understand the characteristics of the trade. In addition, WWF collected and analysed wildlife seizure data from national and regional environmental authorities. The results of these assessment efforts are summarized in this section.

Colombia

Five species of marine turtle occur in Colombia: green, hawksbill, leatherback, olive ridley (only along the Pacific coast) and loggerhead (only along the Caribbean coast).

In Colombia, the consumption of turtle meat has a historical component to it. Findings indicate that illegal trade in marine turtles currently takes place along both Colombia's Pacific and Caribbean coasts, being essentially motivated by the trade in turtle meat and eggs for consumption, carapace for the production of handicrafts (including jewelry and cock fighting spurs), and penis for its alleged aphrodisiac properties. The drivers of this trade are thus cultural, economic and social, with market and supply chain characteristics differing between the two coasts (Figure 14).

Along Colombia's Caribbean coast, an important domestic market for hawksbill was found to exist. Here, handicraft products made of this species' carapace are commonly available (either secretively or openly, depending on the location) along main touristic streets (Figure 15, 16). In the Colombian Caribbean, an increasing demand for cock fighting spurs made of hawksbill carapace is thought to be of special concern. This activity seems to be the most profitable one relating to marine turtle trade in this region, being relatively easy to identify retailers and cock fighting locations (e.g. through locals). While the sales of these products are typically made discreetly, it is possible that they are part of larger outlaw activities. Evidence of carapaces being used and sold was found, among others, in Baru (state of Bolivar; Figure 17) and in Tolu (state of Sucre), where fishermen trade these products with people from other cities (Medellín).

In addition to an apparently increasing market for cock fighting spurs, a strong market for green and hawksbill turtle meat (and to a lesser extent of turtle penis) was also found to exist, especially in the insular state of San Andrés and Providencia Archipelago, off the Caribbean coast of Nicaragua. It seems that fishermen prefer selling whole live animals to known buyers (restaurant owners), as this fetches higher prices than selling a few pounds to different customers. Moreover, researchers were able to locate several restaurants where turtle meat was served as a typical dish. The state of La Guajira was found to be of particular concern in this sense, as eating turtle meat is very common and sale points were easy to find (up to six restaurants offering turtle meat were identified in Riohacha, La Guajira).

Figure 14 - Map of Colombia including its Caribbean and Pacific coastal states.

In La Guajira, marine turtles have been traditionally caught by Wayuu indigenous people during migratory movements of females departing Costa Rica and crossing Panama to nest in Aves Island (Venezuela). Most of these females are illegally taken in shore waters of La Guajira Peninsula.

Along the Pacific coat of Colombia, a well-established domestic market for marine turtle meat was also found to exist in the city of Buenaventura (Valle del Cauca), which comprises Colombia's main port along this coast. Here, over 12 restaurants were identified where turtle meat dishes are sold daily. Restaurant owners are unable to indicate what species they are selling because turtle meat is received already in a processed form. Turtle penis is also in high demand in Buenaventura (Figure 18). Table 3, below, summarizes the main findings on sources, transit and destinations of the marine turtle trade in Colombia.



Figure 15 and 16 - Earrings and bracelets made of hawksbill carapace being offered in street sales in the new Cartagena city (Bolivar state).



Figure 17 and 18 **-** Cock fighting spurs made of hawksbill carapace in Baru town, South of Cartagena city (Bolivar state); Marine turtle penis bottled in alcohol and herbs available at a market place in Buenaventura (Valle del Cauca state).

The actors involved in the local and regional illegal trade in marine turtles include fishermen (who harvest individuals at sea and sell their products on shore), and intermediaries who deliver the meat to restaurants and carapaces to artisans and local vendors. Suppliers and consumers are all well aware of the illegality of these activities, hence products being sold covertly.

The consumption of turtle meat in Colombia is a well-established practice, which is further encouraged by poverty. Generally, a turtle meat dish costs between 8 and 10 USD and a whole turtle can cost up to 500 USD (Table II in Appendix 2 shows the prices of different products sold). According to interviews to local community members, marine turtle populations have declined in Colombia and fishers must navigate greater distances for specimens to be seen.

Table 3 - Details about sources, transit and destinations of the major marine turtle trade in Colombia.

Location	Source	Observations	Final destination
Valle del Cauca state	Buenaventura Port	Fishermen target turtles at sea and process them before landing to avoid environmental authorities' controls. Captures are believed to be comprised of hawksbill, green, leatherback and olive ridley turtles.	Meat is sold in local restaurants in Buenaventura. Penis is also sold in the area, in both processed and unprocessed forms.
Sucre state	Tolu	Marine turtle meat is consumed locally and carapaces are sold as sub-products.	Meat is consumed locally. Carapaces are sold to tourists from Colombian main cities (Bogotá, Medellin, Monteria and Cali).
	Santa Cruz Island and surroundings islands	Fishermen capture green and hawksbill turtles at feeding grounds. Only hawksbills are released (after being tagged) as part of a conservation programme that exchanges them for chicken meat.	Meat is consumed locally.
Bolivar state	Cartagena	One of the biggest selling points of hawksbill carapace handicrafts in Colombia, particularly because of the high flow of national and international tourists.	Handicrafts are bought by national and international tourists. Items are also taken for sale in other touristic places in the Colombian Caribbean (e.g. Santa Marta).
	Baru, Del Rosario Island and surroundings	Fishermen capture hawksbill turtles and sell their carapaces. Cock fighting spurs are produced for trade.	Meat is consumed locally. Hawksbill carapace products transit through the entire country.
San Andres and Providence Archipelago state	San Andres, surrounding islands and cays	Turtles are captured by fishermen in Providence and surrounding cays.	Hawksbill, green and loggerhead turtle meat is consumed locally and sold to visitors through street vendors. Hawksbill carapaces are probably sent to Cartagena to be sold as handicrafts.
Guajira state	Riohacha	Comprises the main consumers of marine turtle meat in the country, motivated by a high traditional demand.	Domestic consumption is the main end of the meat. However, it is thought to also be taken to other national cities (e.g. Bogota).
	Cabo De La Vela and surroundings	Local residents use turtle nets for targeted take mainly of juveniles and subadults. Hawksbill, green, loggerhead and leatherback turtle meat is consumed.	Most of the captured animals are transported to the main cities of Riohacha, Uribia and Maicao. These are the main meat consumption locations, but also the main distribution points for other cities in the country.

Needs (Colombia)

- **Strategic plan**: Strategic action in the long run is needed along the Caribbean and Pacific coasts of Colombia to reduce turtle consumption and carapace demand, respectively. These could be implemented in cooperation between NGOs, National Parks, the Ministry of the Environment, and other relevant stakeholders.
- **Awareness**: Creating awareness among those involved in the illegal activity, focusing particularly on harvesters, intermediaries and consumers.
- **Enforcement**: Control and surveillance are needed. Environmental authorities must improve the rigor in their implementation of such activities.
- **Capacity building / Information sharing**: NGOs, such as WWF, are currently contributing with valuable trade information to environmental authorities in the hope that this provides them with further resources to tackle take, use and trade. These capacity-building efforts should continue. At the national level, the Ministry of the Environment should also ensure communication flow to update local communities and environmental authorities on the existing policy frameworks and international treaties that protect marine turtles in Colombia.
- **Communities engagement / Alternative livelihoods:** The protection of marine turtles must be encouraged through socio-economic incentives able to address poverty and improve the livelihoods of those directly relying on marine turtles and their habitats. Community-based conservation has a key role to play, and new sustainable activities such as ecotourism, the provision of biodiversity goods and compensations for ecosystem services should be considered. Securing alternative livelihoods will reduce locals' needs to commercialize turtles.

Nicaragua

The largest remaining green turtle rookery in the Atlantic basin, and one of the two largest in the world, is the population that nests in Tortuguero, Costa Rica (Garland *et al*. 2010; and references therein). The primary foraging habitats for this rookery are located along the extensive coastal shelf along Nicaragua's Caribbean coast, which is also the location of one of the largest, legal commercial marine turtle fisheries in the Americas (Garland *et al*. 2010; and references therein). Four species forage and nest along the Caribbean coast of Nicaragua (green, hawksbill, loggerhead and leatherback) (Brautigam *et al*., 2006).

The commercialization of turtles in Nicaragua is a historical one[27]. The constitution of Nicaragua, which recognizes Caribbean coastal communities as having traditional rights to use the country's natural resources, is the basis for all natural resource management and environmental regulations. The capture or killing of any marine turtles other than for subsistence use is prohibited (as is the sale of turtle meat beyond communities). Fishing is only allowed on the Atlantic coast of the country and fishers must comply with closed seasons and regulations, risking facing penalties if otherwise (Garland *et al*., 2010; and references therein).

Garland *et al*. (2010) indicated that harvest is driven by local market demand for meat, and by the desire for revenue. Although turtle meat was considered one of the cheapest available meats, harvesting and selling turtles was also the quickest and easiest legal way for fishermen to generate revenue and feed their families (Garland *et al*., 2010). In addition to local sales, turtle meat was reported to be occasionally transported to other towns and inland markets for sale to individuals and restaurants (Garland *et al*., 2010).

So far, surveys have been conducted by WWF among fishing communities in several coastal areas of Nicaragua: Asseradores, Jiquilillo, Padre Ramos, Corinto Port, El Transito and Masachapa. Preliminary results suggest that in many areas there is no well-established market for marine turtle products: often harvested hawksbill eggs are locally consumed, and a small proportion of them may be commercialized in local markets. In such areas, eggs

[27] According to Garland *et al.* (2010), green turtles in the Caribbean Nicaragua have played an important role in the region by providing nourishment, maintaining social relationships and economies based on sharing and exchange, opening up the Caribbean region for trade with Europe in the past and, ultimately, providing the means for coastal indigenous groups to acquire income and material goods. Prior to the introduction of cash-based market activities, green turtle meat was one of the primary items exchanged and given in this system as a crucial marker of kinship and solidarity relations. Sea turtle meat was a dietary staple and an integral aspect of consumption and repayment in Miskito culture.

are the only marine turtle product used. On the other hand, in some other areas a better-established market appears to exist, with olive ridley meat being consumed locally but also sold to markets in other areas (Table 4). So far, only one shop has been found to be selling handicrafts made of hawksbill turtle (at Managua International Airport).

Despite legislation, the autonomous status of the Caribbean coastal regions of Nicaragua, together with time constraints and a lack of enforcement make the implementation of laws challenging (Garland *et al*. 2010; and references therein). According to WWF, awareness amongst community members about regulations applying to marine turtles differs according to the area considered.

Table 4 - Details about source, transit and destination of illegal marine turtle trade in Nicaragua.

Location	Source	Observation	Final destination
State of Chinandega - El Viejo	Communities: Aserradores, Jiquilillo and Padre Ramos.	These are areas of aggregation and reproduction for hawksbill and of transit for olive ridley. Turtles are not targeted, but eggs are consumed.	Hawksbill eggs are consumed locally and also sent to state commerce.
State of Chinandega - Corinto	Corinto Community	Fishermen incidentally capture olive ridley, leatherback, and green turtles with gillnets, commercializing their meat locally.	Eggs harvested along the coast are marketed to León and Managua.
León state	El Tránsito	People harvest olive ridley eggs from nests for consumption and trade.	Olive ridley eggs and flipper meat are sold in León and Managua.
Managua - San Rafael del Sur	Masachapa	Fishermen land net-drowned turtles. These are mainly olive ridleys and are destined for meat and carapace commercialization. There is no egg trade.	Meat and flippers are sold in Managua at locations owned by individuals originally from the Caribbean coast. Carapaces are prepared on request.

Needs (Nicaragua)

- **Alternative livelihoods:** Efforts should improve the socio-economic status of local community members by ensuring that alternative employment opportunities involving acceptable livestock rearing options are provided.
- **Enforcement / Capacity building**: Building community awareness and enforcing laws preventing trade of turtle meat outside of coastal, indigenous communities are needed (Garland *et al.* 2010).

Panama

Marine turtles represent a valuable marine biodiversity resource in Panama. Four species occur in the Caribbean sector of the country, from Bocas del Toro and the Comarca Ngäbe-Buglé, on the border with Costa Rica, to the Comarca Kuna Yala bordering Colombia (Bräutigam *et al*., 2006). These include the loggerhead, hawksbill, green and more rarely the leatherback turtle.

WWF has identified hawksbill, green, olive ridley and leatherback turtles to be involved in trade in Panama. The specific features of this trade vary according to the species and area considered (Table 5). In general, trade along the Caribbean coast tends to focus on hawksbill and green turtles, and on olive ridley along the Pacific coast.

Findings indicate that the Caribbean coast of Panama is under greater pressure regarding the illegal trade in marine turtles. Particularly, the provinces of Bocas del Toro, Comarca Kuna Yala, and part of Comarca Ngäbe-Buglé[28] seem to be the most critical areas. These are main sites along Panama's Caribbean coast where turtles are captured by locals during fishing trips that target other catch (Figure 19). While turtle meat and eggs are locally used, carapaces from these provinces are sold to traders from other provinces (e.g. from Veraguas province,

[28] In Comarca Ngäbe-Buglé and Comarca Kuna Yala marine turtle egg and meat consumption are a cultural tradition for the aboriginal people and Law 10 declares marine turtle hunting in Ngäbe-Bugle an act of basic subsistence.

where at least three people dedicated to the processing of hawksbill carapaces to produce cock fighting spurs were identified; a major part of cock fighting spurs distributed in the country is sourced from the Caribbean waters) but also from neighbouring countries. Evidence suggests that hawksbill products are being traded across national borders and into Colombia (specifically from Comarca Kuna Yala to the Colombian cities of Cartagena and Turbo). It appears also that raw hawksbill carapaces are exported into Mexico for processing into valuable cock fighting spurs that are later imported back into Panama. This scheme would involve export via Costa Rica of carapaces sourced from Bocas del Toro. Findings also identified online trade to be present in Panama, particularly the commercialization of cock fighting spurs, having great potential to reach abroad destinations. Although Bocas del Toro, Comarca Kuna Yala and Comarca Ngäbe-Bugle are main landing sites for local meat consumption (Figure 20), visiting foreigners are also known to seek turtle meat.

Along the Pacific coast of the country, trade appears to be mostly focused on beaches in Punta Chame (West Panama Province), and Provinces of Los Santos Province and Veraguas. Along this coast, eggs are widely consumed by locals, who also sell them in processed forms to other urban centers and main cities to be further commercialized in bars and public events (Figure 21). Cock fighting spurs are offered in some agricultural stores in Veraguas province, either secretively or openly. While hawksbills appear to be more affected by trade along Panama's Caribbean, along the Pacific coast olive ridley is the species most affected by egg consumption.

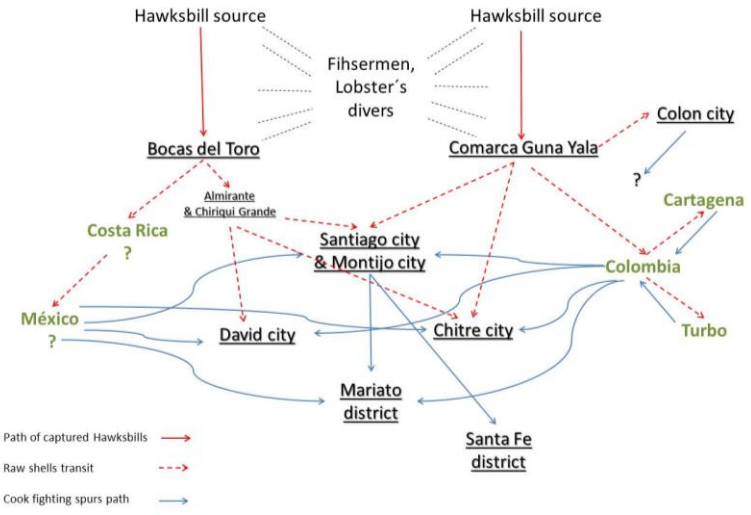

Figure 19 - Schematic representation of the trade path of hawksbill turtle carapace in Panama.

Figure 20 - Schematic representation of the trade path of green turtle meat and eggs in Panama.

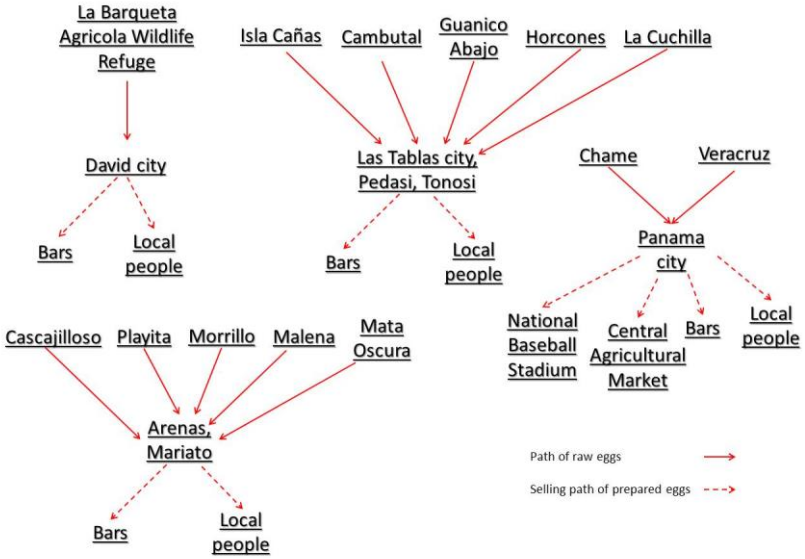

Figure 21 - Schematic representation of the trade path of olive ridley eggs in Panama.

Table 5 - Details about sources, transit and destinations of the +major marine turtle trade in Panama.

Location	Source	Observations	Final destination
Bocas del Toro province	Playa Larga, Playa Bluff, Zapatillas Cays, Punta Vieja, Playa Polo, Cayo de Agua, Playa Carenero	Fishermen mainly from Bastimentos Island harvest nesting females and eggs (mainly of green and hawksbill turtles). Sometimes harpoons are also used to capture individuals at sea.	Eggs and meat are sold in Isla Colon. Some people from Panama City seek prepared dishes in local restaurants of Isla Colon. There is a possibility that some hawksbill carapaces cross the border with Costa Rica towards Mexico.
	Playa Soropta	Nesting leatherbacks are killed and their eggs, as well as those of green and hawksbill turtles, are harvested.	Leatherback, green and hawksbill eggs and leatherback meat are offered in restaurants in Changuinola.
	Open sea, 5 miles from Zapatillas Cays	Fishermen, mainly from Bastimentos and Almirante, harvest green turtles during their migration season using harpoons and artisanal fishing nets	Turtles are locally consumed in Bastimentos and Isla Colon, including at restaurants.
Comarca Ngäbe-Bugle	Playa Roja, Punta Escondida, Punta Nispero, Quebrada Nasa, Cayo Paloma, Bahia Azul, Tobobe, Kusapin, Playa Chiriqui, Escudo de Veraguas Island	These are communities that use marine turtles extensively as part of their diet. They consume green, hawksbill and leatherback turtles, making use of the meat, eggs and carapace (in the case of hawksbills).	Communities use marine turtles mainly for local consumption, although at a smaller scale some professionals and traders visiting the town of Kusapin buy turtle meat. These marine turtles are also traded in Chiriquí Grande and Almirante.
	El Banco, located away from Escudo de Veraguas island	Fisherman from the communities harvest green turtles during their migration period using artisanal fishing nets.	Communities use marine turtles mainly for local consumption.
Chiriqui province	Wildlife Refuge Playa La Barqueta Agricola	Local residents harvest eggs and flippers from olive ridley	A part of these products are consumed locally and eggs are sold in David City.
Los Santos province	Playa Cambutal, Playa La Cuchilla, Playa Horcones, Guanico Abajo, Isla Cañas Wildlife Refuge	Local residents harvest eggs and occasionally flippers of olive ridley.	Eggs are sold in Tonosi, Las Tablas bus terminal and in the town of Pedasi.
	Mensabe Port	Fishermen land marine turtle meat (of unidentified species).	This meat is likely consumed locally.

Panama Oeste province	Punta Chame, Veracruz	Local residents harvest eggs, meat and also prepare olive ridley turtle oil.	Part of the products are for local consumption and part sold in Panama City.
Veraguas province	Cascajilloso, Playita, Morrillo, Malena beach, and Mata Oscura beaches	Local residents mainly harvest eggs of olive ridley and sporadically of hawksbill.	Eggs are mainly sold in Arenas town and Mariato. Cock fighting spurs make of Hawksbill carapaces are also found in agricultural stores in Santiago City and Mariato town.
Comarca Kuna Yala	Carti Sugdub, Isla Tigre, Corazon de Jesus, Ticantiqui, Rio Azucar, Nargana	Fishermen and lobster divers harvest hawksbills nearby coral reef areas, making use of the meat, flippers, eggs, carapace and plastron. Sometimes, green turtles are also captured for their meat.	The meat, flippers, plastron and eggs of hawksbills are consumed locally and the carapace is sold to vessels coming from Santa Isabel Port (Colon province) and from Cartagena and Turbo (Colombia). These vessels supply goods to communities in Kuna Yala. As a side activity, they purchase hawksbill carapace. In the case of green turtles, the meat is consumed locally.

Marine turtles in Panama are used for their meat (commonly used in local dishes), eggs, oil (used for producing medicinal remedies), penis (for its alleged aphrodisiac benefits), plastron and carapace (for the production of cock fighting spurs (believed to perform better than synthetic ones). Product prices vary according to species, but with some consistency regarding eggs (Table III, Appendix 2). The sale of turtle specimens represents a source of extra income for fishermen and divers. While there are no conclusive figures about the number of actual specimens traded, Table 6 provides reference values based on the information collected by WWF.

It is, however, possible that trade in marine turtles is declining in Panama, according to the perceptions of surveyed individuals. If true, this could be related to the presence of different conservation projects coordinated by NGOs, community-based groups, and the Ministry of the Environment, which have helped to reduce the pressure for illegal trade, particularly through increased patrolling and surveillance.

Table 6 – Volume of marine turtle specimens traded in Panama.

Source	Species	Amount of product traded	Observations
Wildlife Refuge Playa La Barqueta Agricola	Olive ridley	Between 4 and 5 turtles are captured during the high nesting season every year.	This activity is developed by one person according to Marcelino Batista - MiAmbiente ranger.
Open sea 5 miles away from Zapatillas Cays	Green turtle	During a single nesting season, 1000 turtles are captured, sometimes up to 7 are captured per hunter per day.	Data from MiAmbiente rangers in Zapatilla #2 Cay.
Playa Bluff, Playa Chiriqui, Playa Roja, Isla Escudo de Veraguas island, Zapatilla Cays, Playa Larga, Punta Vieja and Playa Polo	Hawksbill	During 2017, a total of 29 individuals were killed at these sites.	Data from Cristina Ordoñez - Sea Turtle Conservancy.
Kusapin	Green turtle	During every high season, up to 15 turtles may be killed.	Data from Natalia De Castro - Bocas del Toro.
Soropta beach	Leatherback	Between 2007 and 2018, records indicate that 12 turtles were killed.	Data from Juan Obando – AAMVECONA.
Cambutal beach	Olive ridley	Between 2016 and 2017, a total of 187 nests were looted and 3047 eggs confiscated. Between 2017 and 2018, a total of 130 nests	Data from Haydee Medina – Tortuguias.

		were looted and 3013 eggs confiscated.	
Cascajilloso beach	Olive ridley	During every season, around 30 – 40% of nests are looted.	Data from Joelbin De La Cruz – MiAmbiente Cerro Hoya.
Isla Cañas Wildlife Refuge	Olive ridley	During a given year, around 100 000 to 200 000 eggs are collected illegally.	Data from Dr. Janzel Villalaz, CITES scientific authority in Panama.
Punta Chame	Olive ridley	During 2015, 8 turtles were killed and during 2017, 3 turtles were mutilated.	Data from Haydee Medina – Tortuguias.
Carti Sugdub, Isla Tigre, Nargana, Corazon de Jesus, Ticantiqui, Rio Azucar	Hawksbill	One person may catch between 3 and 6 turtles per month.	Data from local interviews to fishermen and lobster´s divers.

Needs (Panama)

Panama has shown great progress in protecting nesting sites (especially those already impacted by human activities), in training, management, environmental education, and local awareness on conservation. At different levels, the government has promoted synergies among regional and international organisms addressing marine turtles (MiAmbiente, 2017). However, further action is still required:

- **Capacity to implement strategies**: Resources are needed to implement the actions established in the National Action Plan for the Conservation of Marine Turtles in Panama (MiAmiente 2017). The new National Directorate of Coasts and Seas of the new Ministry of Environment must be strengthened in personnel training and provided with efficient equipment, especially in the provinces of Ngäbe-Buglé, Bocas del Toro, Comarca Kuna Yala and Los Santos. Rangers of the Ministry of Environment and other actors (such as prosecuting attorneys in environmental laws) also require training on the national regulations protecting marine turtles. The number of trained personal conducting surveillance at key sites within and outside protected areas needs to be increased.
- **Information sharing**: An illegal trade database must be developed at the national/regional level to assist authorities. This could be facilitated through CITES data reporting requirements.
- **Education and awareness**: It is urgent that conservation education programmes be continued in sensitive areas on both Caribbean and Pacific coasts. The development of a nationwide awareness campaign, highlighting the importance of marine turtles and the trade regulations that apply to them is of particular need. Consideration should be given to the development of a long-term environmental education program for primary and secondary schools in Bocas del Toro, Comarca Ngäbe-Bugle and Comarca Kuna Yala and should involve also local stakeholders, NGOs and responsible authorities.
- **Legislation**: There are inconsistencies between national laws and decrees regarding the adoption of international conventions that protect marine turtles which need to be addressed.
  There is a need to work with the Kuna Yala General Congress to promote the application of marine turtle related bans, especially for hawksbill during its nesting season.
- **Protected areas**: There is a need to prioritize the declaration of new protected areas to strengthen the conservation of foraging and nesting sites. Particularly, this should be done in Comarca Ngäbe-Bugle, including the coral reef near Tobobe, Playa Roja and Punta Nispero; and Playa Bluff (Bocas del Toro) key sites.
- **Research**: Scientific-based conservation is urgently needed, and it can be improved by involving the private sector and calling for social responsibility. Research is particularly needed on Playa Ibiari (Comarca Ngäbe-Bugle) to support the declaration of this nesting beach as a protected area.
- **Projects**: Consideration should be given to the development of an ecotourism project targeting underprivileged communities along the coast of Comarca Ngäbe-Bugle to generate local income and reduce the pressure on marine turtles; and to a project for fishermen in Comarca Kuna Yala to improve their fishing gears, increasing fishing yield and reducing the need to target marine turtles.
- **Enforcement / Control**: An Action Plan must be developed to increase the surveillance of sensitive areas during the migration period of green turtles, especially in Bocas del Toro and Comarca Ngäbe-Bugle. This Plan needs to create synergy among the national security bodies, the Ministry of Environment, and local

authorities. Control points also need to be established jointly with the Ministry of Environment and National Security Bodies at hotspot locations (e.g. Almirante, Chiriqui Grande, Tonosi, Chame). The Costa Rica – Panama Sixaola Binational Commission needs to be reactivated to ensure enforcement of transit and trade control and surveillance across the border at Sixaola River. This action must also be enforced at Guabito checkpoint.

Relevant findings from the *in-situ* assessments in the Southeast Asia/Coral Triangle region

Figure 22 - Countries assessed *in-situ* by TRAFFIC: Indonesia, Malaysia and Viet Nam.

In the first half of 2018, TRAFFIC assessed the availability of marine turtle products at locations in Indonesia, Malaysia and Viet Nam (Figure 22) where trade in marine turtles was suspected to exist. The researchers investigated specimens' availability at local markets and online, interviewing also relevant stakeholders to better understand the characteristics of the trade. Seizure data[29] for the period between 2015 and 2018 was also analysed. The results of these assessment efforts are summarized in this section.

Indonesia

Six species of marine turtle occur in Indonesia: green, hawksbill, leatherback, olive ridley, loggerhead and flatback, and nesting sites are distributed throughout the 17 000 islands that form the archipelago (TRAFFIC, unpublished; Profauna, 2010).

The trade in marine turtles and their products appears to be widespread in Indonesia with turtle eggs and meat still in local demand. Stricter enforcement and media coverage of seizures are thought to have led to greater awareness among the general public about the protected status of these species. This appears to have driven the trade in live specimens, meat, eggs and shell products largely underground with accurate information now much harder to identify. It is possible that the trade may be shifting to online platforms, as the open sale of turtle carapace products appears to be now more limited in physical markets (particularly when compared to TRAFFIC's findings in 2009).

Of the 49 venues visited by TRAFFIC (in East and West Java, Bali and West Sumatra), only two souvenir shops in Gianyar (Bali) were found to be selling turtle carapace products (Table 7). Although not visited during market surveys, the Mentawai islands, where a strong traditional culture remains (Damanhuri *pers. comm.*, 2018), were reported to have significant volumes of turtle carapace products for sale. A two-day survey on the online availability of marine turtle products on 13 sales platforms identified 26 various items for sale (Table 8).

Table 7 - Shops found to be selling ornaments made of turtle carapace in Bali, May 2018.

Date	Location	Items on sale recorded	Number of items	Price per item
27 May 2018	Gianyar	Small ornament in the shape of a turtle	1	IDR 5,000,000 (~USD355)
		Ornaments made from preserved medium and large turtles	2	"Not for sale"
27 May 2018	Gianyar	Small ornament in the shape of a turtle	2	IDR 5,280,000 (~USD380)

[29] Including data records from TRAFFIC, media reports, grey literature and from other non-governmental organisations.

Table 8 - Marine turtle products being advertised for sale online in Indonesia, June 2018.

Date	Type of products	Price	Number of sites
7 June 2018	Bracelets (various sizes)	IDR40,000 - IDR1,750, 000 (~USD3 - USD124)	18
	Rings	IDR10,000 (~USD1)	3
	Fans	Not provided	1
	Hair combs	Not provided	1
	Stuffed (whole)	IDR 12,400,000 (~USD877)	2
	Ancient bracelets	Not provided	1

Note: USD exchange rate based on https://www.oanda.com/currency/converter/ as of 26 June 2018.

Local consumption and trade in marine turtles, eggs and other products is reported to be taking place at roadside stalls and in village/small town markets close to nesting beaches and ports where fishing boats may land specimens. It is reasonable to assume that, in most places where turtles nest or forage, there will be some local consumption and/or trade in meat and eggs.

The coasts of West Sumatra, Java, Bali, Kalimantan and perhaps to a lesser extent, Sulawesi, Maluku and Papua appear to act as important trading hubs. These areas are likely being supplied with marine turtle products (mostly by sea) from the thousands of smaller surrounding islands. While it is challenging to identify individual hotspots for export, large cities with ports and other harboured areas are thought to offer easier trade routes than transport by air.

Through the analysis of seizure data from between January 2015 and June 2018, 69 incidents were recorded in Indonesia. Of those, Bali was the most frequent seizure location with 25% of incidents (n=17), which mostly involved live turtles and meat. West Kalimantan, East Java, East Kalimantan and Nusa Tenggara East were also notable in terms of seizures, involving all commodity types except turtle meat (Figure 23). These seizures further highlight the role of these areas as transit areas for marine turtle trade.

The analysis of seizure records in the Southeast Asia/Coral Triangle region involving Indonesia, Malaysia and Viet Nam enabled the identification of at least 53 trade routes recorded for the period between January 2015 and June 2018. These involved both domestic routes, within Indonesia and Malaysia (Figure 24), and international routes (Figure 25). Domestic trade routes were mostly apparent for Indonesia (n=17), where maritime transport was the more common (76%) mean of moving marine turtle commodities within the country.

In 2012, it was reported that the international trafficking of marine turtles out of Indonesia was on the rise nationwide largely to meet a demand from East Asian countries (IOSEA, 2014). Present findings suggest that this still persists, with seizure data analysed by TRAFFIC (January 2015-June 2018) revealing the international trade in marine turtles from Indonesia to Malaysia, China, and Viet Nam. China was implicated as a destination country in at least seven of those cases.

Following the increased enforcement of regulations on the trade and consumption of marine turtles and their products, some communities (notably in Bali) have opened 'turtle attractions' that are visited by large numbers of fee-paying tourists. While permits are issued by BKSDA (the nature conservation body of the Indonesian Government), not all facilities are established for conservation purposes. While these centers may potentially threaten wild populations through the transfer of diseases when individuals are released, it has been suggested that they may also be conduits through which turtle eggs and meat are sold more easily (Firliansyah *et al.,* 2017), although it is unknown to what extent this may be occurring.

In Indonesia, a further trend that may be of concern is the sale freshwater softshell turtle (Trionichidae) meat marketed as marine turtle meat. Given the unprotected status and captive breeding of many softshell turtle species, together with people's confusion between freshwater and marine turtle species, there is the potential for unsustainable exploitation of the former (Anon. *pers. comm.*, 2018).

At a smaller scale, but still important, are also reports of traditional practices where hunting expeditions targeting marine turtles at sea and at beaches are still being practiced.

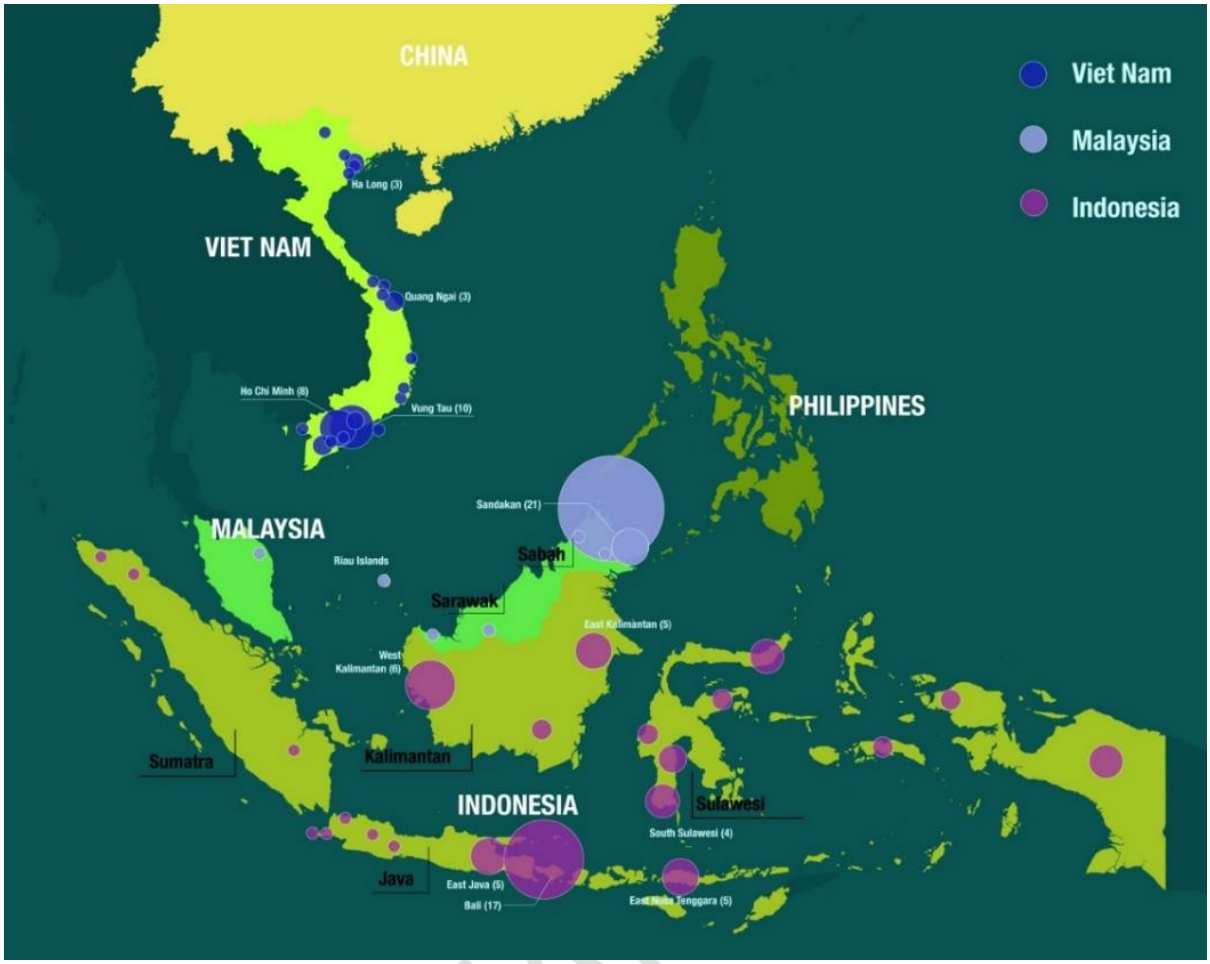

Figure 23 - Location of seizures for Indonesia, Malaysia and Viet Nam between 2015 and May 2018.

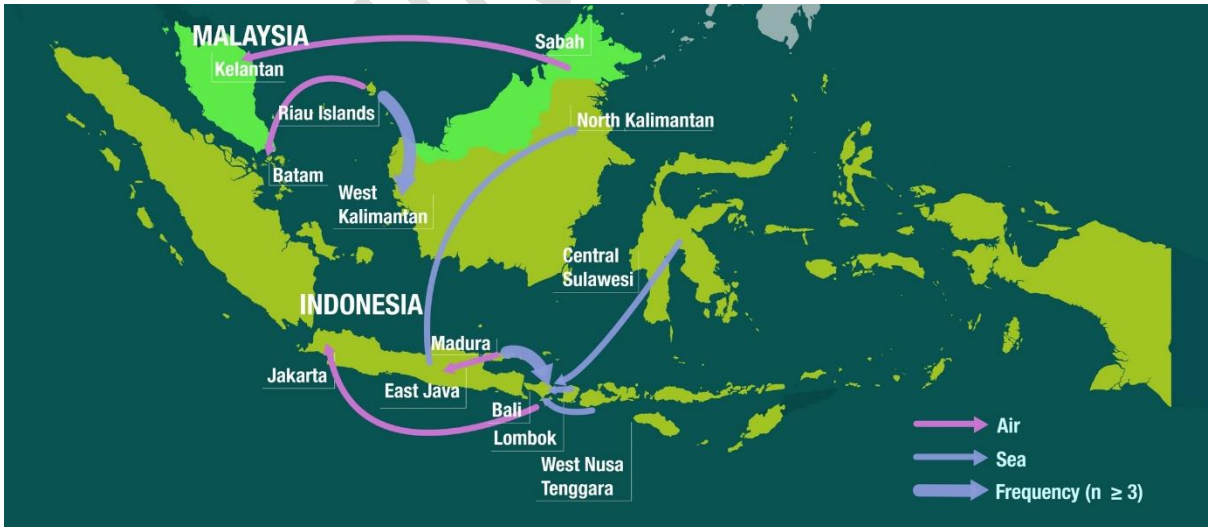

Figure 24 - Domestic trade routes for Indonesia and Malaysia based on seizure data between 2015 and May 2018.

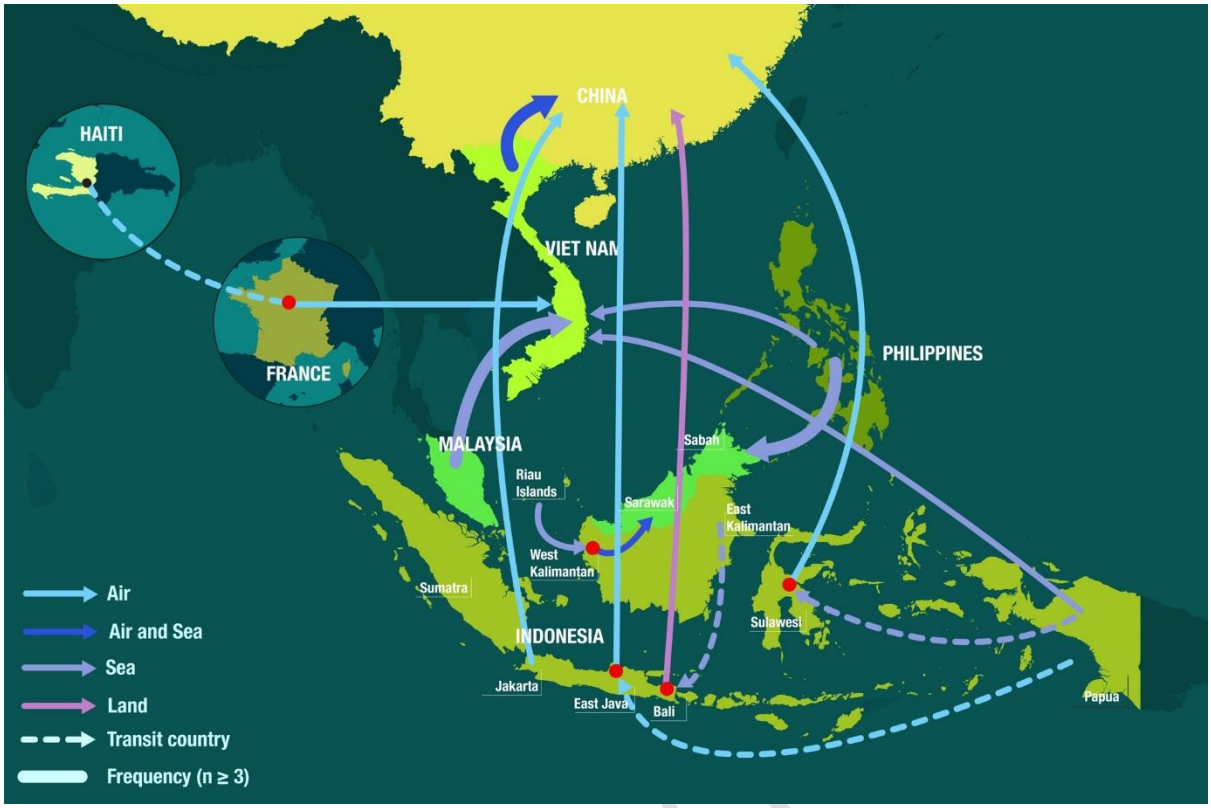

Figure 25 - International trade routes for Indonesia and Malaysia based on seizure data between 2015 and May 2018.

Malaysia

Five species of marine turtle are distributed in Malaysia: green, hawksbill, leatherback, olive ridley, and loggerhead. In Malaysia, primary nesting sites are found in the states of Sabah and Sarawak in East Malaysia, as well as the states of Terengganu and surrounding islands, Melaka and in some parts of Pahang and Perak in Peninsular Malaysia (TRAFFIC Southeast Asia, 2009).

TRAFFIC surveyed trade in marine turtles at 24 venues in Sabah, Sarawak, Terengganu and Melaka, known (TRAFFIC Southeast Asia, 2009) to be main hubs for the trade in the turtle eggs, but also key nesting states in the country (Table 9). Trade in live turtles was not observed during the market surveys and was not reported to occur in Malaysia. Trade mainly focuses on turtle eggs and meat for consumption and turtle parts (e.g. carapace) for souvenirs. While local demand appears to focus on the consumption of eggs, meat appears to mainly serve foreigners. The trade typically involves green and hawksbill turtles, but it is unclear whether these species are specifically targeted or whether they are just more abundant in Malaysian waters than other species.

Table 9 - Summary of results from physical market survey of turtle products in Malaysia between April and May 2018.

State	Venue type/ locality	Number of outlets visited	Type of items recorded for sale	Quantity	Price
Melaka	Wet market	1	None	NA	NA
Sabah	Wet and dry markets	14	None	NA	NA
	Souvenir shops	3	None	NA	NA
	Roving traders*	Up to 10 traders were observed in Sandakan; 1 to 2 in other towns.	Eggs	Approx. 50 eggs/trader.	- RM3.50/egg (fresh) (USD0.90) - RM5.50/egg (boiled) (USD 1.40)

Sarawak	Wet and dry markets	4	Eggs	Approx. 50 eggs (only observed at one vendor in Serikin market).	- RM20 (USD0.50) for ten eggs (only sold in batches of 10)
	Souvenir shops	1	None	NA	NA
Terengganu	Wet and dry markets	2	Eggs	Approx. 100 – 150 eggs/vendor (at least 7 vendors observed selling turtle eggs).	RM4 - RM6/egg (USD1 - USD1.50)
	Souvenir shop	1	None	NA	NA

*Note: * In all of the areas surveyed in Sabah, trade of turtle eggs is conducted covertly with traders having no established base for sale. Traders typically roam around towns approaching potential buyers with the 'OK' sign, which is commonly understood to refer to availability of turtle eggs for sale. USD exchange rate based on https://www.oanda.com/currency/converter/ as of 26 June 2018.*

The eight-day survey conducted into online trade (three platforms were surveyed) identified advertisements, exclusively on Facebook, for trading in turtle eggs (Table 10). The offers identified mainly focused on the Peninsular Malaysian states of Kelantan and Terengganu, but also in Sabah. Results suggest that the volume of eggs being traded online is small and conducted on an opportunistic basis (typical offers ranged from 10 to 50 eggs).

Table 10 - Summary of results from online survey of turtle products in Malaysia in May 2018.

Date	Type of Products	Price	Number of sites
May 2018	Eggs	RM 1 – RM 5 (USD 0.25 – USD 1.22)	18

In Malaysia, the hunting and trade in marine turtles and their products is prohibited in Sabah and Sarawak, but licensed egg collection is allowed in the states of Terengganu and Melaka. Terengganu is therefore an important hub for trade in turtle eggs. These are illegally obtained from other parts of Malaysia (e.g. Sabah), as well as from neighbouring countries and are then openly and legally sold in Terengganu (MT-IOSEA, 2014). Trade appears to have remained constant in this state: based on market surveys, at least 1,000 eggs were being sold daily at Pasar Payang in Kuala Terengganu (estimated at 365,000 eggs/year), a number not too different from the total 422,000 eggs estimated in 2009 (TRAFFIC, 2009).

In Sabah, based on observations and interviews with local stakeholders, there is a general perception that the open trade in turtle parts and derivatives is declining. This is attributed to a perceived increase in enforcement activities in recent years, with the highest number of seizures being recorded in 2016 and 2017 (WWF-Malaysia and SWD, 2018). Nevertheless, this apparently declining trend may be a 'false positive' as further inquiries reveal a black-market trade in turtle meat and eggs.

Through the analysis of seizure data from between January 2015 and June 2018, 29 incidents were recorded in Malaysia, most of which in the state of Sabah (n=26), with Sandakan being the most frequent seizure location. All incidents in Sandakan involved the seizure of eggs (Figure 23).

The analysis of seizure records in the Southeast Asia/Coral Triangle region involving Indonesia, Malaysia and Viet Nam, and already referred to in the section above, enabled the identification of at least 53 trade routes recorded for the period between January 2015 and June 2018. These involved both domestic routes, within Indonesia and Malaysia (Figure 24), and international routes (Figure 25).

Much of the illegal international trafficking of marine turtles in Malaysia has largely been attributed to poaching by foreign fishing fleets (mostly Chinese and Vietnamese) concentrated in the waters off the western coast of Sabah to meet market demands in China and Viet Nam. Previous seizures and studies (WWF & SWD, 2018; MT-IOSEA, 2014) identified that these locations host thriving turtle markets, offering turtle meat dishes, turtle-based souvenirs, and traditional medicine made of turtle parts. Based on the recent seizure data mentioned above, such

incidents still occur. There were at least 10 seizure incidents linking Indonesia, the Philippines and Viet Nam in the international trafficking of marine turtles with Malaysia. Most of these cases (at least 8) involved turtle eggs transiting from the Philippines into Malaysia.

According to a recent study by WWF and the Sabah Wildlife Depart (2018), the *modus operandi* for poaching of marine turtles has seen a shift in recent years through an increase in involvement of local community members. These are paid to capture turtles that are then collected in centralized locations for packaging and subsequent export to foreign markets, specifically China, Viet Nam and the Philippines (WWF & SWD, 2018). This shift is believed to result from increased maritime security that makes it more difficult for foreign vessels to directly operate in Malaysian waters (WWF & SWD, 2018).

Viet Nam

Five species of marine turtle are distributed in Viet Nam: green, hawksbill, leatherback, olive ridley, and loggerhead. In Viet Nam, major nesting beaches are scattered from the northern border with China to the southern border with Cambodia, including on most offshore island groups. Concentrated nesting areas are found in the Gulf of Tonkin, central provinces and the islands in the Southeastern waters and the Gulf of Thailand, though many are under severe pressure from human activities and some no longer exist (Hamann *et al.,* 2006).

Marine turtle products were observed for sale in 39 of the 436 outlets surveyed by Education for Nature - Viet Nam (ENV) in Hanoi, Ha Tien, Ho Chi Minh City, Nha Trang, Vung Tau (Table 11).

Table 11 - Locations in Viet Nam observed selling marine turtle products between January and April 2018.

Location	Outlets Surveyed	Outlets with turtle products (No.)	Outlets with turtle products (%)
Hanoi	88	5	5.7%
Ha Tien	41	9	22%
Ho Chi Minh City	139	9	6.5%
Nha Trang	118	10	8.5%
Vung Tau	50	6	12%
TOTAL	**436**	**39**	**8.9%**

Source: ENV, 2018. Note: Surveys by ENV are still ongoing and as such they were unable to share quantities of items recorded for sale in time for this study.

Most of the products observed for sale were made of hawksbill, with a small number made of green turtle. It was not possible to positively identify any other species on sale. The products most commonly observed consisted of small handicrafts (bracelets, fans, combs, pendants) and trophies.

Similar findings were observed by TRAFFIC in 2016 and 2017 (TRAFFIC, unpub.) during physical market monitoring within Viet Nam. TRAFFIC observed 163 marine turtle products for sale in four cities at 13 outlets (Table 12). All products observed were made of hawksbill and most of these were either bangles or bracelets (n=126).

Table 12 - Marine turtle products observed for sale in four cities in Viet Nam between 2016 and 2017.

Location	No. of Products
Ha Long	13
Hanoi	83
Ho Chi Minh City	53
Nha Trang	14
TOTAL	**163**

Source: TRAFFIC, unpublished data.

During the two-day online survey conducted by ENV, a total of 25 individuals (unique online accounts) were found to be selling marine turtle products through 42 advertisements. As with the physical market, most of the products for sale were small handicrafts and trophies. Meat was observed for sale on one occasion (quantity not specified).

Data on seizures, as well as results of market surveys conducted by conservation NGOs have demonstrated that the domestic and international trade in marine turtle products is currently still active in Viet Nam. Due to the lack

of comprehensive data on seizures and reliable investigation into trade routes, it is difficult to determine the overall trends in trade.

In 2002, TRAFFIC undertook a study (TRAFFIC, 2004) that found 29,000 marine turtle products for sale in 22 provinces in Viet Nam, most of which were for ornamental purposes. The products comprised of four turtle species (green, hawksbill, loggerhead and leatherback). In 2009, a different study by TRAFFIC found that only two species of marine turtle were regularly in trade (hawksbill and green turtle) (Stiles, 2009). Compared to the TRAFFIC 2002 survey, the number of outlets and items in Ho Chi Minh City and Ha Noi decreased considerably. However, trade had increased in other places, including Ha Long, Phu Quoc, and Ha Tien where marine turtle products were openly purchased regardless of the illegality.

The survey by TRAFFIC in 2016 and 2017 (Table 12) found only hawksbill products in trade. Moreover, in June 2018, 72 taxidermied marine turtles of various species were seized in Vung Tau after being on display at a shell-craft shop.

While the trade in marine turtles persists in Viet Nam, it is becoming less conspicuous. Demand plays a key role in driving it. Domestically, meat and eggs are consumed as a delicacy and as an aphrodisiac. However, international demand from Chinese nationals is emerging[30]. Sources find that Chinese tourists often buy wildlife products including combs, hairclips made of tortoiseshell[31]. Violators have claimed that they export large volumes of processed marine turtle products to wholesalers in China for local consumption. However, further investigation is needed to identify how this trade route operates.

Over the years, Sa Ky Port (Binh Chau Commune, Binh Son District, Quang Ngai Province) has remained an active market for the illegal trade in marine turtles. Despite arrests, commercial trade for marine turtles persists in this coastal location. In 2009, 117 marine turtles weighing 2 tonnes were seized from a Vietnamese individual in Binh Chau. Investigation revealed that these marine turtles were destined to wholesalers in Nha Trang and Ho Chi Minh City for Chinese tourists. In October 2013, 94 dead frozen marine turtles were seized from a driver who disclosed that the specimens were collected from fishing vessels in Sa Ky Port and destined for domestic trade.

Today, fishers targeted marine turtles in groups and equip themselves with large motorized boats. It appears that middlemen are willing to sponsor modern equipment and boats for fishermen to use while hunting. Alive or dead, marine turtles are processed (mainly stuffed) in Viet Nam before export. In November 2015, the customs department in Hai An Port, Hai Phong province seized a 40ft container filled with dried turtles and tortoiseshells. These products were illegally transported from Port Klang (Malaysia) to Viet Nam.

Through the analysis of seizure data from between January 2015 and June 2018, 41 incidents were recorded in Viet Nam. The Province of Vung Tau and Ho Chi Minh City in Viet Nam were the most frequent seizure locations, with 10 and 8 incidents, respectively. This mostly involved the seizure of taxidermied and live turltes and eggs (Figure 23). The analysis of seizure records in the Southeast Asia/Coral Triangle region involving Indonesia, Malaysia and Viet Nam, and already referred to in the section above, enabled the identification of at least 53 trade routes recorded for the period between January 2015 and June 2018 (Figure 25).

Based on this seizure data (January 2015 and June 2018), at least 10 incidents demonstrate that Viet Nam mainly functions as either a destination for the illegal trade in marine turtles or as a transit country for products destined to China. According to Wild Aid (2018), between 2013 and 2017, there have been at least 7 reported cases indicating cross-border trade in marine turtles between China and Viet Nam.

Research by TRAFFIC in 2002 had also revealed an active international trade in marine turtle products, mainly bekko, with much of the products being exported from Viet Nam. Through this research, many Vietnamese dealers stated that much of their trade was international (TRAFFIC, 2004), compared to what was previously thought (CRES, 1994).

[30] https://tuoitre.vn/tang-tru-hang-ngan-xac-rua-bien-de-che-tac-my-nghe-674781.htm; https://www.youtube.com/watch?v=oZ833NyihLM; http://infonet.vn/rua-bien-con-dao-bi-san-bat-xe-thit-lam-mon-nhau-hot-post176839.info.
[31] http://gappingworld.com/trung-quoc-thua-nhan-gay-thiet-hai-cho-rua-bien-va-cac-rang-san-ho-tai-bien-dong/.

Needs (Southeast Asia/Coral Triangle region)

- **Legislation / Enforcement:** A standardized legislative provision is required to improve conservation of turtle populations in Malaysia, including ensuring that all states prohibit the domestic trade in turtle products. Improved monitoring, detection and law enforcement are required at markets, maritime areas involving fishing vessels, as well as air and seaports in the three countries, from the local to national level.
- **Research / Alternative livelihoods:** Focused research on identifying the actual trade drivers in each country would help to provide insights that can subsequently help develop cohesive management interventions to address illegal trade. Research should consider the entire trade network from source to market. Also, coastal provinces/cities should develop programmes for providing sustainable alternative livelihoods to local communities.
- **Education and awareness:** Education and awareness raising among key players (such as local communities, fishermen, traders and consumers) to reduce the consumption and trade in marine turtles, focusing also on conservation are needed. Moreover, it is relevant to address the unsustainability of communities' practices for their own livelihoods.
- **Information sharing / Capacity building:** Given the clear regional linkages on marine turtle trade, improved cooperation between Indonesia, Malaysia, and Viet Nam (as well as the Philippines, that is also an important country involved in the trade) is urgently required. Regional cooperation is also important to identify illegal trade flows from within Southeast Asia to East Asian destination countries and territories (mainland China, Taiwan, Hong Kong SAR, Japan), key trade routes, methods, volumes, and 'hotspots'. Close collaboration and exchange of actionable intelligence regarding illegal harvest and trade of marine turtles and their products should be promoted between and within these regions. Capacity building (including on national legislation international regulations) and joint information sharing platforms should be encouraged and implemented.
- **Site protection:** Coastal provinces/cities where marine turtles nest and forage are advised to establish comprehensive management policies and regulations (including access or capture restrictions) to protect important nesting and foraging areas, as well as develop provincial site monitoring mechanisms in collaboration with maritime police and other relevant bodies.

Relevant findings from the *in-situ* assessments in the East African region

Figure 26 - Countries assessed *in-situ* by the Marine Research Foundation: Madagascar and Mozambique.

In the first half of 2018, the Marine Research Foundation visited locations in Madagascar and Mozambique (Figure 26) where trade in marine turtles was suspected to exist according to evidence. The availability of products was assessed at local markets, at touristic sites, and also online. Local inhabitants were surveyed to better understand the characteristics of the trade, and wildlife seizure data from national and regional environmental authorities was also collected and analysed. The results of these assessment efforts are summarized in this section.

For Mozambique, in specific, the Marine Research Foundation conducted a literature review to identify quantitative reports of illegal take of marine turtles within the country which could be attributed to artisanal fishing or targeted take (rather than to fisheries bycatch). Between May and June 2018, it undertook also field surveys, including rapid assessment interviews with artisanal fishers (77) and conservation management practitioners (11) along the coastal provinces of the country. The results of these assessment efforts are described below.

Madagascar

Mozambique

Five species of marine turtle are distributed in Mozambique's waters: green, hawksbill, olive ridley, loggerhead and leatherback (Figure 27). Loggerheads and leatherbacks nest mainly in the South, and green and hawksbills mainly in the North, being primarily restricted to islands with some scattered, low-density nesting along the mainland (Louro *et al*., 2006).

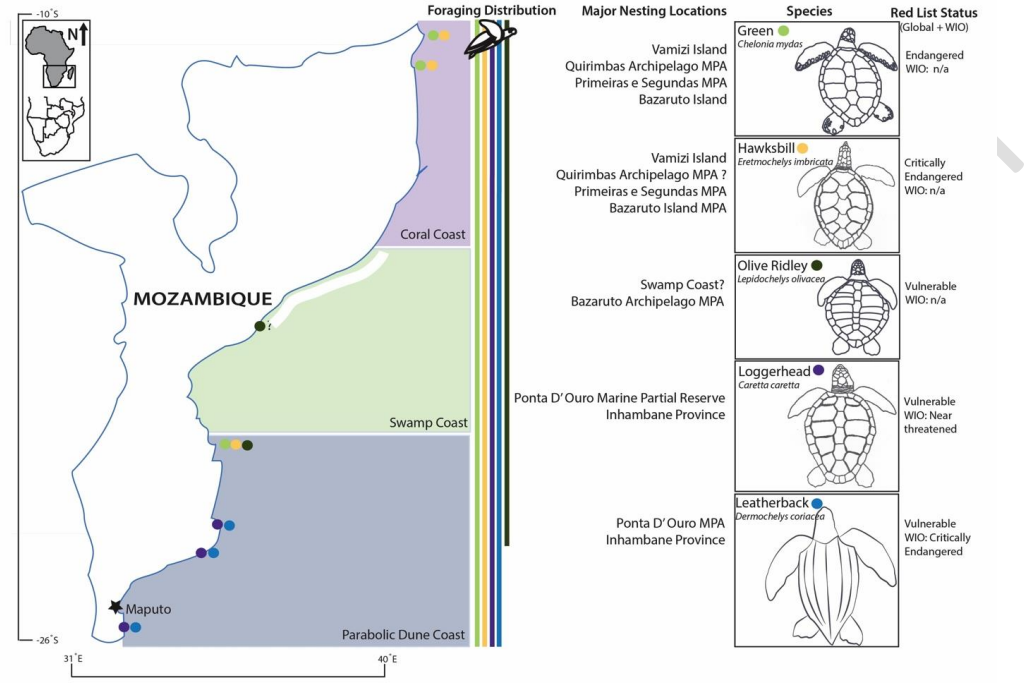

Figure 27 - Distribution, nesting locations and regional conservation status for the five species of marine turtle found in Mozambican waters. Major marine coastal habitat types (parabolic dune coast, swamp coast, coral coast) are shown on map (colour coded). Maputo, the capital city, is represented by a star symbol and Sofala Banks, the main commercial fisheries grounds, are shown as a white stripe. Foraging is likely to occur throughout the distribution range for each species. Adapted from Louro *et al.* (2006); with foraging and nesting information from Hamann *et al*. (2006), Fernandes *et al.* (2017), and Robinson *et al*. (2017); all presented in Williams (2017).

Despite marine turtles having been protected in Mozambique since 1965, illegal take is widespread throughout the country and considered understudied (Louro *et al*., 2006; Williams *et al*., 2016). Reports of high density illegal take have been documented in literature for numerous locations, particularly the islands of the Quirimbas and Primeiras and Segundas Archipelagos in Cabo Delgado and Nampula Provinces. Anecdotally referred to as 'turtle graveyards', these locations are likely to represent semi-permanent or seasonal artisanal fishers' camps used as bases for fishing offshore from the islands. Specialised turtle hunters using nets (primarily jarifa nets) and spears were reported by fishers in Mecufi, Murubue, Mefunvo in Cabo Delgado, and Nacala, Mucoroge, Sangange, and Moma in Nampula. It appears that targeted fishing for turtles occurs in sporadic campaigns a few times per year rather than all year round, and captures up to 30-40 turtles in a single event (fishers estimated that 80-100 turtles/year could be removed by specialised turtle hunters).

Williams (2017) reported that many fishers were aware of the illegality of harvesting marine turtles but noted that the risk of being caught was low and not an effective deterrent. According to present findings, domestic trade almost exclusively involves artisanal (local resident or migrant) fishers. Migrant fishers are more evident in the

North, in Cabo Delgado[32] and make seasonal campaigns in Mecufi district, parts of the Quirimbas, Palma and Macomia districts – although it is not clear to what extent migrant fishers (may) contribute to illegal take or use.

All species of marine turtle are subject to illegal take in Mozambique, and are not targeted according to size or species (Williams, 2016; Williams, 2017). Green, hawksbill and loggerhead turtles appear however to be the main species used in domestic trade, with there being a preference for hawksbill's meat due to its similarity to that of goat. Turtle meat is sold in a secretive manner, in private homes and through mobile street vendors. Given the widespread knowledge of the illegality of such activities, selling turtle meat in local markets is considered too risky. Although domestic sales were more evident from the interviews in Cabo Delgado, findings suggest that they could be equally as high in Nampula Province. First-hand turtle meat being sold in local markets was not directly observed, but three such recent events were reported to the researchers.

The sale of turtle meat and eggs was only documented in the North, but turtle shell products were found in tourist craft markets in both North and South. It is possible that the sale of turtle meat does not exist or is very rare in the South, perhaps related to local beliefs[33]. Turtle shell products (Figure 28) were detected in tourist craft markets in Pemba (North) and Vilanculous (South).

According to Williams (2017) the primary reason for illegal take of marine turtles in Southern Mozambique appears to be for meat consumption, with opportunistic egg harvesting occurring also. Louro *et al*. (2006) reported turtle captures in several areas in Mozambique. Gove *et al.* (1996) also reported carapaces being used for medicinal practices, however little is known about these practices as they are kept secretive. Current findings indicate that end products for the domestic trade include different forms of prepared meat[34]. Reports indicate that live turtles are captured to preserve the freshness of the meat likely destined for longer journeys, and possibly for illegal export to Tanzania. Hawksbill turtle shell handicraft products were abundant in Pemba (over 200 pieces[35]) in an artisanal arts and craft store. Artisanal fishers report not having the skills to make such products, but the Maconde[36] are known for these kinds of handicrafts (Rich, 2012).

Figure 28 - Turtle shell products on display for sale in Pemba, Cabo Delgado (31/05/2018) (photos J Williams).

Meat prices vary according to sale location (Table IV, Appendix 2). Prices are generally not high (approximately 50 MZN/kg, 1 USD) and equivalent to low priced fish meat or ray meat. Turtle shell product prices ranged between 200 and 500 MZN (4 to 6 USD) per piece[37].

[32] With individuals originating from Nacala and some of the Southern districts of Nampula (e.g. Angoche and Moma).
[33] For instance, in Dovela, Inharrime, Southern Mozambique, turtle meat was not sold for beliefs of 'turtles being a gift from god, to be eaten not sold' (Williams *et al.* 2016).
[34] Fresh meat was eaten in coastal communities and rarely sold for transit, whereas dried and smoked products were destined for sale in locations far from the place the turtle was captured.
[35] Ranging from rings, bracelets, earrings, glasses frames and a small cylindrical box/ashtray.
[36] An ethnic bantu group originating from Cabo Delgado and Niassa provinces.
[37] Game fish (e.g. tuna, billfish), crayfish, shark fin, and holothurians all sell at significantly higher prices per kilogram and make these legal products more financially appealing.

In areas with limited capacity for enforcement or a total absence of enforcement, it is likely that illegal take of turtles for domestic use is more abundant. However, reports suggest that trade or local use of eggs is becoming more infrequent as nesting abundance has declined in Mozambique since the country's Independence in 1975. Whilst domestic use in some areas still exists, its magnitude is likely to be lower at present that it was 10 years ago given that it can only occur clandestinely.

Evidence of intentional, targeted and presumably widespread international trade was documented during conversations with fishers and fishery management officers. Nearly 40% of respondents indicated they know about foreign buyers and a slightly lower proportion reported they knew of active international trade. The majority of respondents, however, were not clear about the trade destinations (Figure 29). It appears that there is not a large number of foreign buyers (Figure 30). Given the small number of respondents who were aware of foreign trade or foreigners involved, the numbers of turtles traded internationally from the artisanal fishery are inconclusive.

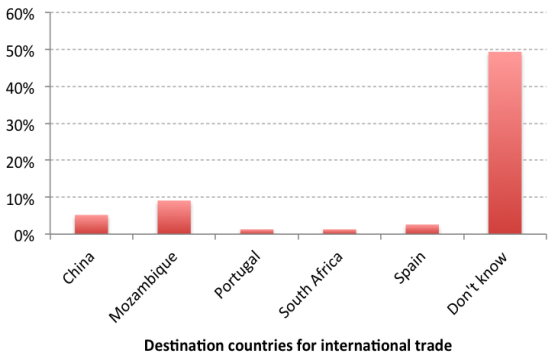

Figure 29 - Responses to the question on where international trade was destined. Of note is the high proportion of fishers who responded 'Mozambique' highlighting a limitation of the study (familiarity with the subject).

The interviews conducted confirmed that the international trade in marine turtles from Mozambique to other neighbouring countries exists: In Cabo Delgado, interviews with fishers confirmed illegal trade of whole live turtles (likely mostly green and hawksbills) being exported to Mtwara, Tanzania, where they reportedly would fetch higher prices (a whole live turtle, which appears to be the main product exported, could be valued up to 500 MZN[38]). It is not clear if the end destination of these turtles is the domestic Tanzanian market and private households, or if Tanzania is part of a larger trade route. In addition to exports occurring from Cabo Delgado, they are also likely to occur from Nampula province. No clear evidence of trade for export was documented in Southern Mozambique through interviews or found in literature.

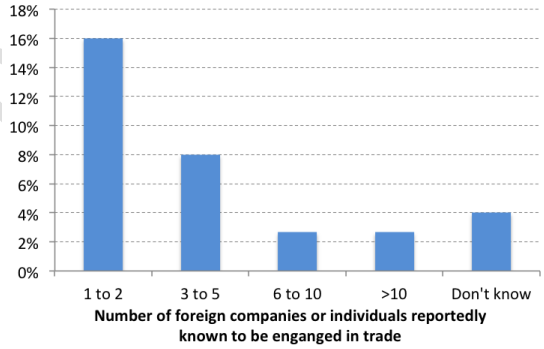

Figure 30 - Proportion of respondents who reported knowing foreign buyers for sea turtle products.

While there is no clear evidence of the trade in marine turtles being linked to that of terrestrial specimens in Mozambique, the findings of Pierce *et al.* (2008) and Williams (2017) suggest that it is possible that illegal take of turtles may coexist with shark finning. Moreover, there is an emerging market for dried sea horses throughout Mozambique destined to Asia and China[39]. Large scale collection of sea horses for sale to Asian markets have been reported for Bilene and Inhambane estuaries. Whilst there are no confirmed connections between turtle and sea horse trade, the existence of a trade in sea horses from Mozambique to Hong Kong[40] illustrates a well-established network[41] that may potentially be facilitating the illegal movement of marine turtle products.

Artisanal fishing is widespread along the entire coast of Mozambique and is mainly non-selective. As a result of non-selective gear types and the low-income status of coastal communities (Finkbeiner *et al.*, 2015; Berkes *et al.*, 2001), all catch including marine turtle bycatch, is typically retained (Williams, 2017). Although marine turtle bycatch is not well documented in Mozambique (or in the SWIO (Kiszka 2012; Bourjea 2015)), it is thought to be substantive given the current expansive nature of the artisanal fisheries sector in the country (Pereira *et al.*, 2014).

[38] In Tanzania, turtles reportedly sold for greater value than in Mozambique.
[39] Trade of sea horses from artisanal fishers to Mozambican middle-men or directly to Chinese buyers was reported in Inhassoro and was observed also at a larger scale in the Palma district, Cabo Delgado (pers obsvs. J Williams, September 2017).
[40] In 2014, 67kg of sea horses were detected in Hong Kong in a sea container originating from Mozambique (https://coconuts.co/hongkong/news/67-kg-dried-seahorses-seized-container-ship-arriving-mozambique/).
[41] Large exports of dried sea horses have already been recorded by the Mozambican customs authorities had recorded

Previous mortality estimates caused by artisanal fisheries was 240 – 420 turtles per annum in Mozambique (75% of that *C. mydas*; Louro *et al*., 2006) however it was subsequently suggested that this figure was lower than actual catch rates (Williams, 2017). Beach seining alone (considered in Inhassoro, Inhambane Province) was estimated to impact 160-280 turtles annually over a single 8-month fishing season (Gove & Magane 1996, Hughes 1971, Magane *et al.* 1998).

Extrapolating linearly from the estimates of bycatch derived from this survey is problematic given the uncertainties in fishing effort over an entire year, and along the entire coastline. An additional complication comes from interpreting fisher responses. A conservative approach whereby fishing is restricted to only half of the year to account for inclement weather, and where levels of take are conservatively estimated, resulted in a massive potential bycatch of over 800,000 turtles per year – across all species and gears, and this estimate is only reflective of the situation in the three provinces surveyed (Table 13). If these levels of catch are indeed realistic, it is worthwhile considering that they may double when expanded to the entire coastline of Mozambique.

Table 13 - Potential bycatch of sea turtles in three provinces of Mozambique derived from a linear extrapolation of take responses during the interview process. The number of gears was taken from the Mozambique Census of Fisheries 2012.

Province	Gear type	Estimate of turtles taken per year†	Number of respondents	Number of gears*	Potential bycatch levels
Cabo Delgado	Beach Seine	174	3	684	39,672
Cabo Delgado	Gamboa	111	2	440	24,310
Cabo Delgado	Gillnets	680	4	1358	230,860
Cabo Delgado	Hook & line	207	3	3017	208,173
Cabo Delgado	Purse Seine	345	4	108	9,315
Cabo Delgado	Spear	71	2	0	142
Inhambane	Beach Seine	348	3	516	59,856
Inhambane	Hook & line	378	3	1012	127,343
Nampula	Beach Seine	661	21	3699	116,430
Nampula	Gamboa	2	1	208	416
Nampula	Gillnet	1	1	2115	2,115
Nampula	Purse Seine	4	1	139	556
				Total	**819,189**

Respondents indicated that some 75% of the bycatch is released alive, which would suggest that the total loss of turtles through the artisanal fishery in the three provinces surveyed might be in the order of 200,000 turtles[42] – not at all unrealistic given the number of fishers and the number of gears deployed.

On the other hand, there are reported high rates of turtle bycatch in the semi-industrial and industrial sectors (Gove *et al*., 2001; Brito, 2012). Since the early 1980s, the shrimp trawl fishery was identified as a major source of turtle mortality (Gove *et al*., 2001) and it was estimated that around 120 semi-industrial and 100 industrial trawlers were operating in the country with take rates of up to 4-12 turtles/vessel per month during the nesting season. At the regional level, Mellet (2015) further revealed alarming estimates of turtle bycatch from fisheries operating in the SWIO, where estimates go up to 40,264 turtles/year bycaught in the gill net fishery and 4,129+-1376 turtles/year in the industrial long line one.

Figure 31 - Suspected IUU vessel within three nautical miles at Bazaruto Archipelago (28/05/2018).

[42] Some evidence exists to support this large estimate of total bycatch: There have been major population translocations in Mozambique since the civil war, when people fled to coastal areas to seek safety, food and livelihoods. With no alternative livelihoods, fishing is the option. Interview respondents indicated that an estimated 90-95% of the total population were fishers of some sort.

Reports of IUU fishing were evident in statements made by artisanal fishers primarily in Inhambane province, but there is no concrete evidence of artisanal fishers collaborating on illegal take of turtles. It is not clear, or possible to quantify how IUU vessels contribute to illegal take, use or trade of turtles in Mozambique, however the superficial investigations conducted into IUU fishing resulted in the confirmation of two vessels in the area (one of which of Taiwanese origin, seen laying 10km of gillnets off Bazaruto Island on 26 May 2018; Figure 31).

To date, the lack of existing baseline data on the domestic use, take, mortality events or trade in marine turtles has prevented the detection of noteworthy changes in trends and regional trade patterns specifically for marine turtles. Despite this, a number of existing trends in foreign buyers of other marine products is evident and may influence the local use and/or trade in turtles. These influential fisheries are briefly summarised:

- Artisanal shark fishing throughout Southern Mozambique is widespread and has been present for more than ten years now (Pierce *et al.,* 2008). It is suspected that bycaught turtle meat sustains temporary shark and ray fishing camps in Mozambique (Williams, 2017). Given that the artisanal shark fishery in Mozambique is larger than official estimates suggest, and probably increasing in size and sophistication (Pierce *et al*., 2008), it is likely to represent an important threat to marine turtles in Mozambique. Changes to this fishery are likely to influence domestic use and potentially export rates of marine turtles.
- This study found evidence of an emerging fishery for crayfish collection via artificial respiration methods[43] destined exclusively to Chinese/ Asian buyers in the district of Ilha de Moçambique, Nampula province and possibly also in Pemba, Cabo Delgado. The particular structure of the boats (which are owned by foreign companies) used in this fishery can allow fishers to easily hide clandestine catches such as turtles.
- The international demand for live crabs (by Tanzanian and Chinese buyers) has driven an increase in the market value of this catch. In the Quirimbas National Park, in recent years fishers have been switching from nets to the use of cages for catching crabs for export in which turtle meat is being used as bait[44].

Needs (Mozambique)

- Awareness: Continuing public awareness and outreach, particularly targeting the fisheries sector, where despite management practitioners understanding that reporting accidental mortality of bycaught turtles is mandatory, to date there are no cases of reported take in any of the three provinces surveyed. Alarmingly, a 2016 report from Mozambique to the Indian Ocean Tuna Commission suggests that no interactions with marine turtles have been reported in mandatory logbooks or through the observer scheme program of 2015 (IOTC, 2016), which is unlikely to correspond to reality[45].It is known that some fishers are afraid of reporting incidents in fear of prosecution.
- Capacity building: This is needed at different levels (local administrators, community leaders, community fishing councils) on the interpretation of turtle protection laws. Amongst others, there is the need to address the destination of seized turtle products as current practices[46] convey mixed messages about the legality of the consumption of protected species.

[43] Fishing using artificial means of respiration is prohibited under the general marine fisheries regulations of 2003 (known as REPMAR 2003).
[44] Has a potent odour and lasts longer as bait than fish meat, it is used in these cages to maximize crab catch. Turtle meat used as bait in artisanal shark fin fisheries has also been reported before in interviews in Quionga, Palma district, Cabo Delgado, and Pomene, Inhambane Province (pers. obvs. JL Williams).
[45] Alarmingly, a 2016 report from Mozambique to the Indian Ocean Tuna Commission suggests that no interactions with marine turtles have been reported in mandatory logbooks or through the observer scheme program of 2015 (IOTC 2016). This statement is unlikely to be true given a 2014 report that suggested take in this fishery was up to 5,000 turtles based on the earlier publications by Gove *et al.* (2001) and Brito (2012). None of the semi-industrial boats operating in Maputo Bay have TEDs devices installed despite it being mandated by law since 2004, and anecdotal reports suggest major capacity limitation in the fisheries observer scheme.
Despite the maritime fisheries decree having aimed to make TEDs mandatory by 2004, to date this has not been implemented. Two campaigns led by WWF Mozambique to implement TEDs in vessels operating out of Sofala Banks have been implemented, but the program has not been successful. Evidence suggests that are no commercial or semi-industrial scale vessels that have TEDs installed in Mozambique.
[46] For example, in Mecufi district, Cabo Delgafo and Moma district, Nampula the local authorities claimed that after turtle meat is seized from poachers and used as evidence, it is distributed to jails, hospitals and student residences. While this is the official process designated for fisheries products seized during illegal fishing in closure periods, this process has been inadvertently extended through to turtles, despite it fostering mixed messages about the consumption of protected species.

- Law enforcement: Although law enforcement is occurring, this is not being implemented at necessary rates, with perpetrators often fleeing before prosecution can occur. It is currently needed within and outside MPAs, and at the country's maritime and land borders with Tanzania, which appear to be essentially open and unregulated. Monitoring is needed through transects to quantitatively document turtle mortality. In areas where enforcement is especially weak, priority should be made to search mangrove areas nearby to fishing communities. Drone surveys may be a more efficient way to survey mortality along the coast. Also, the enforcement of the use of TEDs in vessels is in need of enforcement, as despite the maritime fisheries decree having aimed to make TEDs mandatory by 2004, to date this has not been implemented.
- Community programmes / Implementing capacity: A lack of enforcement is particularly evident at landing sites, beaches and islands, particularly those of the Primeiras and Segundas Archipelago, and some parts of the Quirimbas archipelago. Given national resource limitations in implementing effective enforcement, it may be beneficial to expand and develop community enforcement programmes such as the Management-Oriented Monitoring System (MOMs) program implemented by World Wildlife Fund for Nature (WWF) in the Quirimbas National Park. Additional support (financial, equipment and training) could also be provided to the Conselho Comunitário de Pesca (CCP; or Community Fishing Council) to monitor and enforce sustainable fishing in their fishing areas.
- Legislation: The legislation that describes community fishing councils currently falls short of providing CCPs with the jurisdiction to legally enforce sustainable fishing measures other than those described within general marine fisheries regulations (REPMAR, 2003).
- Investigation into cross-border trade: Subsequent to radicalized attacks since October 2017 in villages in the Northern part of the country, Pereira *et al.* (2018) suggested that the concept of terrorism/extremism is potentially being used to distract authorities and secure trade routes, which may be feeding networks in Congo, Somalia, Kenya, and Tanzania (and possibly also in Viet Nam and China). These suggestions seem worthy of further investigation efforts. A comprehensive quantitative survey on presence, scale and products being sourced by foreign buyers is also needed.
- Research into fisheries and illegal take: Research is needed to establish a baseline for the status of marine turtles in Mozambique, as this would assist in efforts to quantify and elucidate illegal use and trade. Moreover, research is needed into fisheries (including IUU practices) and its interactions with turtles, including an assessment of the effectiveness of current logbook and fisheries observer schemes, and a comprehensive scoping baseline report on IUU fishing in the country. Further evaluation of illegal take and use of turtles to provide more reliable national-scale estimates is also necessary.
- Areas of particular concern for the needs indicated above include the following:
  - Memba and Nacala, Nampula province;
  - Islands around Ilha de Mozambique, Nampula province;
  - Primeiras and Segundas Islands (i.e. Puga Puga, Fogo, Njovo), Nampula province;
  - Mucoroge, to Zambezia Province border, of Moma district Nampula
  - Pebane, Zambezia province;
  - Pomene, Inhambane province;
  - São Sebastião, Inhambane province;
  - Massinga, Inhambane province;
  - Jangamo to Legogo, Inhambane province;
  - Mefunvo Island, Quirimbas Archipelago, Cabo Delgado;
  - Quissanga, Cabo Delgado;
  - Islands of Bazaruto Archipelago National Park, Inhambane province;
  - Key turtle habitats in the Sofala province.

Relevant findings in recent literature on the West African region

The coasts of West Africa are amongst the world's most productive marine areas, being an important global reservoir of marine biodiversity (Polidoro *et al.* 2016; and references therein). Despite the Atlantic coast of Africa holding important habitat for marine turtles, this importance is not well captured in peer reviewed literature (Tomás *et al*., 2010). In most countries in the region, turtle nesting populations are exploited to levels thought to

Figure 32 - Countries for which findings in literature are presented in the current section: Angola, Cape Verde, Equatorial Guinea, Guinea Bissau, The Gambia, Togo.

be seriously affecting their conservation status (Tomás *et al*., 2010; and references therein). Adding to direct exploitation, emerging threats include fisheries bycatch (Tomás *et al*., 2010; and references therein) and the rapidly increase in oil exploration and extraction activities, particularly in the Gulf of Guinea (Tomás *et al*., 2010; and references therein).

Five species of marine turtle occur in the Eastern Central Atlantic (ECA)[47]: loggerhead, green, hawksbill, olive ridley, and leatherback. The latter four, have important nesting sites in the Gulf of Guinea: all nest in Bioko's Southern beaches along a restricted 20km coastline which is considered the most important nesting site in the region for its species and nesting numbers (Castroviejo *et al.*, 1994). Several other nesting beaches have been reported throughout the region, including sites in Guinea Bissau, Sierra Leone, Liberia, Côte d'Ivoire, Ghana, Cameroon, São Tomé and Príncipe (Polidoro *et al*. 2016; and references therein), but the ECA is considered a relatively data-poor region and estimates of population sizes and comprehensive inventories have not been conducted at all sites. Some estuarine and lagoon areas have also been identified as essential habitat for juveniles, including the Cameroon Estuary (Polidoro *et al.* 2016; and references therein). Olive ridley and green turtles are reportedly the most abundant species of marine turtle along the West African coast (Segniagbeto *et al*. 2016; and references therein).

According to Polidoro *et al*. (2016), marine turtles constitute the most threatened taxonomic group of marine biodiversity in the ECA. Nesting populations are being severely depleted throughout the region, particularly in the Gulf of Guinea islands. Where marine turtles are abundant, they are considered important food and income sources, being harvested[48] both on land and at sea for their meat and eggs (Castroviejo *et al*., 1994). In areas with large turtle aggregations (such as green turtle feeding grounds in Equatorial Guinea and São Tomé and Príncipe), organized market systems have developed (Polidoro *et al.* 2016; and references therein) and a significant trade for their carapaces exists.

In addition to harvesting, in the ECA all five species are adversely affected by commercial fisheries activities (including bycatch and destructive fishing practices). Following fisheries interactions, the second greatest threat faced by marine biodiversity in the ECA is habitat loss, followed by coastal development and pollution (Formia *et al*., 2003).

In many countries in the ECA, limited surveillance and enforcement capacity enable illegal fishing and overfishing to take place. Improved reporting at landing and estimation of fishing effort are needed across the region, as well as developing and enforcing catch quotas and appropriate fishing techniques and gears to reduce the impact of fisheries on marine biodiversity (Polidoro *et al*., 2016).

Angola

The distribution and status of marine turtles along Angola's coast is poorly understood (Weir *et al*., 2007). Four species occur in the country: loggerhead, green, olive ridley, and leatherback. While the latter three are found to nest (data from 2000-2003), olive ridley is the most widespread species (Weir *et al*., 2007). Huntley (1974) and Hughes *et al*. (2003) also reported the additional presence of hawksbill turtle.

Direct harvest and fisheries bycatch have been major causes of anthropogenic-related turtle mortality in Angola since the 1970s (Hughes *et al*., 1973; Carr *et al*., 1983). The interviews conducted by Weir *et al*. (2007) with fishing

[47] The Eastern Central Atlantic (ECA) can be biogeographically defined as the marine zone from Mauritania to Angola, including the offshore islands of Ascension, Cape Verde and Saint Helena; and Bioko, Sao Tomé and Príncipe and Annobón in the Gulf of Guinea (Polidoro *et al.* 2016; and references therein).
[48] Although often illegal.

communities between 2000-2006 revealed widespread turtle exploitation in the country, with both meat and eggs being used for local subsistence. Commercial poaching also occurs in the proximity of heavily populated areas, resulting in 100% use of meat, carapaces and eggs on some beaches. The interviews further suggested a large-scale hunting of juvenile green turtles for meat in the Foz de Cunene (in the Southern part of the country) and revealed that egg collection at Baía do Cuio destined to the Benguela market occurred once per week, with 1-3 olive ridley nests being located daily.

Despite protective legislation since at least 1972[49], exploitation of marine turtles continues to occur in Angola, having increased since the early 1990s due to increasing poverty and human displacement into coastal areas resulting from people escaping conflict. Adult individuals are killed for meat and large numbers of eggs are harvested annually (Weir *et al*., 2007; and references therein), even within protected areas. Although limited exploitation of turtles by stable coastal communities is potentially sustainable, this may no longer be the case when large numbers of people are displaced into coastal areas (Brongersma, 1982).

The findings of Weier *et al.* (2007) indicated also a widespread occurrence of marine turtle mortality associated to artisanal fisheries bycatch, with turtles killed for meat and used commercially in some locations, confirming that bycaught turtles are often consumed (Carr *et al*., 1991). Adding to direct exploitation and fisheries bycatch, other threats to marine turtles in Angola include natural nest predation by domestic and wild animals (Weir *et al*., 2007; and references therein), beach erosion, nest disturbance by vehicules, flooding, and urban development, particularly linked to the country's above-mentioned post-conflict rehabilitation.

Given the current socio-economic situation of the country, and also the absence of accurate population and life cycle data on marine turtles, controlled exploitation of turtles is currently not a practical solution, and instead implementing sustainable alternative food and income sources may be more worthwhile (Weir *et al*., 2007). As exploitation occurs both locally and commercially, a combined approach is necessary to maximize law enforcement and involve coastal communities in conservation and in the development of alternative livelihoods, taking into account the use of turtles as a food source by local people (Weir *et al*., 2007). The management and protection of marine turtle populations in Angola should be carried out in consultation with the relevant coastal fishing communities and their traditional leadership (Weir *et al*., 2007).

Cape Verde

The Cape Verde Islands (particularly the island of Boa Vista), are the main nesting area for loggerhead turtles in the Eastern Atlantic. Only loggerheads nest on the island of Boa Vista, despite green turtles and hawksbill juveniles often being encountered feeding along the island's coasts (Marco *et al*.m 2012; and references therein). The Cape Verde population of loggerhead turtles constitutes a key conservation unit for the conservation of marine turtles, as it hosts between 9 and 15% of the world's loggerhead nesting, between 13% and 22% of the Atlantic's nesting (Marco *et al.,* 2012), and more than 95% of the nesting on the eastern Atlantic (Fretey, 2001).

Monitoring conducted between 2007 and 2009 across Boa Vista (Marco *et al.,* 2012) demonstrated a sustained high level of anthropogenic take of nesting females for local consumption that potentially threatens the survival of the population. It was estimated that a minimum of 36% (1253), 18% (408) and 5% (215) of females nesting on the island in the 3 years of the study, respectively, were killed on unprotected beaches (with counts likely underestimated). While during the 1990s the slaughter of nesting turtles was very intense on the high-density beaches that were assessed by Marco *et al*. (2012), their findings on these beaches accounted only for 6% of the females hunted on the island.

More recently, in 2011 Hancock *et al.* (2016) conducted 438 interviews on the islands of Boa Vista and Santiago (Cape Verde) and found that while turtles are caught on the beaches in these islands, the majority is caught at sea. They estimated an annual harvest of at least 50-114 turtles for both the islands of Boa Vista and Santiago altogether.

The harvesting of marine turtles in Cape Verde is typically carried out by fishers, with fish sellers being the main intermediary between those and consumers. Hancock *et al.* (2016) estimated that from 2002 to 2011 the

[49] In 1972 the Angolan *Regulamento de Caça* prohibited harming turtles and their eggs or nests (Huntley, 1974) and in 2002, the government signed the Abidjan Memorandum (CM, 1999), which requires the protection of the species in West Africa (Weir *et al*., 2007).

percentage of the those involved in harvesting marine turtles decreased from 61% to 17% in Boa Vista, and from 87 to 18% in Santiago; the percentage of fish sellers involved in the sale of marine turtle products remained stable in Boa Vista and decreased from 78 to 22% in Santiago. The consumption of marine turtle products on both islands has also decreased since 2002: by 62% in Santiago, and by 28% in Boa Vista. Typical products traded in Cape Verde include whole turtles, turtle meat, eggs and penis.

The findings of Marco *et al*. (2012) indicated a substantial decrease in the mortality rate of turtles at least during 2007-2009, and those of Hancock *et al.* (2016) a reduction in levels of harvesting and of consumption of turtles in Cape Verde from 2002 to 2011. However, Hancock *et al.* (2016) found that the prevalence of commercial use of multiple types of turtle meat has increased in Boa Vista since 2002, suggesting that there has been a shift to harvesting primarily for trade with Santiago. Traditionally, turtle harvesting has not been a primary source of income on either island and it appears that specimens are taken mostly opportunistically and to meet extra expenses. Illegal harvesting of marine turtles persists on nesting beaches and in the waters surrounding the islands, despite national sea turtle protection laws (Marco *et al.*, 2012), implementation of penalizing legal frameworks, military enforcement and public awareness, confirming evidence from previous studies (*Cozens et al.*, 2012). Suggested reductions in take/consumption levels over time[50] must however be regarded with caution, as only a small time frame was assessed and respondents may have been more inclined to report a positive change, given he illegal nature of the activity being surveyed.

The lack of law enforcement and insufficient protection at beaches and docks are the likely factors allowing the trade in marine turtles to continue. Policies and controls should be targeted at points in the trade chain where they are likely to have the greatest impact (Hancock *et al.*, 2016). Increasing legal protection and beach protection and monitoring, continuing educational and awareness campaigns and projects in proximity with local communities, preserving core nesting areas from urbanization, and demonstrating the economic income potential of alternative activities (ecotourism) are necessary to safeguard the only major nesting aggregation of loggerheads in the Atlantic (Marco *et al.*, 2012; Hancock *et al.*, 2016). Turtle-based tourism may be a viable alternative to the consumptive use of marine turtles, however its effectiveness and fairness in generating income for local communities on these islands remains to be assessed (Hancock *et al.*, 2016).

Equatorial Guinea

Information on the turtle populations in western Equatorial Africa and, in particular, along the Gulf of Guinea is scarce (Castroviejo *et al*., 1994; and references therein). Five species of marine turtle have been reported to occur in the Gulf of Guinea: green, leatherback, olive ridley, hawksbill and loggerhead; although nesting activity is almost exclusively restricted to the first four (Tomás *et al*., 2010; and references therein). Green turtles have been reported in all countries of the Gulf of Guinea and the region hosts one of the world's largest nesting aggregations of the leatherbacks, centered in Gabon (Tomás *et al*., 2010; and references therein).

The Gulf of Guinea islands are some of the most significant marine turtle nesting areas in Africa (Castroviejo *et al*., 1994; Tomás *et al*., 2010). Bioko island (Equatorial Guinea) is a rookery for the four species nesting in the Gulf of Guinea, with nesting occurring almost exclusively in the South of the island (Tomás *et al*., 2010; and references therein). South Bioko is an area of critical importance for sea turtle conservation in Africa, as it hosts appreciable densities of four species in a very limited geographic area. Green turtles and leatherback nest in regionally important numbers, while olive ridley and hawksbill species are less abundant. Bioko is suggested (Tomás *et al*., 2010) to be the second most important nesting area for green turtles along the Atlantic coast of Africa, after the rookery of Guinea Bissau (Catry *et al*., 2002).

The first insights into nesting and exploitation levels in the Gulf of Guinea Islands came from Castroviejo *et al*. (1994) (from data from 1985-1994), who described the traditional take of eggs for local consumption throughout the nesting season and an active organized harvest of adult females, despite the fact that all marine turtles have

[50] Possibly as a result of the protective law introduced in 2002, to the several conservation and educational initiatives that have been implemented in Cape Verde over the past decade or so, as well as nocturnal patrols, and other protection efforts particularly led by NGOs during the nesting season appear to have been an effective deterrent to poaching and have alleviated the hunting pressure at relevant sites. Despite this, however, determined hunters continue to take turtles, as the relative inaccessibility to some important beaches make patrolling and enforcement difficult (Marco *et al*., 2012; Hancock *et al*., 2016).

been protected in the country since 1988. According to Castroviejo *et al*. (1994), the main cause of exploitation of marine turtles in Bioko was the meat and egg trade, with specimens being traded in the capital's main markets. There were accurate records of the number of sea turtles killed each year in the Gulf of Guinea islands, but it was suggested that the largest number would have been taken in Bioko (an estimate of approximately 500 green turtles/year was suggested despite the authors not explaining the rational for this estimation; Castroviejo *et al*., 1994). It was reported that shell handicraft products from the Gulf of Guinea islands were an important traditional activity and so turtles were sold directly to craftsmen rather than being sent to markets. Shell handicraft products would then be sold in local markets, with trade with Angola having been reported and being also likely with Europe (Castroviejo *et al*., 1994; and references therein). In general, marine turtle commerce appeared to produce low returns for the local islanders, but was an important complementary revenue (Castroviejo *et al*., 1994). Adding to human predation, natural predation had also been observed on the islands and was of unknown impact (Castroviejo *et al*., 1994).

More recently, Tomás *et al*. (2010) conducted surveys in Bioko during the 1996/1997 and 19989/1999 nesting seasons. Observations suggested that natural predation is likely to exert a minimal impact on marine turtle populations in Bioko in comparison to anthropogenic threats. They reported that local markets were mainly supplied by specimens taken from South Bioko, with records of ca. 250 green turtles, 50 leatherbacks, 6 olive ridleys, and 6 hawksbills per season being transported by land from Ureca to Luba and Malabo markets. The capture of individuals by Bioko's fishermen in other countries of the Gulf of Guinea is also of concern: the authors were able to confirm the capture of 12 green turtles in fisheries through a tagging scheme[51].

As earlier suggested by Castroviejo *et al*. (1994), carapaces of hawksbill turtle have been used for production of artisanal jewelry in Bioko, despite existing legislation. Ongoing permitted and illegal take of adult turtles at nesting sites in Equatorial Guinea and the level of take in fisheries (including elsewhere in the region) are thus suggested to constitute serious threats to breeding aggregations in the Gulf of Guinea (Tomás *et al*., 2010). This exploitation, may be, at least in part, the cause of the extremely low numbers of this species observed in Bioko. During the seasons 1996/1997 and 1997/1998, egg take by locals and dog predation on clutches were under control by the presence of a project, however, when this ended, the control and supply of alternative resources in the area also ended which prompted locals to pursue direct egg take again while it is not known whether this is sustainable.

Moreover, tagging and measurements by Tomás *et al*. (2010) demonstrated that Bioko's green turtles had smaller body size than most nesting populations of these species, which has previously been suggested to be linked to continued take by humans over long periods[52]. It is thus possible that Bioko's green turtle stocks may be decreasing, despite high levels of inter-annual variation in nesting numbers of green turtles, as is normal in this species (Broderick *et al*., 2001), precluding robust trend analysis over short time periods (Tomás *et al*., 2010; and references therein).

Guinea-Bissau

Catry *et al*., 2009 presented the first overview of sea turtles in Guinea-Bissau. There have been several efforts to improve the conservation status and the knowledge of the ecology and distribution of sea turtles in this country, however research projects over the past 20 years have often resulted in short internal reports (many of which with little or no quantitative data), with most information collected having remained unpublished.

Five species of marine turtle have been confirmed to occur in Guinea-Bissau: green, hawksbill, olive ridley, loggerhead, and leatherback. The green turtle is by far the most widespread and abundant of the five species that

[51] Noting that less than 200 individuals were initially tagged; that not all captured animals may have been reported; and that tag loss is an ongoing problem with green turtles (Tomás *et al*., 2010; and references therein).

[52] It has been suggested that intensive capture of turtles either in the foraging areas or in the same nesting areas can result in the reduction of the nesting female size (Carr and Carr 1970; Bjorndal *et al.* 1985, Limpus *et al.* 2003). So it is possible that the smaller size of green turtles nesting in Bioko would be a result of the continued take by humans over long periods. It is not clear why larger individuals might arrive earlier (Reina *et al.*, 2007) but it could be linked to better swimming capabilities or body condition which could in turn be related with age and breeding experience (Limpus 2001). Concerning the size of the other species, data provided are simply descriptive due to low tagging effort. However, Bioko's leatherback were considered generally large. Bioko's olive ridleys are also among the largets for the species (Tomas *et al.* 2001b), while hawksbill show no exceptional size values compared to other nesting popuations (Castroviejo et al., 1994; and references therein).

nest in the country, and its most important nesting site appears to be located at Poilão. The nesting numbers of green turtle in this country are also particularly relevant in an international context (Catry *et al.* 2002). Olive ridley turtles appear to be the second most abundant species in Guinea-Bissau, and loggerheads and leatherbacks are very rare. The most important turtle nesting areas in Guinea-Bissau are situated in the core zones of protected areas[53].

From 1992 to 1994, a survey of the 6 main beaches of the Orango Group was conducted (reported by Catry *et al.*, 2009). During the survey, 44.8% of those considered to be old green turtle nests (n=288) had suffered predation, of which 36.4% was of human origin (the remainder was by crabs and monitor lizards). A survey conducted in January 2008 on those 6 beaches in Poilão revealed the presence of at least 374 green turtle shells which, according to witnesses, had been killed and consumed in 2007. During the same survey, 35% of old olive ridley turtle nests (n=142) when first visited had suffered predation, with 26% of the cases by humans.

In the Bijagós Archipelago, marine turtles can be used in religious ceremonies (e.g. Bernatets, 2005), but their meat is not reserved only for special occasions. In fact, the consumption of turtle meat and eggs seems to occur very frequently and, on most nesting beaches, few if any turtles or nests are left untouched when found by locals. Except for Poilão[54], there do not seem to be any general traditional rules protecting sea turtles, although at some places it appears that leatherbacks can only be killed under special circumstances. On the other hand, there is very little use of turtle shell for the manufacture of goods. Marine turtles are strictly protected by the national fisheries law, although there is no specific mention to their eggs and nests in the law text. Turtle meat and eggs are very seldom seen at markets in the country and most take results in local consumption.

Nevertheless, there are recent reports of turtles being exported alive by foreign fishermen. Targeted capture at sea is only known to be done by nationals on a small scale, around Unhocomo and Unhocomozinho. Whether there are occasions and places where foreign fishermen specifically target turtles in Guinea-Bissau waters is unknown, but the authors have first-hand reports of this happening not far from the national border, in Senegalese waters, which, given the mobility of fisherman across frontiers, makes it likely that it happens in Guinea-Bissau too.

Off Guinea-Bissau, many industrial fishing trawlers operate, coming from countries as diverse as China, Spain, France, Italy, and Portugal, and many fishing vessels operate illegally. While very little is known about the impact of the industrial fishing fleet in Guinea-Bissau waters, Limoges and Robillard (1991) suggested a catch of 500-1000 turtles/year[55]. A later (superficial) assessment based on 11 interviews with national fisheries observers and on information on the number of licenses for the international fleet indicated that that catch might be in the order of 300 turtles/year, of which many could be released alive (Broderick *et al.*, 1998). In Guinea-Bissau, such fishing is mostly carried out by foreign fishermen (generally from Senegal, Guinea-Conakry, and Sierra Leone), but also by nationals, often in association with foreigners. If caught alive, turtles are generally killed and consumed. Despite having no quantitative data to present, Catry *et al.* (2009) suggest that the level of this type of mortality is almost certainly very high, as informal contacts with fisherman indicate that turtles are frequently captured and that one large fishing canoe can, at certain times and locations, capture several turtles per day. Nevertheless, the illegal use of nets by foreigners and nationals in those critical sectors is still common practice. In the core areas of the Orango National Park, for example, illegal fishing boats were present every day when surveys were carried out in January–March 2008.

Informal interviews conducted by Catry *et al.* (2009) along the coastal zone of Guinea-Bissau in the last two decades suggest that turtle populations have markedly declined within living memory (with the possible exception of the population nesting in Poilão). Main threats are poaching of eggs and of nesting females and the incidental capture in fishing gear.

Few enforcement activities have taken place and there have been virtually no penalties for people killing marine turtles or harvesting eggs. The regular presence of monitoring and research teams in Poilão has certainly

[53] Within the Bolama-Bijagós Biosphere Reserve that covers the entire Bijagós archipelago.
[54] Considered a sacred site.
[55] Sea turtles are regularly captured in monofilament nets set from open boats, in coastal waters, to catch predatory fish, such as sharks, rays, barracuda, jacks, and snappers (Catry *et al.*, 2009).

reinforced the traditional protection that benefits this site. Without such presence, it is likely that temporary camps of foreign fisherman would be re-established and the illegal harvest of turtles would take place as in the past. Ecotourism initiatives alone are unlikely to provide sufficient incentive for conservation and innovative methods should be sought. Alternatively, direct payments for community involvement in conservation and monitoring may be worth considering (Ferraro *et al*., 2002).

The Gambia

Green, hawksbill, leatherback and olive ridley turtles all occur in The Gambia (Barnett *et al*., 2004). While it is possible that loggerheads also occur, Barnett *et al.* (2004) found that green turtles are the most abundant species in the country, and the only one observed to nest as of the year 2000. Most nesting activity is confined to the Southern coastline of the country, in particular to Gunjur and Kartong.

The biology and conservation status of marine turtle populations in The Gambia are poorly documented, and this lack of information is largely due to the absence of local specialists, research resources and infrastructure. Threats to marine turtles in The Gambia are mainly of human origin and include the illegal harvesting of eggs, juveniles and adults (Barnett *et al*., 2004). In addition to the illegal harvesting of specimens, artisanal fisheries bycatch (including from trawling activity) is also noted as a main threat to marine turtles in the country, as is habitat erosion and coastal development linked to tourism (Barnett *et al*., 2004). Despite protective legislation[56], turtles are still caught at sea and brought to land for butchering, with these activities prevailing because of the lack of human and financial resources devoted to law enforcement, an unwillingness to enforce environmental and wildlife laws, and a general public legislative unawareness.

Togo

Through patrols conducted along Togo's coast between 2012 and 2013, which recorded a total of 743 marine turtles (nesting, stranded and landed individuals), Segniagbeto *et al.* (2016) found that intentional killing of marine turtles by fisherman appears to be regular along the country's coastline, with 13.2% of the 743 individuals recorded comprising of nesting females killed on beaches and individuals killed at sea for household consumption. Intentional killing of marine turtles by fishermen is said to be common in Togo (Okangny, 2012) and according to the findings of Segniagbeto *et al*. (2016), interactions between these species and human activities along the country's coast may represent a conservation concern for the occurring species.

Fisheries interactions, including bycatch and boat collision, are also of conservation concern in Togo, as over 58% of the 743 individuals identified by Segniagbeto *et al.* (2016) were incidentally captured in nets placed inshore by fishermen. Growing numbers of coastal fishermen in Togo (Okangny, 2012) increase the likelihood of fisheries interactions with these species.

While local subsistence consumption of turtles should be monitored (Segniagbeto *et al.,* 2016), further research is thought necessary to better understand the interactions between human activities and marine turtles in Togo.

Relevant findings in recent literature on the Mediterranean region

Figure 33 - Countries for which findings in literature are presented in the current section: Egypt.

Three species of marine turtle occur in the Mediterranean: the green turtle, the loggerhead and the leatherback, but only the former two nest in the region. Green turtles mostly frequent the Levantine basin, mostly nesting in Turkey, Cyprus and Syria; loggerheads mostly nest in Greece, Turkey, Cyprus and Libya; and leatherbacks appear to concentrate in specific areas, such as the Tyrrhenian and Aegean Seas

[56] The Gambia became a signatory to the Abidjan Memorandum in 1999, which provides a basis for the regional conservation of marine turtles of the Atlantic Coast of Africa. However, accurate and up to date information from all participating countries is necessary for effective management and conservation measures to be put in place. The Wildlife Conservation Act of 1977 and the Biodiversity/Wildlife Policy and Regulation of 1999 protect marine turtles at the national level

and the area around the Sicily strait (Casale *et al*., 2010; and references therein).

Marine turtles in the Mediterranean are affected by a wide range of threats which include: tourism development, beach erosion, pollution, artificial lighting, nest trampling, natural predation, boat strikes, illegal dynamite fishing, offshore breakwater, entrapment in power station filters, direct take of eggs/ nesting females, intentional killing by fishermen and intensive fishing activities (Casale *et al*., 2010; and references therein).

Severe exploitation of marine turtles occurred in the Mediterranean from the 1920s to the early 1970s by fisheries specifically targeting turtles to trade with the United Kingdom and Egypt for consumption (Stella, 1982). Currently, turtle trade and consumption are uncommon in this the Mediterranean (Boura *et al*., 2016) and international trade is not considered a conservation threat for marine turtles in this region (Casale *et al*., 2010). Specific national and international legislations aimed at protecting turtles in the Mediterranean have resulted in relatively little take of eggs/adults, although these threats are still relevant in some cases[57] (Casale *et al*., 2010).

There are reports indicating that in recent years (1995 onwards) egg poaching in Libya has become more intensive in certain areas due to alleged medicinal beliefs. The practice was first noticed as a local tradition in the western region (Tripoli to Tunisian border) during surveys in 1998 (Laurent *et al*., 1999). Egg poaching and illegal trading were also reported in Misuratah and Sirte from the Gulf of Sirte beaches during the 2005-2007 seasons, with over 12.5% of nests being poached in 2005 (Hamza and Ghmati, 2006). More recent evidence has, however, highlighted Egypt as likely being the the last major illegal market for marine turtle trade in the Mediterranean basin.

Marine turtles in the Mediterranean are severely affected by numerous fisheries activities (Nada *et al*., 2009). Turtle bycatch occurs practically everywhere, as is expected from the distribution of turtles and fishing effort:

- Casale (2008) estimated over than 150 000 captures of marine turtles take place annually in the Mediterranean basin, and a 50 000 deaths/year in excess.
- Having one of the largest fishing fleets in the Mediterranean, Italy represents a major threat to marine turtles on a regional scale (Casale, 2008). For example, bottom trawl in the North Adriatic captures were conservatively estimated at 4300/year, with a potential mortality as high as 43% (Casale *et al*., 2004). Pelagic longline in the Ionian Sea was estimated by Deflorio *et al*. (2005) to capture 1100-4400 captures/year.
- Laurent *et al*. (1990) estimated the annual incidental captures in Tunisia at 4000-5500 loggerheads; Sfax port contributed from 60 to 70% of the total captures.
- Laurent (1990) estimated also that 3581 loggerheads are captured/year by the driftnet swordfish fishery along the Moroccan Mediterranean.

Although nowadays intentional killing for trade is considered absent or negligible in the Mediterranean, meat consumption onboard may take place in some cases (being particularly significant in Egypt and in Greece; Casale, 2008), especially by foreign crews who support this tradition (e.g. in fisheries in Greece and Libya; Casale *et al*., 2010). In circumstances where it may be economically convenient, turtles may also be killed for recovering expensive hooks (Casale and Cannavò, 2003) or in fear of fishing gear damage (e.g. in Syria[58], Cyprus[59]).

Egypt

The Mediterranean coastal waters of Egypt host important loggerhead and green turtle foraging grounds and migratory corridors from multiple nesting areas, including those of Egypt but also of Cyprus, Turkey and Syria (Laurent *et al*., 1996; Broderick *et al*., 2011). In comparison to other Mediterranean sites, loggerhead and green turtle nesting in Egypt are considered low, with the main nesting area (22km of sandy shoreline on the North Sinai Peninsula) carrying an average of 66.5 nests/year for loggerhead, and 7 nests/year for green turtle (Boura *et al*.,

[57] Although turtle meat and eggs are not typically consumed in the Mediterranean, Casale *et al.* 2010 reports on some instances of localized cultural beliefs in some countries/areas that turtle meat, eggs and/or blood have medicinal properties (e.g. in areas of Turkey, Syria, Libya), however this does not imply the existence of active markets (Casale *et al.*, 2010).

[58] For example, turtles are deliberately injured in Syria and left at sea as this is believed to make turtles leave the area (JOny and Rees, 2009 in casale 2010).

[59] Deliberate killing is now very limited and is caused by the occasional fishermen who had his nets damaged by a turtle, there may be 1-2 turtles (of both species) killed this way every year, though none were found since 2006 (information comes from sranding records).

2016; and references therein). In addition to these two species, the presence of leatherback at sea has also been verified via stranding and bycatch surveys (Boura *et al*., 2016; and references therein).

According to Nada *et al.* (2009) marine turtles in the Mediterranean region of Egypt are more threatened by human activities than previously thought (Laurent *et al.*, 1996; Nada, 2001). Egypt was one of the first markets to trade in marine turtles in the Mediterranean: loggerhead and green turtles have been sold in several fish markets along the Mediterranean coast (Alexandria, Abou Keer, Brullos, Port Said and Damietta) since at least the beginning of the 20th century (Nada *et al.*, 2009; and references therein). Turtle consumption is a tradition documented in Egypt at least since the 1970s, especially in Alexandria (Boura *et al.*, 2016; and references therein). Despite Egypt being a signatory of international conventions since the 1970s and having also adopted national laws in the 1990s rendering marine turtle trade and consumption illegal, Alexandria is probably one of the last major illegal markets for sea turtle trade in the Mediterranean basin (Boura *et al.*, 2016).

In 2007, Nada *et al*. (2008), demonstrated that past conservation efforts in Egypt had resulted in a reduction of trade, but that some covert trade remained, with the major threat being direct on-board killing by fishermen for consumption. Previous surveys reported that high numbers of turtles were traded in the Anfoushi fish market of Alexandria (Laurent *et al.*, 1996; Nada, 2001) but turtles are no longer publicly traded there (Nada *et al.*, 2009). More recently, between 2014 and 2015, Boura *et al.* (2016) assessed markets in Alexandria and conducted 148 interviews at those sites. Their findings revealed that although public trade appears to have ceased, a black market in marine turtles continues to exist. Trade was noted in 6 markets in 3 areas of Alexandria, where specimens are sourced from local fishermen (but also from other Egyptian fisheries) and mostly incidentally (90% of all by-caught turtles are landed, according to interviews). Based on interviews, the average annual catch estimated in the area is of 4.51 turtles/vessel (or 216.5 turtles/year, as reported by 48 interviewees). The evidence collected from interviews indicated that trade has increased by 60-120% in comparison to previous assessments in 1998-1999 and 2007 (estimates indicate that 600-800 turtles are potentially traded per year), with more sellers, markets and neighbourhoods now involved in the trade.

Turtles are illegally traded at the domestic level mainly for meat consumption (onboard or household) but also for the artefact sale. Blood consumption does not seem to be as widespread as it was in the past. If landed alive, the specimens are sold to fishmongers. Boura *et al*. (2016) identified three fishmongers that are specialized in turtle trade and an additional 36 that engage in the activity sporadically. It appears that the main consumers of marine turtles in Egypt are fishermen, fishmongers and community members that have not completed primary education or were illiterate. While action since the 1990s has delivered awareness, it seems to have not resulted in a behavioural or cultural change. Tradition, alleged health benefits and the lower relative cost of marine turtle meat were reported as the main drivers for consumption. However, turtles are not considered important nutrition sources, and with the exception of a few specialized fishmongers, trade is not considered an important income source either.

There are indications that Alexandria may be a source of cross-border trade as artefacts are sold to tourists by fishmongers and artefact shops. However, the artefact trade seems to be a by-product of the consumption trade, and this does not seem to be a case of organized mass cross-border trade, but rather an opportunistic one. Nada *et al.* (2009) suggested that marine turtle mortality from intentional killing and consumption by fishermen while out fishing is more important than mortality from trade.

It is likely that several hundreds of turtles die every year as a consequence of capture by fishing gear along the Mediterranean coast of Egypt (Nada *et al.*, 2009). For example, it has been estimated that 7,164 turtles/year are caught along the Mediterranean coast of the country (these are captures, not necessarily individual turtles, because the same turtle can be caught more than once; Nada *et al.*, 2009). Moreover, the 90% mortality rate of bycaught specimens reported in Alexandria is higher than in other Mediterranean fisheries that do not supply the trade (Boura *et al*., 2016), which suggests that Egypt is of priority for marine turtle conservation in the Mediterranean.

Without urgent action, illegal trade in Egypt will continue and potentially increase considering that overfishing and fisheries depletion in the Mediterranean may lead to further exploitation of non-target species. Based on findings, Boura *et al*. (2016) recommend: implementing an action plan that can guide marine turtle conservation in Egypt; improving law enforcement and implementing education and awareness campaigns tailored to different

target groups, including to tourists; implementing year-round monitoring surveys at markets to better characterize the trade; building capacity, empowerment and wide engagement of all relevant actors; increasing donor support and implementing bycatch monitoring surveys. Additionally, mitigating fisheries interactions in Egypt appears to be a particularly relevant priority that will benefit population recovery and amplify conservation efforts across the Mediterranean.

Discussion and conclusions

Main findings by region

Despite rapid assessments not being the most ideal way of capturing trends in legal/illegal wildlife trade, they still allow for the collection of extremely useful insights ((e.g. the confirmation of certain patterns) that enable the scientific and policy communities to better comprehend the features of an issue at hand. Although this report only presents preliminary results, the following regional patterns in the trade of marine turtles have been identified:

Inter-American region

The three countries assessed in the Inter-American region revealed a still widespread domestic market for marine turtle products. Marine turtle meat, eggs, carapace, plastron, and penis are all used in this region. Although take and commercialization of marine turtles is legal within certain communities and restrictions, it is known that it often trespasses what is envisaged in the legislation. Domestic trade provides poor community members with a food and income source and is driven also by traditional practices (e.g. it is relatively easy to find turtle meat served as typical dishes). A new and concerning component of the illegal trade in marine turtles was found to exist in this region: the trade, particularly online (through social networks such as Facebook), of cock fighting spurs made of hawksbill carapace. Both this form of trade and product traded appear to be on the rise, and evidence collected in the region (including IAC and WWF, *pers. comm.*) indicates that it goes beyond national borders. While products transported by post can easily avoid authorities' controls having the potential to reach greater distances (e.g. suspected destination countries for cock fighting spurs traded online and exported from Colombia may include Chile and Ecuador), it emerges that international trade via land and sea is also occurring (at least from Panama to Mexico, involving also Costa Rica). These trends deem further investigation. Although the interviews conducted by WWF suggest that marine turtle trade has decreased in the last 10 years, the researchers suggest that creating awareness and implementing a strategy to reduce consumption and demand are needed throughout the region. Likewise, capacity building for authorities, tackling legislative inconsistencies, ensuring that all levels are well aware of legislation applicable to marine turtles, researching, protecting important sites, encouraging communities to engage in conservation, developing alternative livelihoods for them and involving them in decision-making are all critical aspects. Moreover, a central illegal trade database that could guide managers and other authorities could be particularly useful in this region.

Southeast Asia/Coral Triangle

Preliminary results from TRAFFIC suggest that the illegal trade in marine turtles in Indonesia, Malaysia and Viet Nam persist, although open trade is limited, particularly in Indonesia and Malaysia. Evidence suggests that Indonesia remains an important source country supplying the demand for eggs and meat, as well as for carapaces (either in processed or raw form), with consumption and trade prevailing across the archipelago. In Malaysia, local demand for eggs remains in the states of Sabah and Terengganu. Still, it would appear that new trade mechanisms have developed to account for stronger enforcement actions particularly in Sabah, where consumption and trade in marine turtles is strictly prohibited. In Viet Nam, local demand for marine turtle meat still exists and trade in other products was observed in several surveyed locations. However, the open trade in turtle shell products seems to have reduced significantly in Viet Nam in comparison to findings in 2004. While products appear to mainly serve local demand in the three countries, foreigners are also known to seek them. The analysis of seizures in the three countries further supports the persistence of international trafficking in the Asian region, with China often being a key destination. Viet Nam acts mostly as a destination country, but also as transit route for trade into China; Indonesia is particularly relevant as a source country, with seized shipments destined to China, Viet Nam and Malaysia; Malaysia emerges both as a destination for eggs from Indonesia and as a source of turtle products destined to Viet Nam. While it has not been possible to quantify current trade in this short assessment,

it is suggested that the threat posed by continued illegal poaching and trade, in combination with the other threats marine turtles face is likely to lead to adverse effects on the remaining turtle populations in Southeast Asia.

East Africa

Eastern Africa is considered a data-poor region regarding information on marine turtle abundance and fisheries interactions. Targeted take of marine turtles occurs in Mozambique, but it appears to mainly serve local consumption and markets. Uncertainties on the relative abundance of marine turtles using Mozambican waters and a lack of robust information on the number of individuals (and size classes) killed by artisanal fisheries make it difficult to conclude whether the current level of illegal harvest for any of the five sea turtle species is or not sustainable, although it is thought the levels of take of hawksbill and green turtles may not be so. Moreover, an increasing population in Mozambique and a heavy national reliance on fish resources could lead to sustained or increased rates of illegal take of turtles (Williams, 2017). The Marine Research Foundation was not able to identify solid evidence of international trade in marine turtles sourced from Mozambique, however anecdotal evidence suggests the existence of an efficient smuggling route across the Mozambique-Tanzania border. On the other hand, given that artisanal fisheries and the five species of marine turtle are widespread throughout the Mozambican coast, the rates of interactions reported between fishers and turtles are of concern. While this interaction does not necessarily lead to illegal take and consumption/trade, results indicate that approximately 30% of fishers could be engaging in illegal take. Extrapolating these estimates to the entire coast of Mozambique, could suggest that a large number of turtles is opportunistically removed every year (although it must be acknowledged that estimating total take from such a rapid assessment is problematic due to several key reasons[60]). Large estimates of bycatch and of subsequent opportunistic take therefore contrast with the sparing reports and evidence found on targeted take. Addressing fisheries interactions with marine turtles in Mozambique (particularly those with the artisanal sector) emerges as a critical need to safeguard marine turtle populations in this country. There is a need to investigate the effectiveness of current logbook and fisheries observer schemes and compliance with the use of TED devices. It could be that the impacts of fisheries interactions on marine turtle populations in Mozambique are potentially of larger conservation concern to the species than trade itself. Still, research is needed to establish a baseline for marine turtles in Mozambique as this would assist in understanding illegal use and trade. Building awareness and capacity, implementing better surveillance schemes (and considering the development/expansion of community enforcement programmes to that end), revising shortfalls in national legislation and investigating the dimensions of cross-border trade with Tanzania are all important needs that must be addressed.

West Africa

Considered a data-poor region in terms of assessment data on marine turtle biology, conservation status and threats, it has been noted that many conservation efforts in West Africa have remained unpublished. Encountered publications indicate that despite at least some degree of protective legislation being in place, illegal take, use and trade in marine turtles are still widespread in this region. Despite the difficulty in finding documented evidence of actual exploitation and/or trade numbers, these activities appear to be undertaken mostly at the local level and to be driven mainly by local consumptive and livelihood needs, with harvested specimens generally ending up locally consumed or traded at the domestic level. It is unclear whether there are linkages between these (apparently localized) national markets and larger scale, international trading networks, as it was not possible to identify solid evidence of local harvest being fuelled by international demand. Nevertheless, it appears that some trade within the region may occur, particularly in the form of cross-border trade between neighbouring countries or facilitated through foreign fishing vessels landing (by)caught specimens in their countries of origin. The scale of these practices, as well as the threat posed by them remain to be assessed. Fisheries bycatch, but also targeted fisheries are extensively reported as sources of concern for marine turtle conservation in western Africa. While understanding the actual dimensions of these activities and their impacts still require further research, it seems possible that they be of significantly greater conservation concern when compared to the possible impacts of local (and potentially international) take, use and trade. Literature has extensively highlighted

[60] including but not limited to 1) it is unreasonable to extrapolate from a small number of interviews to an entire coastline; 2) it is impractical to access the entire coastline and all fishers; 3) fishers understand the illegality of turtle captures and thus under-report these when asked, or do not report them at all if not asked; 4) seasonal variances exist which preclude straight-line extrapolations; and 5) species distribution means that impacts vary by geographical region.

the importance of developing (together with coastal communities) sustainable alternative livelihoods along western Africa for those that rely on marine turtles. Increasing legal protection, continuing awareness and beach protection projects in proximity with local communities, preserving core nesting areas from urbanization, and demonstrating the economic income potential of alternative activities are necessary to safeguard marine turtle populations in the western Atlantic (Marco *et al.*, 2012; Hancock *et al.*, 2016).

Mediterranean

Alexandria, Egypt is believed to be the last major illegal marine turtle market in the Mediterranean basin. Here, tradition plays a significant role in the harvest and use of marine turtles, and the sale of these is generally not associated to protein or income dependency. In comparison to other regions of the world where marine turtles are used and traded, the levels at which this takes place in Egypt appear to be negligible. Likewise, meat consumption or killing on-board is reported to take place in some instances within the Mediterranean but appears to occur at insignificant levels. It was not possible to identify any solid linkages between Egyptian turtle take/trade and international market demand. Although common until the 1970s, international trade is currently considered not to be a threat to marine turtles in the Mediterranean basin (Casale *et al.*, 2010). Rather than trade, documented research suggests that the impacts of fisheries bycatch on marine turtle conservation are of much greater concern for turtles along Egypt's coast and in the Mediterranean. Several publications exist highlighting the immense numbers of turtles bycaught in national Mediterranean fisheries alone. Working to extinguish the last remaining marine turtle trading and/or consumption hub in the Mediterranean is a relevant goal and to achieve that an action plan for Egypt, improving monitoring, enforcement and awareness are pertinent measures. Still, directing efforts to mitigate the interactions between fisheries and marine turtles may have more considerable effects.

Preliminary trends identified

In-situ assessment efforts have confirmed that illegal trade in marine turtles is still existent in the Inter-American region, in East Africa and in the Southeast Asia/Coral Triangle region, and available recent literature indicates that this is also the case in West Africa and in the Mediterranean, although to a much lesser extent in the latter. Illegal domestic use and trade appear to be quite widespread within these regions. In the Inter-American, East African, West African and Mediterranean regions, take seems to be mainly sourcing for a local market demand generally fuelled by tradition or dependency either on the food or income that marine turtles provide. So far, it has not been possible to identify, neither in the field nor in literature, solid evidence of linkages between these domestic markets and larger scale, international trafficking networks involving these regions. When anecdotal evidence is available, however, it is suggestive that illegal international trade is occurring amongst countries at the regional level (e.g. Caribbean countries; those in the Gulf of Guinea; Mozambique and Tanzania). For the Southeast Asian/Coral Triangle region, however, evidence of international trade fuelled by international demand is more apparent, being supported by seizure data. Still, local consumption and trade are also prevalent within the Asian countries assessed.

Based on the information presented in this report, it may be reasonable to suggest that the illegal (domestic and international) trade in marine turtles is currently occurring at lower levels than it has in the past, and more so, that it may be declining in some regions, although further results are needed to fully assess this possibility. The analysis of global marine turtle seizure records suggests that this could be the case since 2008. Also, responses to a survey to 94 marine turtle experts (Lopes, *in prep*.) on their perceptions on the trend in illegal trade in these species within their countries of expertise suggested that in the last five years global illegal trade in marine turtles may have decreased.

It is, nevertheless, important to reflect that while the difficulty in locating evidence of large-scale international trade in marine turtles could be supportive of a decrease in these activities, the findings of the *in-situ* assessment efforts and of Lopes (*in prep*.) suggest that online trade is still understudied, thus requiring further attention.

Conservation impacts

Despite the discoveries made since the first studies began on marine turtles, many fundamental questions about these species' biology, ecology, life history, and population dynamics remain unanswered (Veley *et al.*, 2017). Moreover, the paucity of historical information on population abundance and trends of marine turtles in many regions make it impossible to discern trends in the recent period. It is of extreme difficulty, if not impossible, to

quantify illegal trade in marine turtles, particularly based on rapid assessments, such as those undertaken in the context of this report. Likewise, presented with the multiple threats marine turtles face, together with their life history traits (highly migratory species with long breeding cycles, for example), accurately correlating harvest/trade levels to observed declines in population/nesting numbers is an extremely challenging task.

The threat posed by legal and illegal take/ trade must be considered in the context of the other existing threats to marine turtles. Recent efforts to rank global threats to these species have proposed that fisheries bycatch may currently be of greater global concern to marine turtle conservation than legal and illegal take/trade itself. Here, it becomes important to note that marine turtles are considered a "welcome bycatch" (Senko *et al*., 2011) in certain regions.

Way forward

While there seems to be a general knowledge gap on the understanding of the impacts of harvest on marine turtle population dynamics, new legislation as well as extensive conservation efforts are reported to have taken place in the last years and are believed to have significantly contributed to reductions in consumption and demand for marine turtle products in some areas (e.g. Cape Verde; Equatorial Guinea). Still, it is of utmost importance that actions to improve the conservation status of marine turtles, as well as to address their illegal use and trade, are pursued.

According to the survey conducted by Lopes (*in prep*.), who surveyed 97 experts opinions on the current priority action categories needed in their countries of expertise to decrease the engagement in illegal take, use and trade in marine turtles, the top three highlighted fields were improving law enforcement and compliance; improving management, conservation interventions and monitoring; and educating and raising awareness and participation at different levels (Figure 34). These findings further confirm the updated validity of the needs reported throughout the present report. The following section contains provisional recommendations on actions currently needed for safeguarding marine turtle conservation in the context of addressing take, use and trade.

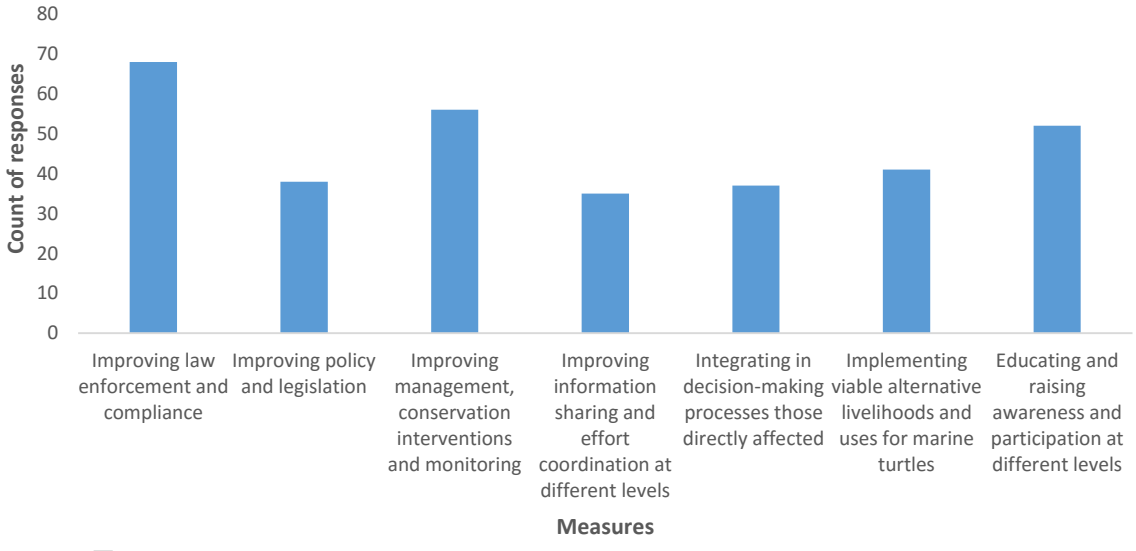

Figure 34 – Participants' perceptions (n=97) on the actions that must be currently prioritized in their country of expertise to decrease the engagement in illegal take, use and trade in marine turtles. Source: Lopes (*in prep*.).

Provisional recommendations

1. Improving compliance with existing regulations

a) Implement regional strategies in cooperation with local stakeholders, governments, NGOs and others to reduce use/ demand for marine turtle products. Where national strategies already exist, encourage and support their implementation (e.g. with capacity building activities, human and/or financial resources);

b) Improve monitoring, detection and law enforcement in the market place, maritime areas involving fishing vessels, and at air- and seaports. The identification of key trade routes, methods, volumes, and trade 'hot-spots' is necessary;

c) Conduct a thorough review of legislation that protects marine turtles and its inconsistencies within countries and within regions, taking account not only of national but also international regulations and commitments;

d) Train and build capacity of relevant authorities at the national level, particularly on the implementation and enforcement of national and international regulations that apply to marine turtles, and on identification and monitoring. International mechanisms and NGOs could play a relevant role to this end;

e) Consider the expansion and/or development of community monitoring programmes to support the implementation of national legal frameworks when national resources are limiting factors;

f) Educate and raise awareness at different levels (communities, traders, consumers, tourists, leaders, fisheries sector, governments, etc.) on the conservation of marine turtles and respective national and international regulations;

2. Addressing threats

a) Promote a greater engagement of marine turtle research and conservation with social sciences. Research is needed into the socio-economics associated to the harvest and consumption of marine turtles, including assessments of the sustainability of alternative livelihood options (e.g. ecotourism activities) for communities depending on marine turtles. Community based conservation has a key role to play and consideration could be given to the implementation of projects for artisanal fishermen to improve their fishing gears, reducing the need to target marine turtles;

b) Encourage research that establishes a baseline for the status and distribution of marine turtles in the different countries/regions and encourage researchers to publish their findings. To better enable an assessment of population changes over time, review and expand, where necessary, monitoring efforts to ensure consistency at index beaches and elsewhere, using Minimum Data Standards (SWOT Scientific Advisory Board, 2011), region-wide. Monitoring should include efforts to estimate remigration intervals and clutch frequencies of nesting populations, and changes in condition and abundance of foraging aggregations;

c) A comprehensive, quantitative (to the extent possible) threats assessment for marine turtles is needed for the different regions where they occur to understand the scale of the domestic consumption/trade in marine turtles (to this end, understanding drivers is important to develop cohesive management interventions). At the national level, it is important to determine whether there are linkages between domestic and international/cross-border trade;

d) Investigate the dimensions of online trade in marine turtles to better understand the severity of the threat it represents;

e) Improve the legislation that protects marine turtles in countries/territories where take is legal and does not violate agreements such as SPAW and CMS. Efforts are needed to ensure that any legal exploitation is controlled using the principals of sustainability, which include science-based management plans and monitoring take levels and turtle populations, and does not enter into international trade;

f) Improve states' accountability for the practices undertaken by their flagged vessels and improve the monitoring and control over CITES-listed species at landing sites, in particular for foreign vessels and vessels fishing in areas beyond national jurisdiction. States must be more rigorous on their enforcement of fisheries regulations (e.g. the use of TEDs, logbook reporting). At the regional level, empirical data on marine turtle (but also other species') bycatch is still needed to inform coordinated action.

g) Identify critical habitats for marine turtle conservation and implement and enforce adequate protection at those sites. Where appropriate, consider the designation of protected areas taking also into account species' life history traits, such as migratory movements;

3. Informing policy making, managers and other relevant actors

a) Promote further regional cooperation, efforts and communication for marine turtle conservation, particularly among CITES, IAC, CMS, IOSEA, SPAW Protocol (and WIDECAST), Ramsar and any others relevant bodies to share information, identify conservation activities and optimize synergies and resources;

b) Improve intra- and interregional collaboration and exchange of actionable intelligence regarding illegal take of and trade in marine turtles. This could be done through the development of a central database that facilitates access to information, information exchange, and identification of knowledge gaps for conservation practitioners, scientists, managers, RFMBs, range States and any other relevant actors. The database could, *inter alia*, include national and regional illegal trade information and could be facilitated through CITES data reporting requirements;

c) Coordinate efforts at the regional level, involving Parties and bodies with relevant mandates, to address fisheries interactions with marine turtles (particularly bycatch).

References

Appendix 1

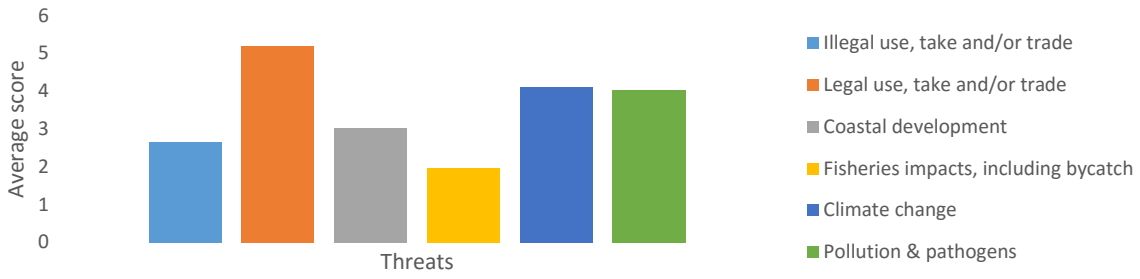

Figure I – Global average importance of the different threats to marine turtle conservation according to experts across regions (n=94). Average scores of 1 indicate highest and most urgent threats to be addressed. Average scores of 6 indicate lowest and least urgent threats to address. Source: Lopes (in prep.).

A	Plants that are artificially propagated in accordance with Resolution Conf. 11.11 (Rev. CoP15), as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 5, of the Convention (specimens of species included in Appendix I that have been propagated artificially for non-commercial purposes and specimens of species included in Appendices II and III).
C	Animals bred in captivity in accordance with Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 5, of the Convention.
D	Appendix-I animals bred in captivity for commercial purposes in operations included in the Secretariat's Register, in accordance with Resolution Conf. 12.10 (Rev. CoP15), and Appendix-I plants artificially propagated for commercial purposes, as well as parts and derivatives thereof, exported under the provisions of Article VII, paragraph 4, of the Convention.
F	Animals born in captivity (F1 or subsequent generations) that do not fulfil the definition of 'bred in captivity' in Resolution Conf. 10.16 (Rev.), as well as parts and derivatives thereof.
I	Confiscated or seized specimens
O	Pre-Convention specimens
R	Ranched specimens: specimens of animals reared in a controlled environment, taken as eggs or juveniles from the wild, where they would otherwise have had a very low probability of surviving to adulthood.
U	Source unknown.
W	Specimens taken from the wild.
X	Specimens taken in "the marine environment not under the jurisdiction of any State".

Figure II – CITES source codes.

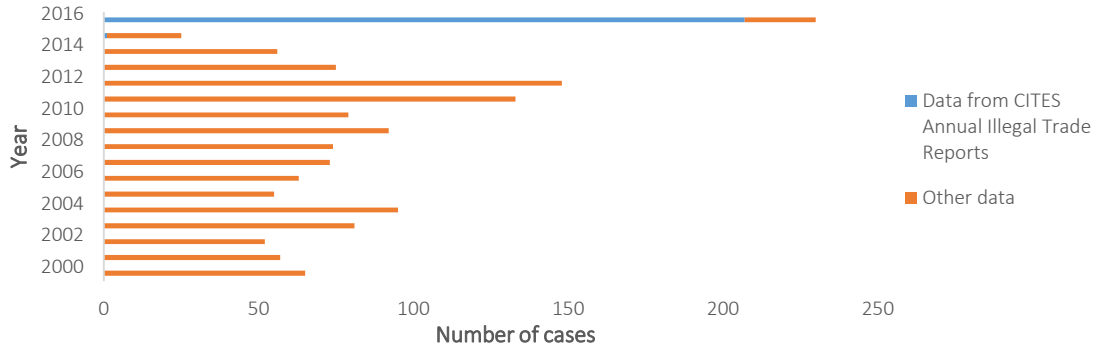

Figure III – Relative contribution of CITES Annual Illegal Trade data to the global records on marine turtle specimen seizures presented in Figure 10. *Other data* includes records provided by UNODC[61] and EU-TWIX[62].

Appendix 2

Table I - Estimated current annual legal take by species for countries with legal marine turtle fisheries as of 1st January 2013. Source Humber *et al*. (2014).
ND = No data found. A = Species absent. R = Species rare. P = Species fully protected. NA = Not applicable. 0 = No legal take known.

Country abbreviations (countries in brackets indicate dependency): ALB = Albania; ALG = Algeria; AND = Andaman and Nicobar Islands (India); ANG = Anguilla (UK); ANT = Antigua and Barbuda; AUS = Australia; BEL = Belize; BOS = Bosnia and Herzegovina; BRI = British Virgin Islands (UK); CAY = Cayman Islands (UK); CHI = Chile; COA = Colombia (Atlantic coast); COO = Cook Islands (New Zealand); COP = Colombia (Pacific coast); DOM = Dominica; FIJ = Fiji; GRE = Grenada; GUY = Guyana; HAI = Haiti; HON = Honduras; IND = Indonesia; JAP = Japan; KIR = Kiribati; MAL = Maldives; MAR = Marshall Islands: MIC = Federated States of Micronesia; MON = Montserrat (UK); MXA = Mexico (Atlantic coast); MXP = Mexico (Pacific coast); NAU = Nauru; NEW = New Caledonia (France); NKO = North Korea; NIA = Nicaragua (Atlantic coast); NIU = Niue; PAA = Panama (Atlantic coast); PAL = Palau; PAP = Papua New Guinea; PIT = Pitcairn Islands (UK); SAM = Samoa; SAO = Sao Tome and Principe; SOL = Solomon Islands; SOM = Somalia; STK = St. Kitts and Nevis; STL = St. Lucia; STV = St. Vincent and the Grenadines; SYR = Syria; TOK = Tokelau (New Zealand); TON = Tonga; TUR = Turks and Caicos (UK); TUV = Tuvalu; VAN = Vanuatu; WAL = Wallis and Futuna (France).
[1] Andaman and Nicobar Islands are a Union Territory of India.
[2] Anguilla, British Virgin Islands, Cayman Islands, Montserrat, Turks and Caicos and Pitcairn Islands are all overseas territories of the UK.
[3] The Cook Islands are self-governing in free association with New Zealand.
[4] New Caledonia is a territorial collectivity (or a *sui generis* collectivity) of France since 1998.
[5] Tokelau is a self-administering territory of New Zealand.
[6] Wallis and Futuna is an overseas territory of France.
[+] No national estimate available, local estimate only.

Numbers in parentheses indicate that some was data originally unidentified by species.

[a] Best guess, not an official estimate.
[b] Includes current or historical direct take estimates (not presented here) calculated using volumes of bekko or meat.
[c] Includes unidentified data broken down into species before calculations (either current and/or historical data).
[d] Only data on poached nesting females.
[e] To be noted: Department has limited information and all Nevis fishers were not willing to cooperate in providing information.

Leg. Cat. = Legislation category (see Figure 1). Legislation categories:
N = Protection absent [some islands or communities have their own regulations]*protection administered at some level through other regulations
L = Legislation allows for a level of harvest of one or more species of turtles [permit/licence required] [[subsistence only]]{ad hoc agreement in Bali for approximately 300-400 turtles/year from hatcheries to be used in religious rituals despite all species being protected}*banned in Principe ^written cabinet approval.
T = Full protection but traditional hunting exemptions exist [permit/licence required] [[personal/domestic use only]] **licence granted for those who traditionally hunted turtles.
M = Moratorium in place only at present [permit/licence required]
U = Unable to verify legislation. *In Panama the legal situation is considered confused as although all turtles species were protected in 1980 other laws allow subsistence fishing and recognise traditional user rights. **Due to the fact that several autonomous regions now exist in Somalia, there is no national legislation to protect marine turtles. However, in Puntland State turtles are protected by a local decree and are fully protected by law in Somaliland.

[61] Only data reported by non-EU countries, as data reported by EU Member States in WorldWISE are sourced from EU-TWIX.
[62] **E**uropean **U**nion **T**rade in **W**ildlife **I**nformation e**X**change (www.eu-twix.org).

Country										
Country Code	Leg. Cat.	Leg. Ref.	Green	Hawksbill	Loggerhead	Olive Ridley	Leatherback	Trend since 2000 (clear = pers. comm.)	Estimated illegal take/year	Refs.
ALB+	N	1	ND	A	(5.0)	A	ND	◁▷	NA	2, 3, M. White pers. comm.
AND[1]	T	4	(57.0)	(57.0)	A	(57.0)	ND	◁▷	ND	5, M. Chandi pers. comm.
ALG	U	ND	A	A	116.0	A	A	ND	ND	6
ANG[2]	M	7, 8	P[c]	P[c]	P	A	P	◀▶	<100	9 – 10, J. Gumbs, pers. comm.
ANT	L	11	(10.0)	(10.0)	ND	A	1.0	◀▶	50	12 – 14
AUS	[[T]]	15	6522.5[c]	75.0[c]	40.0	ND	ND	▼	ND	16 – 28
BEL	[T]	29	0[c]	P[c]	0[c]	R	R	▽	10	30-34, L. Searle pers. comm; I. Majil pers. comm.
BOS	N	T. Kupusovic pers. comm.	ND	A	ND	A	A	ND	NA	T. Kupusovic pers. comm.
BRI[2]	L	35	122.5[c]	47.5[c]	P	A	P	▽	ND	9, 36-40, S. Davies pers. comm., S. Gore pers. comm.
CAY[2]	T**	41	0[c]	P[c]	0	A	P	▽	4	9, 42 – 44, J. Blumenthal pers. comm.
CHI	M	45	P	A	P	P	P	◁▷	1	46 – 48, J. Azócar pers. comm.
COA+	[[L]]	49, C. Ceballos pers. comm	(1655.4)	(645.8)	(645.8)	(4.8)	(48.1)	◀▶	ND	50-53
COO+[3]	[N]*	54, E. Munro pers. comm.	(50.0)	(50.0)	ND	A	ND	▽	NA	54 – 55, M. White pers. comm.
COP+	[[L]]	49	5.0	1.0	ND	1.0	ND	◀▶	ND	56 – 57
DOM+	L	58	ND	ND[c]	ND	A	ND	◀▶	8[d]	14, 42, 59 – 65
FED+	L	66	(165.4)	(38.6)	A	ND	ND	◀▶	9	66 – 69, S. Palik pers. comm.
FIJ+	[M]	70	ND	ND[b]	ND	A	ND	▽	3261	42, 71 – 76, M. Raicebe pers. comm.
GRE	[L]	77	72.5	23.5	23.5	R	P	▽	ND	78 – 80, C. Isaac pers. comm.

Country			Green	Hawksbill	Loggerhead	Olive Ridley	Leatherback	Trend since 2000 (clear = pers. comm.)	Estimated illegal take/year	Refs.
Country Code	Leg. Cat.	Leg. Ref.								
GUY	N*	Environmental Protection Agency, pers. comm.	(2.8)	(2.8)	R	R	(2.8)	▽	NA	81, M. Kalamandeen pers. comm..
HAI	L	82	128.0	155.2[b]	328.0	A	ND	◀▶	ND	42, 83 – 84
HON[+]	T	85, C. Montalván pers. comm.	(75.0)	(75.0)[b]	ND	A	ND	◀▶	ND	42, 86 – 87
IND[+]	{L}	88, I.B. Windia Adnyana pers. comm.	P	P	P	P	P	▼	3279	72, 89 – 98
JAP	[T]	99, Tokyo Metropolitan Government pers. comm.	130.0	P	P	P	P	◀▶	ND	H. Suganuma pers. comm.
KIR	L	100	ND	ND	ND	ND	ND	△	ND	101 – 102, N. Teariki-Ruatu pers. comm.
MAL	M	103	P	P[b]	P	P	P	◀▶	ND	42, 104 – 105
MAR[+]	L	106	221.0	6.0	A	ND	ND	▲	ND	107 – 110
MON[2]	L	111, A. Ponteen pers. comm.	(3.8)[c]	(3.8)[c]	ND	A	ND	▼	ND	9, 112 – 113, A. Ponteen pers. comm.
MXA	[T]	114, 115	ND	P	P	P	P	◀▶	ND	116 – 117
MXP	[T]	114, 115	3.0	P	P	P	P	▽, ◁▷	6644	118 – 129, A. Mancini pers. comm., W.J. Nicholls pers. comm.
NAU	N*	130, M. Depaune pers. comm.	ND	ND	A	A	A	△	NA	130, M. Depaune pers. comm.
NEW[+4]	[T]	131, 132	176.0	P	P	A	P	◀▶	100	133, 164, Direction de l'Environnement Province Sud pers. comm., Direction du Développement Economique et de

Country			Green	Hawksbill	Loggerhead	Olive Ridley	Leatherback	Trend since 2000 (clear = pers. comm.)	Estimated illegal take/year	Refs.
Country Code	Leg. Cat.	Leg. Ref.								
										l'Environnement Province Nord pers. comm.
NKO	U	ND	ND	ND	ND	ND	ND	ND		
NIA	[[L]]	134, 135	9413.0	P	P	A	P	▽	403	42, 136 – 139, C. Lagueux pers. comm.
NIU	L^	140	0	0	A	A	A	NA	ND	J. Tafatu pers. comm.
PAA	U*	13, 141	3000.0	27.0	0	A	34.0	◀▶	ND	42, 141, 142 – 149
PAL	L	150	1362.1	ND	ND	ND	ND	◀▶	ND	151 – 152
PAP	L	153	15000.0	217.4	ND	ND	P	◀▶	3	154 – 163
PIT[2]	[T]	164	0	0	A	A	A	◀▶	ND	165, M. Christian pers. comm.
SAM[+]	L	166	(46.3)	(46.3)	A	A	ND	▽	ND	167 – 168, J. Ward pers. comm.
SAO	L*	169	200.0	125.0	1.0	200.0	7.0	◀▶	ND	170 – 173, R. Ferreira pers. comm.[a]
SOL[+]	L	174	(1043.0)	(800.0)[b]	ND	ND	P	◀▶	ND	42, 165, 175 – 179, R. Masu pers. comm.
SOM	U**	180, J. Torrens pers. comm.	3500.0	ND[b]	ND	ND	ND	◀▶	ND	42, 181 – 183
STK[+]	L	184	(50.0)	(50.0)	ND	A	ND	◀▶	ND	14, 185 – 188, A. Arthurton pers. comm[e]
STL	L	189	19.2	76.8[b]	R	A	P	◀▶	17.5	14, 42, 190 – 192, S.Williams-Peter pers. comm.
STV	L	193	181.0	299.0[b]	8.0	A	3.0	▽	ND	14, 42, 194 – 195, L. Edwards. pers. comm.
SYR	N	196	ND	A	ND	A	R	ND	NA	196 – 197

Country			Green	Hawksbill	Loggerhead	Olive Ridley	Leatherback	Trend since 2000 (clear = pers. comm.)	Estimated illegal take/year	Refs.
Country Code	Leg. Cat.	Leg. Ref.								
TOK[5]	[N]*	F. Tulafono pers. comm., L. Suveinakama pers. comm.	(22.5)	(22.5)	ND	A	A	▽	NA	198, F. Tulafono pers. comm.
TON[+]	L	199	198.0	410.0	A	ND	P	△	ND	200, P. Ngaluafe pers. comm.
TUR[2]	L	201	250.0	210.5	ND	A	ND	◁▷	ND	9, 202 – 204, Stringell pers. comm.
TUV	L	205	(147.0)	ND	A	A	ND	◀▶	ND	206, S. Alefaio pers. comm.
VAN[+]	[T]	66, F. Hickey pers. comm.	(7.5)	(7.5)	ND	ND	0	▼	10	207, F. Hickey pers. comm.
WAL[6]	[T]	Fisheries Act 2005 (B. Mugneret pers. comm.)	0	A	A	A	A	ND	ND	B. Mugneret pers. comm.

Table II - Prices of different marine turtle products in Colombia. Prices are mean values.

Species	Product	Price	Observation
Hawksbill	Whole carapace	20-100 USD	The price depends on the size and thickness of the scutes.
	Spurs	3-4 USD/pair, 35-40 USD/ 12 spurs box case	The price depends on the size and thickness of the scutes.
	Penis	$ 8 USD an inch $ 40 USD bottled with alcohol and herbs	Only recorded in a market place of Buenaventura
	Handicrafts (bracelets, rings, combs and diadem)	1.5-8 USD	The price depends on the size and thickness of the scutes.

Table III - Price of different marine turtle products in Panama. Values are mean values.

Species	Product	Price	Observation
Hawksbill	Meat	$ 2.23 per pound ($1 – 5$)	
	Eggs	$ 0.10 per unit	This price is in Kuna Yala where the consumption is low
	Whole carapace	$ 14.63 ($10 – $25)	The price depends if the buyer is national or Colombian
	Whole turtle	$ 110 ($50 - $180)	The price depends if the buyer is national or Colombian
	Spurs	$15-$12 a pair, $300 - $250 a 24 spurs´ case, $150 - $170 a 12 spurs´ case	The most expensive spurs come from Colombia and Mexico
	Smoked penis	$ 5.00 per unit	This is sold to Colombian fishermen
Green turtle	Meat	$ 2.45 ($0.50 - $ 4.00)	The lowest prices is in Comarca Ngäbe-Bugle, the highest price is in Bocas del Toro
	Eggs	$0.07 ($0.05 - $0.10) per tortilla	This is a kind of tortilla made of a mixture of turtle egg and flour in Kuna Yala
Olive ridley	Eggs	$ 0.44 ($0.25 - $ 0.50) per unit, $ 3.00 a dozen	All data comes from the Pacific side
Leatherback	Meat	$2.00 per pound	This is in Changuinola
	Eggs	$0.62 ($0.50 – $0.75)	This is in Changuinola

Table IV- Price variances in turtle meat sold for domestic use in Mozambique.

Location	Price of turtle meat (MZN)	Eggs	Whole Alive turtles	Data source
Praia do Tofo, Inhambane Province	50.0 kg^{-1}	Not sold	No trade	Williams 2017
Sanculo, Ilha de Mozambique, Nampula Province	50 – 75 kg^{-1}	10 mzn each	No trade	Interview data from this study MZ044
Quirambo Island, Quirimbas National Park, Cabo Delgado	50.0 kg^{-1}	Not sold	No trade	Interview data from this study MZ037
Quirimba Island, Quirimbas National Park, Cabo Delgado	30 – 50.0 kg^{-1}	Sold until 2010 but price not specified	Alive large turtles 500 mzn each live small turtles 250 mzn each	Interview data from this study MZ041

Moma, Nampula	100 kg $^{-1}$	Rare to find now.		Interview data from this study MZ090
Matemo Island, Cabo Delgado	Dried and salted meat traded with Tanzania until 1973 for capulanas and beads	Eggs traded with Tanzania until 1973 for capulanas and beads	Whole turtles + carapaces traded with Tanzania until 1973 for capulanas and beads	Interview data from this study MZ036
Pemba, Cabo Delgado **Quirimbas Archipelago**	150 kg-1 50 mzn a portion	Not sold		Interview data from this study MZ032
Quirimba Island **Mefunvo Island** **Mecufi**	100-150 mzn kg^{-1} 150 – 200 mzn kg^{-1} 200 – 250 mzn kg^{-1}	n/a		Interview data MZ019