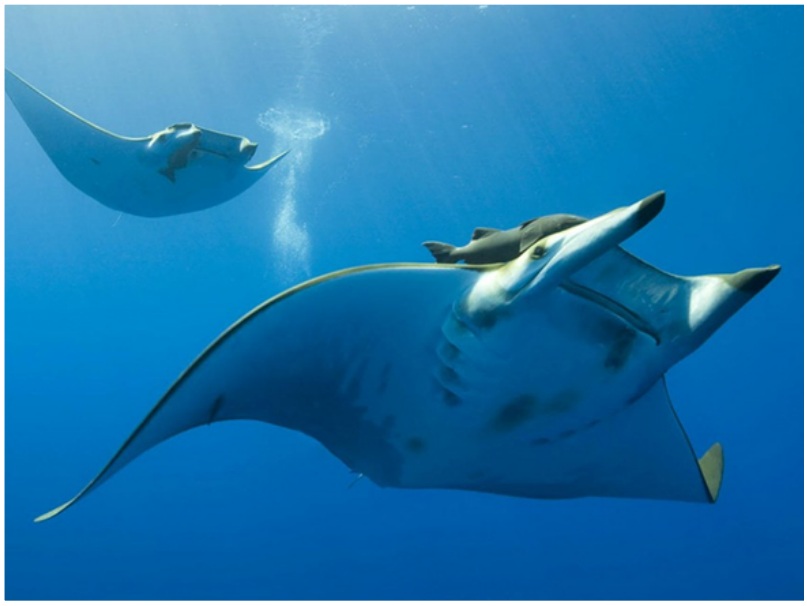

CITES CoP17:
Making it a Success

Columbia University
in participation with the
Wildlife Conservation Society

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Wildlife Conservation Society

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This report was written by students within the Master of Public Administration in Environmental Science and Policy Program at Columbia University's School of International and Public Affairs, for the 2016 Spring Workshop in Applied Earth Systems Management.

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Acknowledgements

The workshop team would like to thank our advisor, Professor Sara Tjossem, our client contact, Dr. Susan Lieberman, and our social media contact, Lisa Jaycox, for all of their positivity, guidance and support throughout this project. We would also like to thank all the experts who took the time to speak with us on this important topic. Lastly, we would like to express our gratitude for the Wildlife Conservation Society as a whole, for their hard work to combat illegal wildlife trafficking.

Executive Summary

The 17th meeting of the Conference of the Parties (CoP 17) to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) will take place from September 24th-October 5th, 2016 in Johannesburg, South Africa. During CoP meetings, representatives from member nations review and vote on proposals for the introduction, movement, or removal of species under the CITES Appendices.

In preparation for CoP 17, the Wildlife Conservation Society (WCS) requested that graduate students in Columbia University's MPA Environmental Science and Policy (ESP) program, at the School of International and Public Affairs (SIPA), research and provide recommendations on potential CITES proposals that specifically address the international trade status of Asian Pangolins, devil rays, the African grey parrot, and the African black rhinoceros. After extensive research, the WCS consulting team

- supports a transfer of the Asian Pangolin from Appendix II to Appendix I;
- supports the introduction and listing of the Devil Ray under Appendix II;
- supports a transfer of the African Grey Parrot from Appendix II to Appendix I;
- recommends that the African Black Rhinoceros be retained in Appendix I.

In addition to these CITES-specific recommendations, the WCS consulting team (henceforth referred to as "the team") provided recommendations for best management practices and policies to conserve and protect these animals at the local, regional, national, and international levels, specifically in the areas of educational outreach, conservation and domestic protection policies, and enforcement detection. The team also developed a social media outreach plan, which will be used by the WCS Communications department to inform and engage the general public and stakeholders, by raising awareness on international trade of these animals in the months leading up to the Conference. The team expects that these contributions will provide support to the WCS in its pursuit to ensure the protection of these animals at CoP 17.

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Erik Berg
Seattle, Washington
Before coming to Columbia Erik was and continues to train as an elite level track athlete specializing in the mile. Conservation is a big interest for Erik. The prevention of major species extinctions and the variety of strategies for conservation are what interest him the most about the topic. He hopes that this experience will help him understand how international treaties are created and how NGO's work together to pass them. Erik's favorite plant and animal are the Venus flytrap and the jaguar.

Andrew Chang
Los Angeles, California
Andrew worked in the solar industry raising funds to develop, acquire, and construct solar power facilities before coming to Columbia. He is interested in learning about how the organization is able to draw interest and gain consensus from various States and parties and hopes to learn about the public engagement measures the organization is taking to mitigate the environmental fauna and flora endangerment concerns. Andrew's favorite plant and animal are the *Phalaenopsis schilleriana* (an orchid species) and the snow leopard.

Sylricka Foster
Van Wyck, South Carolina
Before starting the program, Syl split her time between working at South Carolina NASA Space Grant Consortium as a Program Assistant, and at South Carolina NOAA Sea Grant Consortium, as a Marine Science Education Specialist. She is interested in this project because she wants to learn more about animal trafficking, and about the current efforts that are being used to stop these crimes and is very interested in the outreach portion of this project, because she believes that increasing public awareness of this problem will certainly support efforts to protect those species that are trafficked. She hopes to learn more about the CITES process, and about the animals that are included in the Appendices and to learn more about the scientific process that is used to support the addition/removal of species. Syl's favorite plant and animal are the Magnolia obovate and the *Capra falconeri* (Markhor).

Yoichi Fukui
Tokyo, Japan
Before coming to Columbia, Yoichi worked on Japanese environmental policy at the Ministry of the Environment. He served in the field of pollution control policy, economic environmental policy, and nuclear regulatory organization reform for more than six years. He is interested in this project because he does not have any experience in biodiversity field and really wanted to expand his horizons. He to develop a deep understanding on CITES and how countries and Non-profits work together in this field. Yoichi's favorite plant and animal are the cactus and the frog.

Arnaud Goessens
Brussels, Belgium
Arnaud previously worked as a Policy Officer at the WCS Brussels Office before coming to Columbia. Working to protect endangered species is one of his life's priority goals, which is what drew him to this project. He hopes to learn more about CITES, how to better protect endangered species, and how to improve current legislations. Arnaud's favorite animal is the Black Rhinoceros.

Jamie Rae Hanson
Kimball, Minnesota
Jamie was previously a tenured faculty member at St. Cloud Technical and Community College teaching environmental science lecture and lab courses. After her time in the MPA ESP program, Jamie will be working for the US Fish and Wildlife Service. Jamie has been an advocate of wildlife her whole life, extending back to her childhood obsessing over Ranger Ricks. She knew, after working with Dr. Robert Cook and Melissa Wright on the previous Columbia Workshops regarding wildlife trafficking in the fall and summer semesters, that she wanted to continue researching this important issue. Jamie was excited to be a part of the WCS efforts for the upcoming COP17 of CITES. She is very interested in seeing international environmental law at work and applying knowledge and synthesizing research to produce creative solutions for wildlife conservation. Jamie's favorite plant is *Geum triflorum*, also know as the purple prairie smoke, and her favorite animal is the tiger.

Nikita Iyengar

Lusaka, Zambia

Before coming to Columbia, Nikita worked at a small non-profit organization in Zambia as a Program Manager, creating and implementing various programs from sponsoring smart but underprivileged children from government schools to further their education, and creating feeding programs for vulnerable community schools and children's cancer wards, to creating workshops for local Zambian women who were looking to be empowered and take their careers further. After completing her undergraduate thesis on WCS and growing up in Zambia, she has come to appreciate wildlife and instilled the desire to help conservation before we lose more incredible species. During this project she hopes to learn more about what we can do to for threatened and endangered species on both local and international levels. Nikita's favorite plant and animal are the Baobab tree and the blue whale.

Peter Manyara

Nairobi, Kenya

Peter worked with UNESCO Regional Office for Eastern Africa, supporting the implementation of a program to build the water resource scientific knowledge base for the Horn of Africa region for improved resilience and socioeconomic development, and later addressing the challenge of abandoned mines, assessing their ecosystem and health related effects in Sub-Saharan Africa, with a view to influencing policies. He also participated in various forums (as a hobby) that discussed how to address the rampant illegal trade in ivory and ivory products, through civil society. The prospect of learning the various approaches and methodologies used in elevating endangered species for CITES consideration and action is what interested him most about this project. He is keen to learn how a remote agency in the US manages to impact on various practices and policies in Africa; the tools, methodologies and approaches utilized; and the challenges faced. Peter's favorite animal is the elephant.

Lauren Sevigny

Mission Viejo, California

Before coming to the program, Lauren worked as a research associate with the Civil and Environmental Engineering Department at the University of California, Los Angeles, working on projects ranging from water quality and antibiotic resistance in E. coli near conventional chicken farms. Lauren has always had a strong affinity for wildlife and loves learning about new conservation efforts from all over the world. Coming from a science heavy background, she hopes that this project will help professional develop her interest in the topic of wildlife trafficking and give her a better understanding of the policy processes involved. Lauren's favorite plant and animal are *Paphiopedilum niveum* (white Asian orchid) and Przewalski's horse.

Rebecca Snyder

Seattle, Washington

Rebecca worked at IUCN as an intern for the Global Gender Office before coming to Columbia. Growing up in Puget Sound, Rebecca always revered the Bald Eagles that would frequent the ample fishing in the estuary near her house. Watching their population rebound due to conservation efforts and seeing them taken off the list in 2007 left her with a great deal of interest in conservation and restoration efforts like CITES and is eager contribute to the recovery of additional species. She hopes to learn how conservation takes place at various levels of governance all the way from international convention level down to actual on the ground implementation and about a few species with which she is less familiar with. Rebecca's favorite plant and animal are *Sarracenia oreophila* (pitcher plants) and chimpanzees.

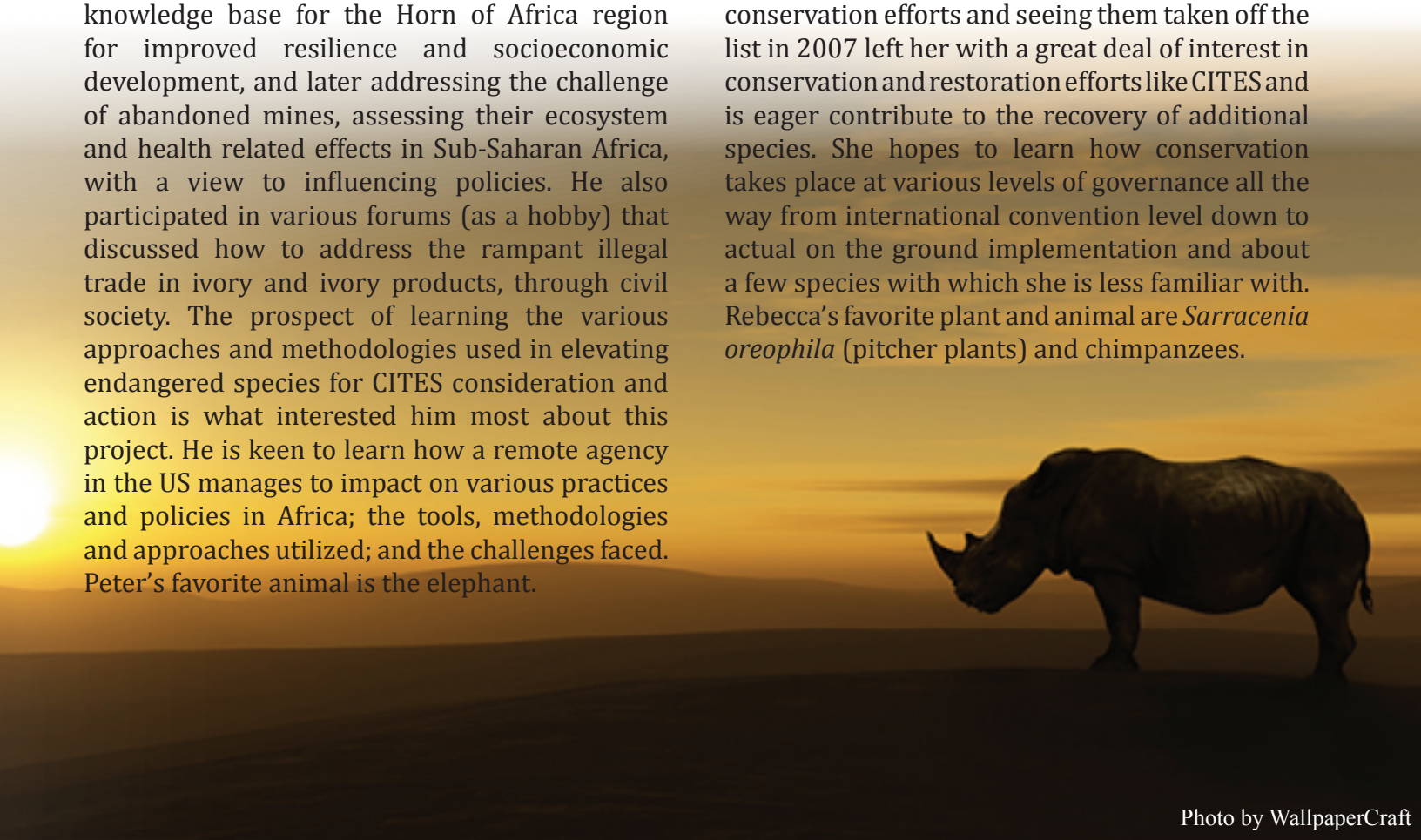


Photo by WallpaperCraft

The Issues Surrounding Wildlife Trade

The illegal trade of wildlife involves more than 350 million plant and animal species each year, with an estimated worth of more than one billion of dollars annually (Wildlife Conservation Society, 2007). Due to the sheer enormity of the wildlife trade, and the propensity for wildlife to be captured, harvested, and moved between nations illegally, many species face population decline and possible extinction. Species extinction, along with other human-caused alterations, cause ecosystem simplification and destruction, and a myriad of other issues. Thus, these ecosystems are reduced in their ability to generate goods and services, which leads to negative social and economic impact in respective regions.

CITES, the Appendices, and CoP 17. The Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) is an international, intergovernmental agreement that consists of 182 Parties, who collectively work towards preventing species decline due to international trade markets. Specifically, the goal of CITES is to ensure that international trade in specimens of wild animals and plants does not threaten their survival. CITES consists of three Appendices that animal and plant species are assigned to. Appendix I contains species that are threatened with extinction, as supported by endangered-status attribution by the International Union for Conservation of Nature (IUCN). Trade of these species is prohibited, and is permitted only in exceptional circumstances. Appendix II includes species not necessarily threatened with extinction but that may become so unless the trade is controlled, therefore this Appendix aims to control the trade in specimens of these species with permits. Appendix II also includes "look-alike species", which are species who resemble species that are listed in the CITES Appendices for conservation reasons. Lastly, Appendix III contains species that are protected contains species that are protected in at least one country, which has asked other CITES Parties for assistance in controlling the trade (CITES, n.d.) in at least one country, which has asked other CITES Parties for assistance in controlling the trade.

Each year, CITES holds a meeting of the Parties, to discuss and vote on the movement, introduction, or removal of species to appendices within CITES, which is decided by a simple majority. Our client, the WCS, is a consultant partner of CITES, that provides Parties with relevant and crucial scientific guidance on species listed under CITES, and species to be discussed at each Conference.

Our Contributions

1. In preparation for this year's convention, CoP 17, our Team provided the WCS with the following deliverables (in the order that they appear in each section of this paper):

2. An analysis of the ecological, political, and economic factors that influence and/or allow the illegal trade of these species

3. Species information in relation to CITES history, history of range states' export quotas, and history of CITES moratoriums or punitive measures towards parties that do not implement assigned trade quotas.

4. Recommendations for best management practices and policies at the local, regional, national, and international levels for the conservation and protection of these key species

5. An analysis of, and recommendations on, potential Party proposals regarding the movement, introduction or removal of Asian pangolins, devil rays, the African grey parrot, and the African rhinoceros, and

6. A social media plan that optimizes how the WCS Communications team uses their existing social media platforms to educate and engage the public and relevant stakeholders, in regards to the four assigned species. Ultimately, the goal is to influence voting at CoP 17 in favor of best outcomes for species conservation.

Report Outline

This report is organized into four main sections. The first section is the Study Design and Methodology, which explains how we conducted our analyses in regard to the deliverables listed above. In the second section of the paper, Species Spotlight, each of the key species has a decided section (i.e., a total of four Species Spotlight Sections) in which we provide information on the background of these species, as well as information detailed in 1-4 of the previously discussed list of deliverables. The section also includes case studies that each species team found to be relevant and compelling. Next, we have a section that details our social media plan to be used by the WCS Communications Team. Lastly, this paper with conclusions that highlight the most important findings.

Study Design

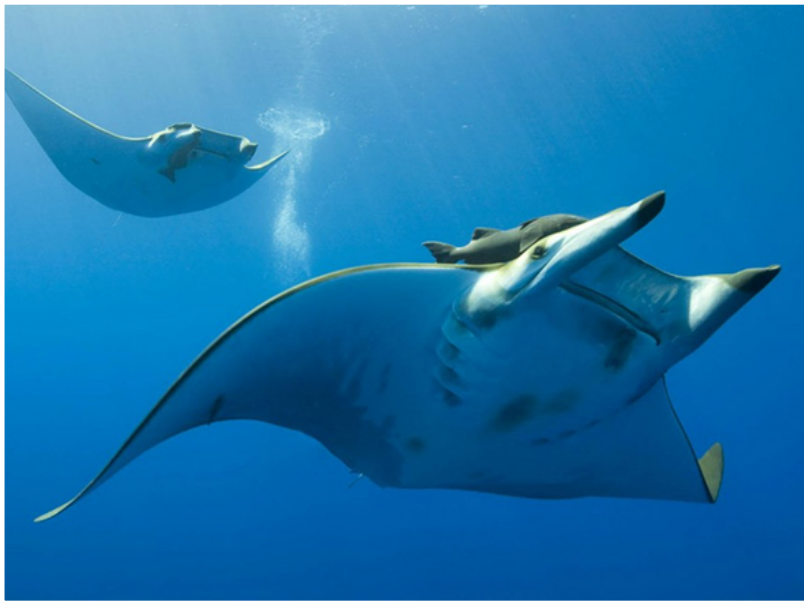
To analyze these species and their potential CITES proposals, the WCS consulting team divided into four teams of two researchers each, and each team focused on one of the four animals. In addition to the species-specific teams, a team of two researchers developed a social media plan for WCS Communications.

Literature Reviews and Expert Interviews

The teams collected scientific journal articles and subsequently conducted a literature review to obtain information on the biology, status, habitat, and trade of their assigned species. Specifically, each team read select sources found in the proposals themselves, journal sources from scholarly databases, and current conservation/CITES-related news from reputable sources. Teams also researched web-based publications of documents (found on WCS and CITES websites) that catalogued or discussed efforts to conserve their species. Additionally, each Team supplemented their literature reviews with information obtained from interviews (via e-mail, telephone, or video chat) with key stakeholders who have professional experience with their species. A list of the experts interviewed are included in the Appendix of this report. The teams used all of this information to produce the deliverables mentioned in the *Our Contributions* section of the Introduction. Ultimately, the research teams answered the question of whether the potential proposals would protect or harm their assigned species.

Social Media Optimization Plan

The Social Media Team was comprised of two members (one researcher from the rhinocerous team and another from the African grey parrot team). As a first step, the project manager and one researcher from the Social Media Team met with Lisa Jaycox, Assistant Director of Social Media for WCS, to establish and discuss the list of "social media deliverables" that the WCS required (See *Our Contributions* in the Introduction). Next, the Social Media Team requested that each Species Team develop (1) a list of interesting facts in regard to their species, (2) pictures of their species, and (3) champions (i.e., celebrities) that could advocate for their species. Concurrently, the Social Media Team created a list of popular United Nations (UN) International Days and CITES Major Dates that the WCS Communications Team could use to increase their visibility, especially in the months leading up to CoP 17. Lastly, all of this information was complied into an easy-to-read plan for the WCS Communications team to use as they see fit.



Animal Spotlights

An In-Depth Analysis of Four Focal Animals


Photo by Ian Mey

Asian Pangolins

Native to Central, South, and Southeast Asia

Will likely be proposed by India, the Philippines, China, and Sunda to move all asian pangolin species from Appendix II to Appendix I of CITES

Main causes for wildlife trafficking are for their scales for its use in medicinal medicine and its meat as a delicacy in Central and Southeast Asia

Devil Rays

Native to the world's oceans, commonly seen along the coasts of the equator

Proposed by Fiji to add all Devil Ray species to Appendix II of CITES

Main causes for wildlife trafficking are their gill plates for Chinese traditional medicine and their meat and cartilage for culinary purposes


Photo by Alberto Quevedo

African Grey Parrots

Native to West and Central Africa

Proposed by Gabon to move African Grey Parrots from Appendix II to Appendix I

Main cause for wildlife trafficking is the illegal pet trade

Photo by Pets4Homes

Photo by flikr

African Rhinoceros

Native to Central and South Africa

Speculated to be proposed by South Africa to move the African Rhinoceros from Appendix I to Appendix II in order to open a legal rhino horn trad

Main cause for wildlife trafficking is for their horns, which are used in medicinal medicine and purchased as a status symbol

Asian Pangolins

Photo by World Wildlife Fund

Background on Species

Pangolins, also known as scaly anteaters, describe a genus of mammal *Manis*, which includes eight species distributed across Africa and Asia. All eight species are listed under Appendix II of the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES), with a zero export quota currently in place for the Asian pangolins (Shepherd, 2009). However, due to continued high rates of poaching fueled by increasing demand for pangolin meat and scales for medicinal use, a move to Appendix I is now under consideration for the four Asian species, which inhabit fourteen range states (Shepherd, 2009).

The pangolin is a lesser known animal for many in western countries (Northam, 2015).

The animal itself is roughly the size of a house cat, and is covered in hard scales made of keratin. When threatened, the pangolin rolls itself into a ball, using the scales as protection. One potential advantage of pangolin ecology is that they can occupy a wide range of environments, from primary forest to agricultural and degraded lands (IUCN, 2010). Similar to anteaters, pangolins feed almost exclusively on termites and ants, and therefore provide an important ecological service by managing insect populations and recycling nutrients (Pangolin Specialist Group, 2016).

"Pangolins save us millions of dollars a year in pest destruction," says Dr. Simon Stuart, Chair of the IUCN Species Survival Commission (Traffic, 2009).

Studies of the Sunda Pangolin report a diet of almost 200,000 worker ants daily (Lim & Ng, 2008). The animals are nocturnal and mostly solitary, making them quite difficult to spot and track (Pangolin Specialist Group). As a result, relatively little is yet known about their reproductive biology, ecology and populations.

The Chinese pangolin (*M. pentadactyla*) and Sunda or Malayan pangolin (*M. javanica*) have experienced the greatest pressure from poaching as their ranges overlap with the primary centers of demand for pangolin meat and scales in China and Southeast


Photo by Firdia Lisnawati

Asia. Both are currently listed as "Critically Endangered" on the International Union for Conservation of Nature (IUCN) Red List (IUCN 2010).

The range states for the Chinese pangolin are as follows: China, Taiwan, India, Laos, Myanmar, Nepal, Thailand and Vietnam. The range states for the Malayan pangolin are as follows: Brunei, Indonesia, Laos and Malaysia (Shepherd, 2009). Distinguishing between the four Asian species can be difficult due to overlapping range and habitat preferences. Chinese pangolins spend little to no time in trees, a characteristic that distinguishes them from the more arboreal Malayan pangolin (IUCN, 2010).

Although the Chinese and Sunda pangolins have historically faced the greatest pressure, their population collapse coupled with increasing demand has pushed poaching into new territory inhabited by the Indian (*M. crassicaudata*) and Palawan pangolins (*M. culionensis*). The Red List currently classifies these two species as "Endangered" (Duckworth, 2008). However, recent trends suggest pressure is mounting, meaning these species may become similarly depleted to the status of "Critically Endangered" in the near future. Over the next two decades, Indian pangolin populations are projected to fall by 50% throughout their range states including India, Pakistan, Nepal, Sri Lanka and Bangladesh (IUCN Red List). Local consumption is partially to blame for current declines, however mounting demand in foreign markets will prove to be the main driving factor in the coming decades. The Palawan pangolin's range is limited to the Philippines where population declines of almost 50% are thought to have occurred (Shepherd, 2009). Like the Sunda pangolin, the Palawan is more arboreal, with a preference for fig trees (IUCN Red List).

In general, each of the four species face similar threats and are almost physically indistinguishable to the untrained eye. As such, this report shall use "pangolins" to refer to all Asian species and will generally discuss ecology, trafficking and conservation with applicability to all four

History of the Issues, and Explanation of Current Issues

The United States Fish and Wildlife Service (USFWS) states that over a million pangolins have been illegally traded in the past decade (USFWS, n.d.). Extrapolations from seizures at ports confirm it is the most trafficked animal on the planet. As discussed previously, because of the dearth of population statistics and size of global trade, data vary on the number of pangolins reportedly seized and trafficked every year. One study estimates 10,000 are seized globally each year by national authorities (Zhou 2014). Another report makes the conservative assumption that around 14,000 Chinese and 7,500 Sunda pangolins are seized every year (Traffic, 2002). While little baseline data exists on Asian pangolin populations, surveys of hunters and traders in Asia indicate that local pangolin populations are dwindling, aside from a few pockets (Traffic, 2009). Through interviews in the 1990's with rural Laotian communities, individuals indicated that, within a single decade, local Sunda pangolin populations had dropped by up to 90% (IUCN Red List). One study by Wu et al. indicates that Chinese pangolin populations in mainland China have fallen by 94% since the 1960s (Challender and MacMillan, 2013). Poaching is the primary cause for declining populations, followed to a lesser extent by limited hunting for subsistence and local tradition. Respondents to surveys believe protection of natural habitats are important as the reduction of vegetation cover makes finding pangolins easier (Chin & Pantel, 2009). However, habitat destruction in and of itself is not considered the principal cause of population decline, although research is limited on this matter.

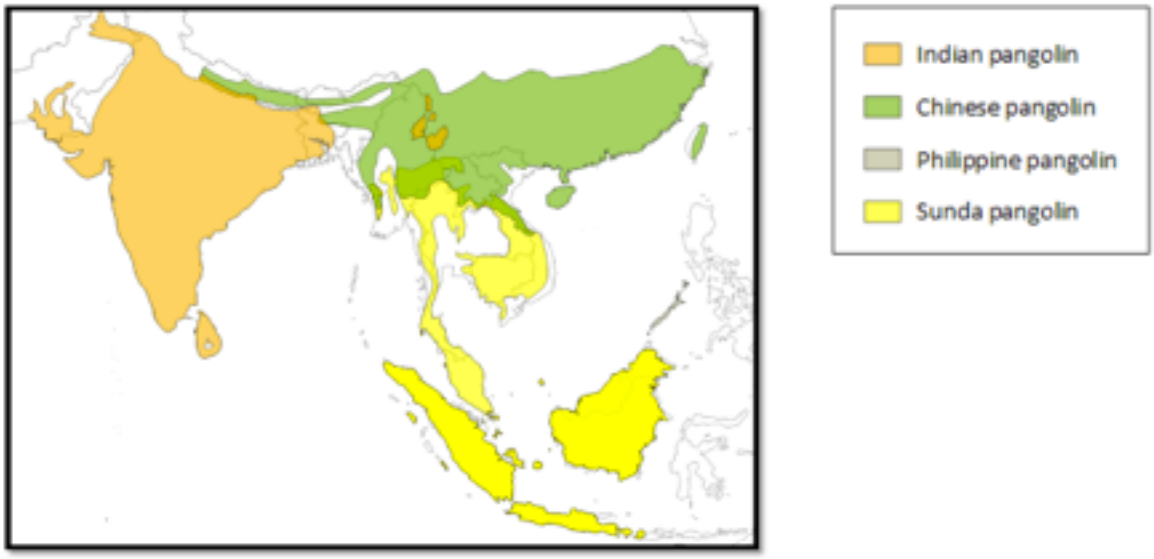


Figure 1. Asian pangolin ranges. Source: Challender, Waterman and Baillie, 2014

Biological Vulnerability. Several biological characteristics intrinsic to pangolins amplify their vulnerability to exploitation. Pangolin species in general have low reproductive and replacement rates. The Chinese pangolin, for example, produces one offspring per gestation period, which lasts approximately one year (IUCN Pangolin Specialist Group, n.d.). When considered in conjunction with trade, the survival of the species is seriously threatened. For the Chinese pangolin, there is an added vulnerability as a result of its terrestrial nature, which facilitates easier tracking and capture. The more arboreal species such as the Sunda, do not experience this added disadvantage (IUCN Red List, 2010).

Many animal sanctuary and zoological conservation efforts for pangolins fail due to high mortality rates when kept in captivity (Patel & Anak, 2010). Numerous zoos have attempted to keep pangolins, but most die within two years of entry into their captive environment. Moreover, little success has been achieved in captive breeding programs. These difficulties are thought to mainly be due to digestive problems associated with inadequate substitutes for their specialized diet, which is difficult to recreate artificially or maintain naturally in a zoo environment (Yang et al., 2007). Some limited success has been achieved at the Taipei zoo, where, with the introduction of a new diet formula in 1995, survival rates significantly improved with fewer observed digestive issues (Yang et al., 2007).

Political and Enforcement. The web of pangolin trade is operated by organized crime syndicates which utilize a complex array of channels and middlemen to acquire and deliver pangolin products to demand centers. As such, enforcement is very difficult. Pangolins and pangolin derivatives can be sent through postal services and transported overland through Myanmar. The animals are processed and transported in packages mislabeled as products derived from non-protected species, such as frozen fish, which then can be transported by boat from Southeast Asia to Chinese ports (Yongping, 2009). Moreover, individual species are often not kept whole during transport. As the scales are in high demand for traditional Chinese medicine, they are often transported separately. It is very challenging to distinguish scales of different species once removed from the body (Center for Biological Diversity, 2015). These scales can also be found in powder form, after pulverization, which is nearly impossible to identify by authorities.

Pangolin traders often camouflage their illegal activity with a legal business front. This includes the use of legal wildlife collection businesses and captive breeding centers, but also a variety of other small business types such as bakeries, grocery stores, home decoration and hardware stores (Sopyan, 2009). Local transport is done using private, disguised vehicles such as minivans painted with food or cigarette labels or public transportation such as buses. Bribery in the form of money and gifts is used to pay off

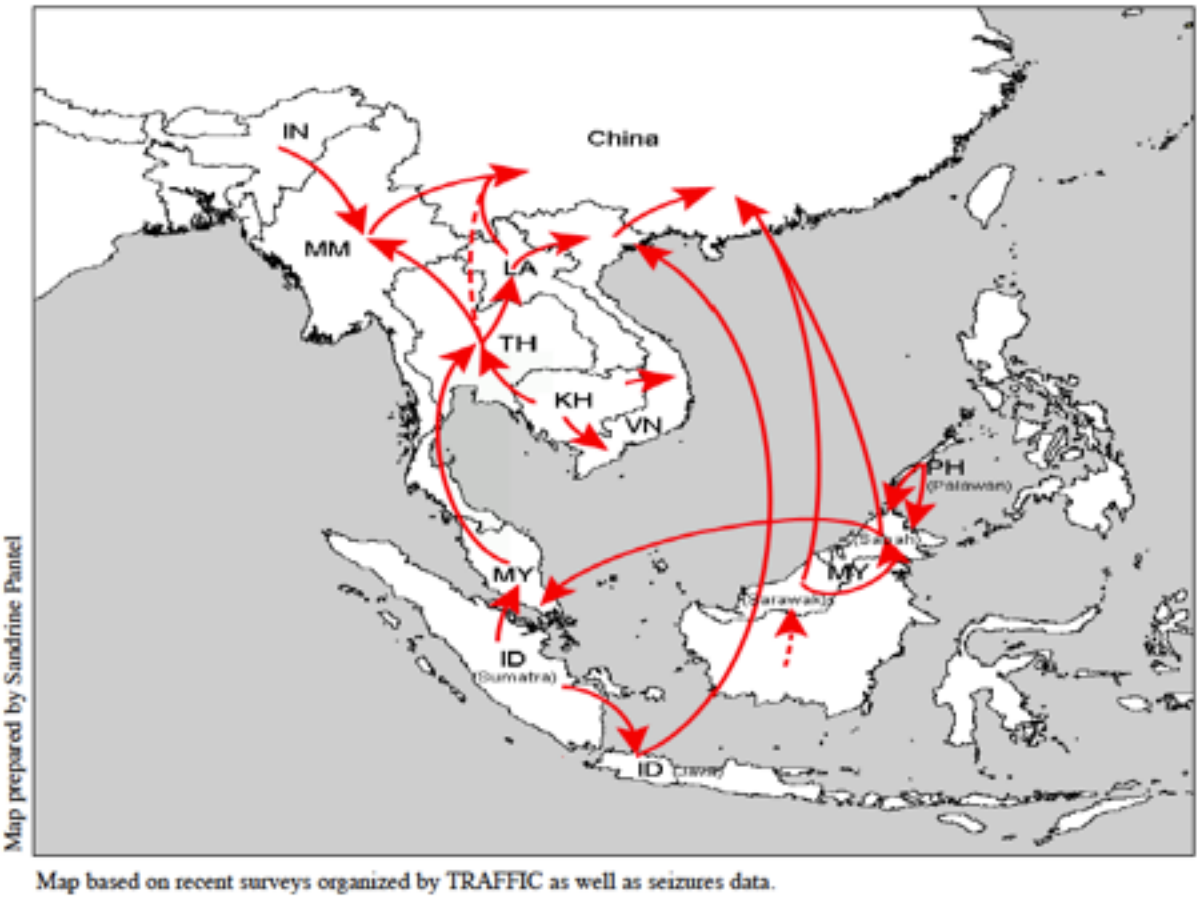


Figure 2. Flowmap of pangolin smuggling routes through Indonesia and SE Asia. Source: TRAFFIC, 2010

authorities and guards, to facilitate their removal from protected areas and transit to demand centers (Sopyan, 2009; IUCN Red List).

Many countries' fines, as they stand now, are not significant deterrents for organized crime groups that are smuggling pangolins. An individual who was caught smuggling 110 Sunda pangolins through Thailand (*Manis javanica*), was released from prison the day of the arrest after paying a fine of US$75,000 in cash (Challender & MacMillan, 2014; Hance, 2012). This event demonstrates the ease with which such criminals can cope with penalties, necessitating implementation of more stringent fines and sentences. Such a fine pale in comparison to the US$170,000, which would have been fetched at market in China, highlighting the continued incentive to pursue illegal trade (Challender & MacMillan, 2014).

Economic. In Vietnam, pangolins are often consumed in a business setting as their rarity conveys respect to clients or because individuals wish to treat themselves using company funds. Pangolins are also consumed by high-income earners to demonstrate their personal status of affluence (Shairp et al., 2016). Pangolin scales are widely used in traditional medicine. This type of use is still legal in mainland China despite bans on hunting and meat consumption (Yue, 2008). The valued rarity can lead to an "extinction vortex," in which the demand skyrockets as the species becomes more and more rare (Shairp et al., 2016).

The market price for an individual Sunda or Chinese pangolin is $1,550/animal (Challender & MacMillan, 2014). For the Palawan pangolin, scales are valued at $250 per kilogram (IUCN Red List). These prices have been increasing and further incentivizing capture and illegal sales (Challender & MacMillan, 2014). As more and more people throughout Asia become increasingly affluent, this demand will likely continue to grow. In 2007, it was estimated that the annual demand for pangolins in China totaled between 100,000 and 135,000 (Center for Biological Diversity, 2015).

While affluence within urban centers is increasing, Gini coefficients, scores which indicate how wealth is distributed in a country, continue to rise throughout Southeast Asia suggesting worsening inequality, with rural populations remaining below the poverty line (Zhuang, Kanbur, & Rhee, 2014). It is from these rural areas that highly trafficked species are captured. With limited opportunities for earning sufficient income to support basic needs, wildlife capture and sales to middlemen is an attractive option. In Vietnam, food prices have remained low causing farming communities to seek income through other means (Challender & MacMillan, 2014). In Indonesia, farmers have switched to the hunting of Malayan pangolins as a 10kg individual has, at times, fetched a price equivalent to that of a calf (Sopyan, 2009). In Vietnam, hunters can expect to earn in excess of $95 per kg of Chinese pangolin (IUCN Red List).

Image 1. Custom agents in Zhuhai, Guangdong made a seizure of approximately four tons of smuggled pangolin.

Asian Pangolin's Relationship to CITES

Pangolin CITES History. CITES first listed all eight species of pangolins under Appendix II of the CITES convention in 1975 (Shepherd, 2009). The 2008 Workshop on Trade and Conservation of Pangolins Native to South and Southeast Asia recommended the listing of all pangolin species under Appendix I. India, Nepal, Sri Lanka and the USA submitted proposals at the 11th Conference of the Parties (CoP 11) to list all Asian pangolins under Appendix 1 of CITES (Jonsson, 2015). At CoP 11, Party members agreed to a zero trade quota in 2000 in lieu of the recommended re-listing under Appendix I, to apply to commercial trade (Shepherd, 2009).

At CoP16, range states of the Asian pangolins also agreed to compile pertinent information on illicit trade of Asian pangolins and current in-country conservation and enforcement efforts, which was submitted for review at the 65th meeting of the CITES Standing Committee, held in 2014 (Scanlon, 2015). Along with establishing an inter-sessional working group to further monitor threats to all eight pangolin species following CoP16, the Standing Committee will also present recommendations at CoP17 pertaining to trade in Asian pangolins, based on the information it has received (Scanlon, 2015; CITES 16.41 and 16.42 Pangolins). It is anticipated that India will propose the listing of the Indian pangolin under Appendix I of CITES at CoP 17. The Philippines is also expected to submit a proposal for the Palawan pangolin to be listed under Appendix I. Additional proposals will likely be submitted for the Chinese and Sunda pangolin for Appendix I classification.

Range State Export Quotas and CITES Punishments for Violations. Violations of Appendix II restrictions and the zero export quota for wild pangolins are fairly frequent. Upon examination of the United Nations Environment Programme World Conservation Monitoring Centre's (UNEP-WCMC) CITES Trade Database, a number of entries can be found that are non-compliant with current restrictions. In 2008, for instance, the Trade Database indicates that Vietnam exported 80 units of Chinese pangolin derivatives to the US, for which the reported purpose was "personal." China imported 1,000 kilograms of Sunda pangolin scales from Singapore for commercial purposes, demonstrating a clear violation of the zero trade ban. Dan Challender explains that a common practice is to label wild pangolins as captive-bred, which would thereby exempt them from the zero export quota established for wild pangolins (Cota-Larson, 2014). In 2010, the Database shows that Laos exported 1,000 Chinese pangolin skins to Mexico for "commercial" purposes, the source of which is recorded as "R" which indicates they were ranched specimens (UNEP-WCMC CITES Trade Database). This clearly represents a fraudulent transaction. As explained earlier, pangolins have incredibly high mortality rates when kept in captivity, even in well-managed zoos which are often well-equipped to properly care for wild animals. The

trade of pangolins sourced from captive breeding is therefore incredibly unlikely, except in small volumes for scientific or zoological purposes.

Since it is only the Asian pangolins which are subject to the zero export quota, trade in African pangolins is still permitted in accordance with Appendix II. However, due to the difficulties in distinguishing between the eight species, it is very likely that a significant portion of the trade that persists in Asian pangolins is facilitated by the purposeful mislabeling of Asian pangolins as African pangolins. For many of the transactions recorded in the CITES Trade Database, no species name is provided; simply the genus *Manis spp.* is included (UNEP-WCMC CITES Trade Database). If the four Asian pangolins are indeed relisted under Appendix I, we can expect such infractions to continue unless more is done to address the trade of African pangolins as well. Both of the scenarios described above expose the fraudulent nature of much of the current

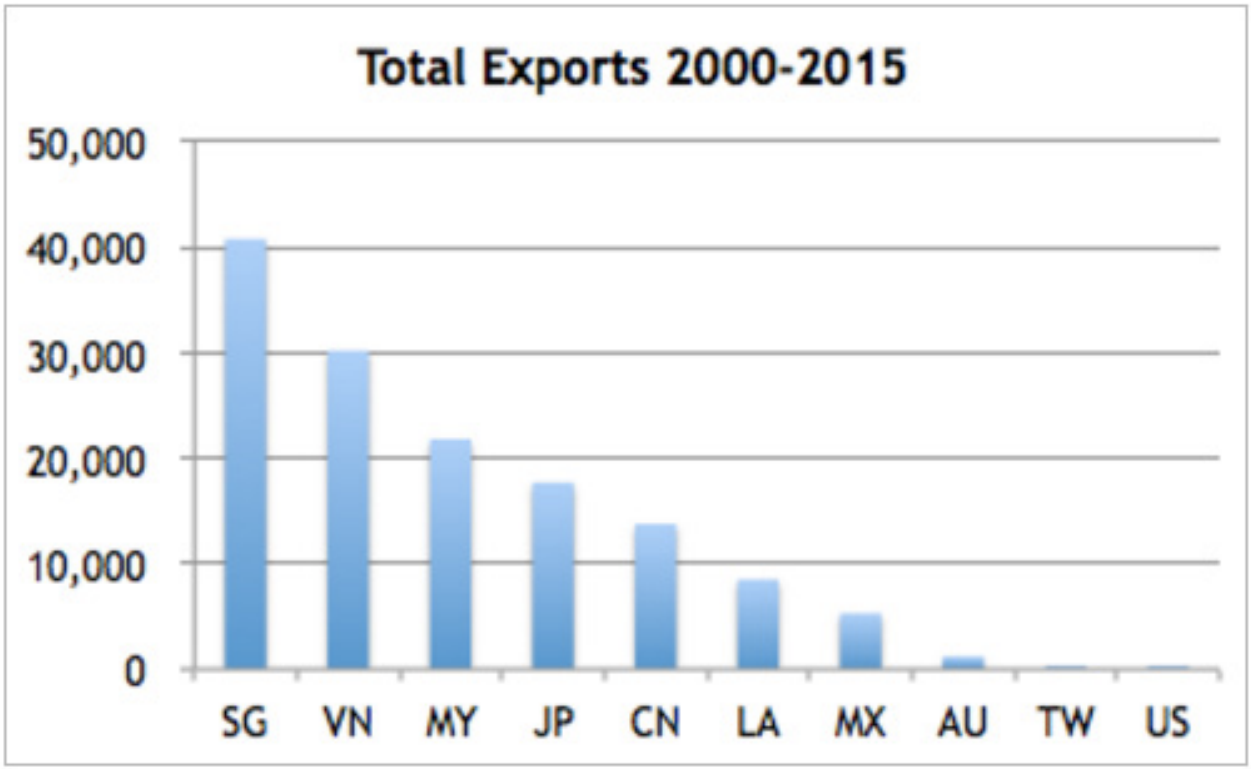


Figure 3. Top ten exporters of Asian pangolins and Asian pangolin products from 2000-2014, by country. In order: SG: Singapore, VN: Vietnam, MY: Malaysia, JP: Japan, CN: China, LA: Laos, MX: Mexico, AU: Australia, TW: Taiwan, US: United States. Source: UNEP-WCMC CITES Trade Database.

legal trade in pangolins, and which are considered violations of CITES.

Figures 3 and 4 show the major importers and exporters recorded in the CITES Trade Database. It is interesting to note that, while much of the literature available on pangolin trade discusses demand centers in Asia, relatively little is mentioned of the large influx of Asian pangolins and pangolin products into North America. This is particularly concerning since the United States and Mexico have reported the largest number of Asian pangolin imports among party nations, since the trade ban was imposed in 2000 (UNEP-WCMC CITES Trade Database). Such data may reflect the varying capacity of different countries to properly report imports and exports.

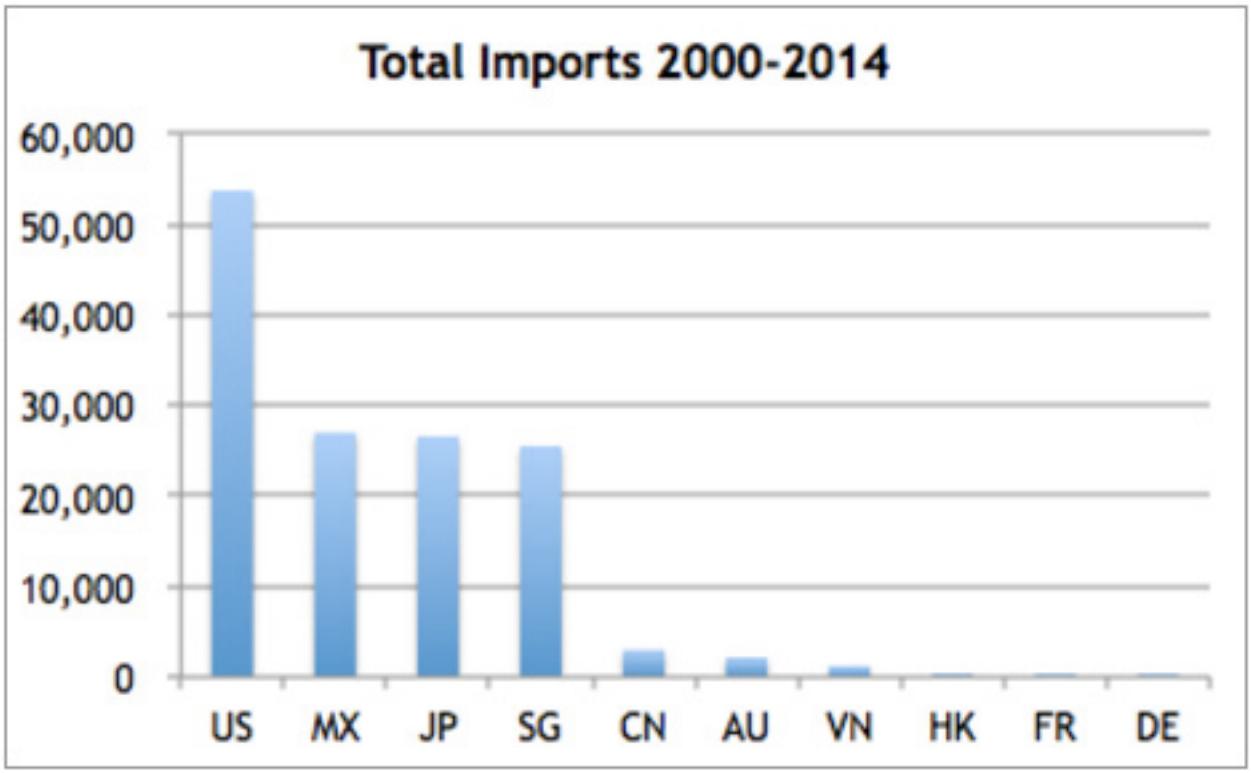


Figure 4. Top ten importers of Asian pangolins and Asian pangolin products from 2000-2014, by country. In order: US: United States, MX: Mexico, JP: Japan, SG: Singapore, CN: China, AU: Australia, VN: Vietnam, HK: Hong Kong, FR: France, DE: Germany. Source: UNEP-WCMC CITES Trade Database.

Recommendations for Policy & Best Management Practices

Local Level.

Education. Some of the most effective conservation takes place at the local level, through community awareness initiatives. One such example comes from rural Nepal, where local leaders became stewards in pangolin conservation through educational efforts. EDGE fellow Ambika Khatiwada worked to teach local community members from the village in which she grew up about the importance of pangolin conservation and how hunting the animal can prove detrimental to their own lives (Khatiwada, 2014). Villagers were advised of current wildlife laws and the potential fines and jail time they could face if they were to kill or injure a pangolin. Ms. Khatiwada also informed villagers of the rewards they could receive for providing information on poachers. At the start of the program, several villagers were found to have killed and consumed a pangolin. However, further into the program, these very same individuals turned over their scales and later became active members in the local conservation committee. Sometimes public awareness efforts led by foreigners can be poorly received by local communities who, understandably, may question the right that outsiders have to dictate their way of life. The above example highlights not only the importance of local awareness building, but also the importance of providing opportunities for people like Ambika to become stewards and educators for people from their hometowns, who may be more receptive to a local voice. Based on the success seen here, we recommend more programs such as this be pursued.

Conservation. Since rural communities from which most trafficked species are initially retrieved may have limited options for generating income, support for these communities through the provision of services, conservation payments and alternative livelihoods would likely help to curb the flow of pangolins into the market (Challender & MacMillan, 2014). Hunters who are aware that pangolins are a protected species often remain active due to the high prices that this illegal wildlife product can generate. Local hunters interviewed about why they chose not to capture pangolins cited stable income and strong law enforcement as major deterrents (Chin & Pantel, 2009). Hunting of pangolins is very time and energy intensive due to their solitary and nocturnal nature. It is thus not worthwhile if alternative opportunities for earning a steady income are available. Economic incentives can be difficult to remedy; establishing funds and work programs to support local communities with low wages is a recommended action that can be taken to raise communities out of poverty and protect these endangered species.

Enforcement. Due to the illegality, regular patrolling and enforcement work is considered a major deterrent (Chin & Pantel, 2009). Investing in stronger enforcement by increasing the number

of patrols and imposing harsher fines for commercial poachers at the local level offers the best chance of protecting pangolin populations, particularly in protected areas where poaching has been observed as a common occurrence. However, such measures should consider the nature and frequency of offenses in order to determine the proper level of penalty, in order to ensure that rural communities aren't unduly affected as a result of infrequent, subsistence hunting. Range states identified various "strongholds" at the first Pangolin Range States Meeting, held in June 2015 (CITES, 2015). Once these strongholds are confirmed, we recommend their prioritization for conservation and enforcement efforts, in order to maximize efficient allocation of resources.

National

Education. Because it is difficult to distinguish between the eight species of pangolins, and because all species are in decline, some more than others, the entire genus *Manis* should be listed to encompass all species to reduce confusion and misidentification. This will make enforcement significantly easier. Those species that resemble other listed species typically fall under Appendix II (CITES 1a). However, since such a situation has proven insufficient in protecting pangolins, similar looking species should be considered as Appendix I. There has been a petition brought to the U.S. Fish and Wildlife Service making the case for regulating all pangolin species in the same manner under the Endangered Species Act's Similarity of Appearance Provision (Center for Biological Diversity, 2015). If the four Asian species are indeed transferred to Appendix I, more efforts will be necessary to educate law enforcement about current laws and ways of distinguishing legal trade from illegal trade.

As TRAFFIC's Southeast Asia Regional Director Dr. Chris Shepherd explains, law enforcement officials often are not properly trained in enforcing wildlife laws and regulations, and may not even be aware of their existence. In many range states and demand centers, law enforcement officials lack adequate training in criminal investigation. Additionally, lawyers often are unfamiliar with prosecuting crimes involving wildlife poaching and trafficking. Even in highly developed countries where demand is considerable, like the United States for example, much of the population, including those typically responsible for enforcing lawful trade, have not heard of pangolins, thereby creating a massive need for national law enforcement education programs to address such knowledge gaps (Cota-Larson, 2014).

Conservation. Conservation efforts at a national scale require greater accumulation of data in order to determine best practices for wild pangolins. Previous attempts to raise pangolins in captivity have failed due to lack of information on animal husbandry and nutritional requirements. Breeding programs have experienced limited success, making such a management option unfeasible and not recommended. Conducting future research around captive behavior,

husbandry, social groups, and space requirements will provide better information for future remediation attempts. Due to the reclusive nature of the pangolin, field research is small. Captive facilities, while detrimental to health, offers the best chance at understanding more about species behavior and conservation techniques. Vietnam's Carnivore and Pangolin Conservation Program (CPCP) is working with forest rangers to reduce threats from hunting (Newton et al. 2008). The early focus has been to improve ecology and behavior of pangolins as well as researching techniques to locate species in the wild (Newton et al. 2008).

Government agencies must be more proactive in sharing information and research. Strong and standardized information sharing between government organizations (GO's) and NGO's not only provides better information for conservation but strengthens enforcement agencies. Establishing a specialist pangolin center in areas designated as hot spots will provide immediate care for confiscated pangolins. Issues include limited capacity to move these species to the correct place fast enough to provide care as many die after confiscation. Providing enforcement officers with decision making materials to guide placement of confiscated animals with appropriate services will save precious time.

Enforcement. In Vietnam, Decree 32 on the Management of Endangered, Precious, and Rare Species of wild Plants and Animals within which pangolins are lists as a protected species, a provisions exists that allows the sale of animals confiscated from illegal trafficking operations to be sold into legal trade (IUCN Red List). There remains a serious question of what to do with confiscated species.

"In 2004, 60 tons of live pangolins were seized. Most died because no suitable location for release or rescue could be found (Hiep, 2009)."

For the most part, live confiscated pangolins are immediately released back into the wild due to resource limitations and high mortality in extended captivity. The conditions of transportation of live pangolins is inhumane as the animals are confined in tightly wrapped bags or boxes and without access to food or water. When confiscated by authorities they are likely to be in very poor health due primarily to the physiological stress of such conditions (Clark et al., 2009). The subsequent release of confiscated individuals is usually done without planning. However, evidence suggests that some intermediate captivity program prior to release is advisable as it allows the animals to recover from wounds and be treated for diseases incurred during trafficking that would more than likely prove fatal without treatment. Additionally, without treatment, infected animals could introduce new diseases when released, which could potentially decimate wild populations. Thus we advise the establishment of more rehabilitation centers in range states (Clark, Thai and Phuong, 2008).

International

Education. One of the major areas in which improvements can be made is consumer awareness. Global efforts to improve public awareness and concern for pangolin conservation is highly recommended. This year, the global community celebrated the fifth annual World Pangolin Day, organized by the non-profit Annamiticus who provides factsheets in seven different languages, most of which are spoken in range/demand states (Annamiticus, 2016). TRAFFIC's Mekong Program, in collaboration with Population Services International (PSI) has launched the "Strength of Chi" campaign in Vietnam that promotes a behavioral shift away from the consumption of Rhino horns by emphasizing that strength and good-fortune come from within. Perhaps this program will drive demand away from wildlife consumption in general. However, a more conscious effort to expand the program should be made in order to more directly target pangolin consumption as well (Nguyen, 2014).

Expansion over social media offers another method of international outreach. More people are online than ever before and social media outlets such as Twitter, Facebook and Instagram can raise awareness to citizens in every country with the click of a button. An NGO the size of the Wildlife Conservation Society (WCS) can make a huge difference in outreach through these platforms.

Conservation. One issue cited in an interview between Julie Scardina, SWBG and Suon Phalla is the lack of cooperation between NGO's. For government agencies trying to find information on pangolin seizures and population trends, it can be difficult to find a comprehensive source for this kind of data. Thus we recommend strengthened partnership between relevant NGO's. A knowledge sharing platform is one way in which this could be achieved. The limited data available now is conflicting on number of pangolin seizures and population estimates. Further study is also necessary to strengthen communication between countries and NGOs. A regional rescue network is one potential opportunity for collaboration as proposed by (Hiep, 2009). We recommended a collaborative effort between NGOs and relevant agencies to establish such a network in order to ensure that confiscated pangolins are properly handled and released.

Enforcement. Due to the complexity and international nature of pangolin supply chains, knowledge sharing and collaboration between range states is

necessary. In 2005, The Association of Southeast Asian Nations (ASEAN) Wildlife Enforcement Network was established, bringing together ten of the range states in Southeast Asia in order to coordinate efforts to strengthen enforcement (Shepherd, 2009). In 2015, the first Pangolin Range State Workshop took place in Da Nang, Viet Nam, which brought relevant stakeholders and experts together to discuss the current status of and solutions to address rapidly declining pangolin populations (Scanlon, 2015).

Communication between parties over secure channels provides safety and speed. We recommend utilizing options such as Interpol's I-24/7 global police communications system to connect police forces across the world. This will facilitate the exchange of data between source, transit and destination countries to share information and strengthen enforcement measures. As part of annual trade reports issued by all member countries, we recommend listing all illegal trade activity and seizures made during each year to provide better estimates of overall activity and more transparency between parties. Such data is currently not provided in annual trade reports. Thus current reports only show half of the story.

Newton et al. and Chin & Pantel both stress the importance for improved research on the pangolin. Population, reproduction, behavioral ecology and other information is lacking on the pangolin which leads to complications in developing best solutions. Most studies discuss the need for more information on populations and better estimates on range of habitat, but the reclusive nature of the pangolin makes this difficult.

Controversy of Farming Pangolins in Vietnam

Vietnam has recently begun promoting commercial wildlife farms to lessen the burden on wild species. This strategy is controversial and not currently in use for pangolins due to poor results in reproduction in captivity. Such a strategy may increase supply and thereby lower prices and, subsequently disincentivize illegal trade, however it could have the unanticipated outcome of drawing in new consumers and thereby increasing demand (Shairp et al., 2016). Other countries have utilized such practices, but with mixed outcomes.

Recommendations for Potential CoP 17 Proposal

Pursuant to Annex 1, on biological criteria for Appendix 1, Asian pangolins are eligible under part A. as their populations have experienced "an observed, inferred or projected decline in the number of individuals or the area and quality of habitat (CITES, Resolution 9.24)." They are also eligible under part C as Asian pangolin populations have experienced a "marked decline in the population size in the wild, which has been... observed as ongoing or as having occurred in the past (but with a potential to resume) (CITES, Resolution 9.24)." This is evidenced by hunter surveys, scientific studies and large volumes of seizures as discussed earlier. Additionally, the presence of "intrinsic [biological] factors" that amplify vulnerability warrants the classification of a species under Appendix I of CITES as outlined in CITES Resolution 9.24.

In a joint statement from the World Wildlife Fund (WWF) and TRAFFIC, the continued illegal international trade in pangolins despite an Appendix II listing, protection in most range States, and the zero quota for Asian pangolins highlights a clear failure of enforcement. An Appendix I listing for all pangolin species would require the use of import permits, which would facilitate better enforcement. Penalties in many pangolin range states under national legislation are higher for illegal trade in Appendix I listed species than for Appendix II. In practice Appendix I species are afforded higher priority (Henry, 2014). Listing all eight pangolin species under Appendix I would extend protection to the African pangolin species, which are now showing increasing signs of hunting pressure. As Asian pangolin populations continue to decline, the trade in African pangolins is beginning to increase to meet demand in Asia (Henry 2014). Without listing all eight species, fraudulent transactions will persist, in which Asian pangolins are claimed to be African or are only recorded using the genus *Manis*.

In consideration of current scientific and trade data, and potential benefits to enforcement for Appendix I status, we recommend the transfer of pangolin species to Appendix I of CITES. At the very least, Asian pangolins should be relisted, since their population declines are most critical at this point in time.

References

Annamiticus. (2016). World Pangolin Day. http://pangolins.org/about-us/

AP Photo/Firdia Lisnawati. (2014). Sunda pangolin mum with her pangopup. *Australian Geographic*.

Center for Biological Diversity. (2015). *Rulemaking Petition to Protect Seven Pangolin Species Under the Similarity of Appearance Provision of the Endangered Species Act*. Seattle.

CITES 1a. *The CITES Appendices*. https://cites.org/eng/app/index.php

CITES. (2013). Resolution 9.24. Criteria for amendment of Appendices I and II. https://cites.org/eng/res/09/09-24R16.php

CITES. (2014). 16.41 & 16.42 Pangolins (Manis spp.). Retrieved from https://cites.org/eng/dec/valid16/193

CITES. (2015). REPORT OF THE FIRST PANGOLIN RANGE STATES MEETING (SC66 Doc.50.2). Retrieved from https://cites.org/sites/default/files/eng/com/sc/66/E-SC66-50-02.pdf

Challender, D. W., & MacMillan, D. C. (2014). Poaching is more than an enforcement problem. *Conservation Letters*, 7(5), 484-494.

Challender, D.W., Waterman, C., & Baillie, J. (2014). Scaling Up Pangolin Conservation: IUCN SSC Pangolin Specialist Group Conservation Action Plan. *IUCN SSC Pangolin Specialist Group*.

Clark, L., Nguyen, V.T. and Tran, Q.P. (2008). A long way from home: the health status of Asian Pangolins confiscated from the illegal wildlife trade in Vietnam. *Proceedings of the workshop on trade and conservation of pangolins native to South and Southeast Asia*. pp. 111-118.

Coggins, C. (2003). *The tiger and the pangolin: nature, culture, and conservation in China.* University of Hawaii Press.

Cota-Larson, R. (2014). Pangolins Roll into the Wildlife Trafficking Spotlight. *National Geographic*.

Duckworth, J.W., Anak Pattanavibool, Newton, P. and Nguyen Van Nhuan 2008. *Manis javanica*. In: IUCN 2009. IUCN Red List of Threatened Species. Version 2009. 2. ,www.iucnredlist.org>.

Hance, J. (2012) Picture of the day: pangolins saved in Thailand from poachers. Available from http://news.mongabay.com/2012/0806-hance-sunda-pangolins-pod.html. Accessed 25 March 2013.

Henry, L. (2014). Comment on the Fish and Wildlife Service Notice: Seventeenth Regular Meeting; Species Proposals for Consideration. Federal Register #3 Docket: FWS-HQ-IA-2014-0018. *TRAFFIC and WWF*.

Hiep, N. M. (2009). Pangolin Conservation in Viet Nam. In *WORKSHOP ON TRADE AND CONSERVATION OF PANGOLINS NATIVE TO SOUTH AND SOUTHEAST ASIA* (p. 40).

IUCN. (2010). IUCN Red List of Threatened Species. Version 2010.4. <www.iucnredlist.org>. Downloaded on 27 September 2010.

IUCN Pangolin Specialist Group. (n.d.). Chinese Pangolin. http://www.pangolinsg.org/pangolins/chinese-pangolin/

Jonsson, P. (2015). CITES and Pangolins: First Pangolin Range States Workshop. *CITES*.

Khatiwada, A. (2014). *Community stewardship for pangolins in Nepal.* EDGE of Existence. Retrieved 21 April 2016, from http://www.edgeofexistence.org/edgeblog/?p=7755

Lim, N. T-L. and Ng, P. K. L. 2008. Home range, activity cycle and natal den usage of a female Sunda Pangolin *Manis javanica* (Mammalia: Pholidota) in Singapore. Endangered Species Research 4: 233-240.

Newton, P., T. Nguyen Van, S. Roberton, and D. Bell (2008) Pangolins in peril: using local hunters' knowledge to conserve elusive species in Vietnam. Endangered Species Research 6:41-53

Nguyen, T. (2014). *Innovative campaign promotes success from within*. Traffic.org. Retrieved 15 February 2016, from http://www.traffic.org/home/2014/9/22/innovative-campaign-promotes-success-from-within.html

Northam, J. (2015). The World's Most Trafficked Mammal Is One You May Never Have Heard Of. NPR. http://www.npr.org/sections/parallels/2015/08/18/432568915/the-worlds-most-trafficked-mammal-is-one-you-may-never-have-heard-of

Platt, J. (2013). Pangolins in Peril: All 8 Species of Scaly Anteaters Endangered by Illegal Trade. *Scientific American*.

Sandrine Pantel and Noorainie Awang Anak (2010). *A preliminary assessment of pangolin trade in Sabah*. TRAFFIC Southeast Asia, Petaling Jaya, Malaysia. ISBN: 9789833393305.

Scanlon, J. (2015). CITES Secretary-General's opening remarks at the First Pangolin Range States workshop. *CITES*.

Shairp, R., Veríssimo, D., Fraser, I., Challender, D., & MacMillan, D. (2016). Understanding Urban Demand for Wild Meat in Vietnam: Implications for Conservation Actions. *PLoS ONE*, 11(1), e0134787. http://doi.org/10.1371/journal.pone.0134787

Shepherd, C. R. (2009). Overview of pangolin trade in Southeast Asia. In *WORKSHOP ON TRADE AND CONSERVATION OF PANGOLINS NATIVE TO SOUTH AND SOUTHEAST ASIA* (p. 6).

Sopyan, E. (2009). Malayan Pangolin Manis javanica Trade in Sumatra, Indonesia. In *WORKSHOP ON TRADE AND CONSERVATION OF PANGOLINS NATIVE TO SOUTH AND SOUTHEAST ASIA* (p. 134).

The Star (2009). Two men caught in cemetery with 130 pangolins for sale. News released on December 20th, 2009. http://thestar.com.my/news/story.asp?file=/2009/12/20/nation/5341258&sec=nation

Traffic. 2002. Seizures and prosecutions - Asia. TRAFFIC Bulletin 19(2): 2.71

Traffic. 2009. Toothless laws encourage rising demand for Asian pangolins. http://www.traffic.org/home/2009/7/14/toothless-laws-encourage-rising-demand-for-asian-pangolins.html

UNEP-WCMC CITES Trade Database. http://www.unep-wcmc-apps.org/citestrade/trade.cfm. Accessed 22th February 2016.

United Nations Environment Programme World Conservation Monitoring Centre [UNEP-WCMC]. (2013). A guide to using the CITES Trade Database. Retrieved from http://trade.cites.org/cites_trade_guidelines/en-CITES_Trade_Database_Guide.pdf

U.S. Fish and Wildlife Service. (2016). *Pangolins.* Retrieved 15 February 2016, from http://www.fws.gov/international/animals/pangolins.html

Yang, C. W., Chen, S., Chang, C. Y., Lin, M. F., Block, E., Lorentsen, R., ... & Dierenfeld, E. S. (2007). History and dietary husbandry of pangolins in captivity. Zoo Biology, 26(3), 223-230.

Yangcheng Evening Report (Image 4). (2014). [Photograph], Retrieved from: http://news.ycwb.com/2014-05/14/content_6736066.htm

Yongping, G. (2009, June). Pangolin trafficking-related crimes in China. In WORKSHOP ON TRADE AND CONSERVATION OF PANGOLINS NATIVE TO SOUTH AND SOUTHEAST ASIA (p. 75).

Yue, Zhang. (2008). Questions addressed to Mr. Zhang Yue, China. In WORKSHOP ON TRADE AND CONSERVATION OF PANGOLINS NATIVE TO SOUTH AND SOUTHEAST ASIA. (p. 87).

Zhou, Z. M., Zhou, Y., Newman, C., & Macdonald, D. W. (2014). Scaling up pangolin protection in China. Frontiers in Ecology and the Environment, 12(2), 97-98.

Zhuang, J., Kanbur, R., & Rhee, C. (2014). Rising inequality in Asia and policy implications.

Devil Rays

Photo by Wolfgang Polzer

Background on Species

General Biological and Geographical Description. Devil rays are the common name for a genus (*Mobula*) of ray in the family *Myliobatidae* (FishBase, 2016). These species are characterized by a dorsoventrally flattened body shape with a broad head and subterminal mouth. They have pectoral fins that extend past the head, forming distinct cephalic fins. *Mobula* rays are found across the world in tropical and temperate oceans (SharkTrust, 2009). These rays are generally found to develop slowly, mature late, and produce few offspring, although the lifespan and age at sexual maturity are not yet known for many mobulid species (WildAid, 2016). The IUCN lists all 9 different species of devil rays on its Red list. Specifically, the IUCN lists all 9 different species (Sicklefin Devil Ray, Spinetail Devil Ray, Giant Devil Ray, Bentfin Devil Ray, Longhorned Pygmy Devil Ray, Shortfin Pygmy Devil Ray, Atlantic Pygmy Devil Ray, Guinean Pygmy Devil Ray, Munk's Pygmy Devil Ray) as endangered, near threatened, vulnerable, or data deficient.

Main Threats. According to Manta Trust, a UK-based charity organization founded in 2011, the main threats to the devil ray include a growing demand for their gill plates, which are dried and used in Chinese medicine, and for their meat and cartilage, which are used for culinary purposes. The devil rays' very low reproductive capacity coupled with slow growth makes this species extremely vulnerable to overexploitation (Couturier et al., 2012). Presently, devil rays are at great risk of severe global population declines due to targeted and incidental fishing pressure, often by small-scale fisheries (Manta Trust, 2015). To make matters worse, these fisheries are largely unregulated and unmonitored and, as a result, catch declines have been significantly observed in multiple locations in the Indo-Pacific, Eastern Pacific, and Indian Ocean regions (Manta Trust, 2015). However, because long-term population trend of each *mobula* species is unknown, further studies are needed to get reliable population estimate for these species (Couturier et al., 2012).

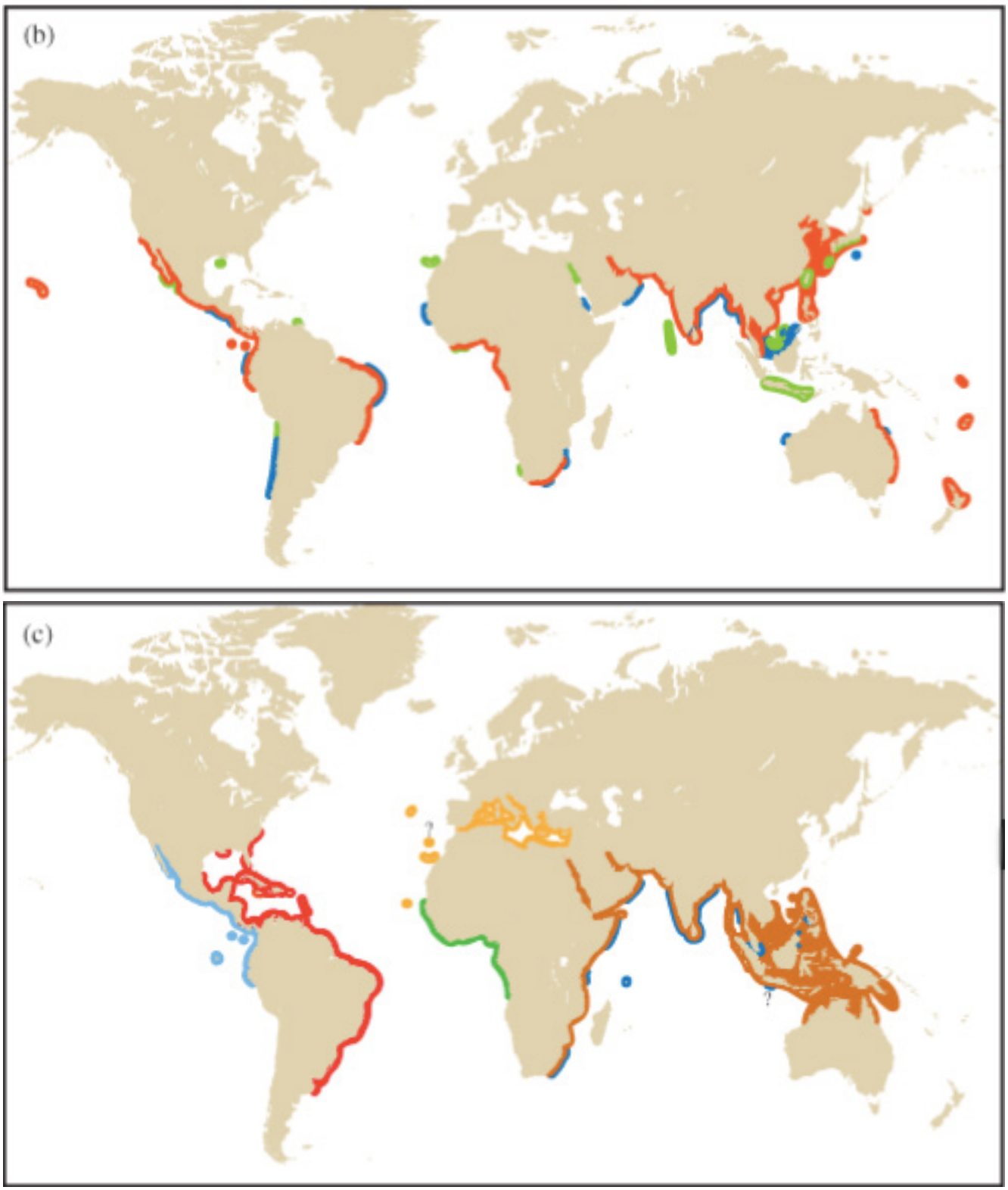


Figure 1. (b) Distribution of wide-ranging species of Mobula: Mobula japanica (red), Mobula tarapacana (green), and Mobula thurstoni (blue) adapted and modified from Clark et al. (2006a, b) and White et al. (2006b).
c) Distribution of regionally endemic species of Mobula: Mobula eregoodootenkee (red), Mobula hypostoma(dark orange),), Mobula kuhlii (light blue), Mobula mobular (light orange), Mobula munkiana (dark blue), and Mobula rochebrunei (green) adapted and modified from Pierce & Bennett (2003), Bizzarro et al. (2006, 2007, 2008), Notarbartolo-di-Sciara et al. (2006) and Valenti & Kyne (2007).

History of Ecological, Political and Economic Issues

Ecological Issues: Fishing Pressures and Population Vulnerabilities

Sicklefin Devil Ray

Habitat and Ecological Role. The IUCN lists the Sicklefin Devil Ray, *Mobula tarapacana*, as data deficient (Clark et al., 2006). This species lives mostly in the oceanic ocean, but occasionally in coastal waters. They are present at scattered locations in the Indian, Pacific and Atlantic Oceans. Unfortunately, there is very little information available for this broadly distributed ray. Limited evidence pertaining to the feeding ecology is available, but it has been suggested that the species may be a more general feeder than other *mobulas* or possibly *ichthyophagous*.

Use and Threats. The Sicklefin Devil Ray, like the other species, is increasingly susceptible to pelagic gillnets and to purse seines and longlines, especially in Indonesia (Clark et al., 2006).

Spinetail Devil Ray

Habitat and Ecological Role. The IUCN lists the Spinetail Devil Ray, *Mobula japonica*, as threatened (Clark et al., 2006). *Mobula japanica* is circumglobal in all temperate and tropical seas (offshore and inshore), but its distribution is not completely defined. The Spinetail Devil Ray is relatively large, and can reach up to 310 cm in disc width. Information on the biology of *Mobula japanica* is extremely limited, and the movement patterns within its range are not well known. Currently, no information is available on its population size.

Use and Threats. The Spinetail Devil Ray is highly susceptible to being caught in gillnets as by-catch in its range areas (i.e., Indonesia, México and the Philippines), and juveniles are often captured in trawl fisheries. Specifically, increasing by-catches of this species in Indonesia, which may mirror increases elsewhere, is of great concern (Clark et al., 2006).

Giant Devil Ray

Habitat and Ecological Role. The IUCN lists the Giant Devil Ray, *Mobula mobular,* as endangered (Clark et al., 2006). The IUCN has assessed Giant Devil Ray as Endangered since 2006, given its high bycatch mortality, limited reproductive capacity, restricted range and targeted catch (Clark et al., 2006).The Giant Devil Ray is the largest species within the genus, *Mobula*, and has a very low reproductive capacity (i.e., gives birth to a single large pup at unknown intervals). Its geographic range is limited to the Mediterranean Sea and possibly adjoining North Atlantic waters.

Use and Threats. Although this species is not utilized nor traded commercially, it is mostly taken as by-catch in many different fisheries, most notably in pelagic driftnets, in several locations within its range. However, more recently, researchers have discovered that this

species is the targeted catch of a massive purse seine fishery in the Levantine Sea that operates on a seasonal basis (Clark et al., 2006). Although the increased control and phasing out of illegal pelagic driftnets has greatly reduced fishing pressure over the last eight years, the significant threat imposed by this fishery in the eastern Mediterranean Sea suggests that this species is still at risk of overexploitation (Clark et al., 2006).

Bentfin Devil Ray

Habitat and Ecological Role. The IUCN lists the Bentfin Devil Ray, *Mobula thurstoni,* as near threatened, and their population size is unknown (Clark et al., 2006). The size of Bentfin Devil Ray at birth is estimated to be between 65-85 cm disc width, but both females and males from the Gulf of California, México are estimated to mature at 150 cm disc width. The geographical range of *Mobula thurstoni* is unknown. However, they are probably circumglobal in tropical and subtropical waters, scattered throughout regions of Indian, Pacific and Atlantic Oceans (Clark et al., 2006).

Use and Threats. This species is taken either as bycatch or as a target species in Indonesia, México, the Philippines and Brazil. Their gill plates are highly valued, and the flesh is utilized both for human consumption and for bait. As is the case with the Spinetail Devil Ray, the Bentfin Devil Ray population is at risk due to increasing catches of *mobulas* in Indonesia (Clark et al., 2006).

Longhorned Pygmy Devil Ray

Habitat and Ecological Role. The IUCN lists the Longhorned Pygmy Devil Ray, *Mobula eregoodootenkee*, as near threatened (Pierce et al., 2003). Longhorned Pygmy Devil Rays are locally common from tropical Indo-west Pacific to northern Indian Ocean, and reach a maximum size of approximately 100 cm disc width. Unfortunately, scientists know very little about this species' biology and ecological role.

Use and Threats. This species is taken as bycatch in many different fisheries, usually in pelagic driftnets, in several locations within its range—however, much of this is unreported. The Longhorned Pygmy Devil ray has a high demand in Thailand and Southeast Asia, where people use it for medicinal and culinary purposes (Pierce et al., 2003).

Shortfin Pygmy Devil Ray

Habitat and Ecological Role. The IUCN lists the Shortfin Pygmy Devil Ray, *Mobula kuhlii*, as data deficient (Clark et al., 2006). *Mobula kuhlii* is an uncommon, inshore devil ray with a patchy distribution in the Indian Ocean and western central Pacific. *Mobula kuhlii* feeds on planktonic crustaceans and possibly small fishes and cephalopods (Clark et al., 2006).

Use and Threats. Surface gillnets, longlines, purse seines, and directed harpoons are all threats to the Shortfin Pygmy Devil Rays (i.e., by-catch). Like the other species, many people value *Mobula kuhlii* for its branchial filter plates, which

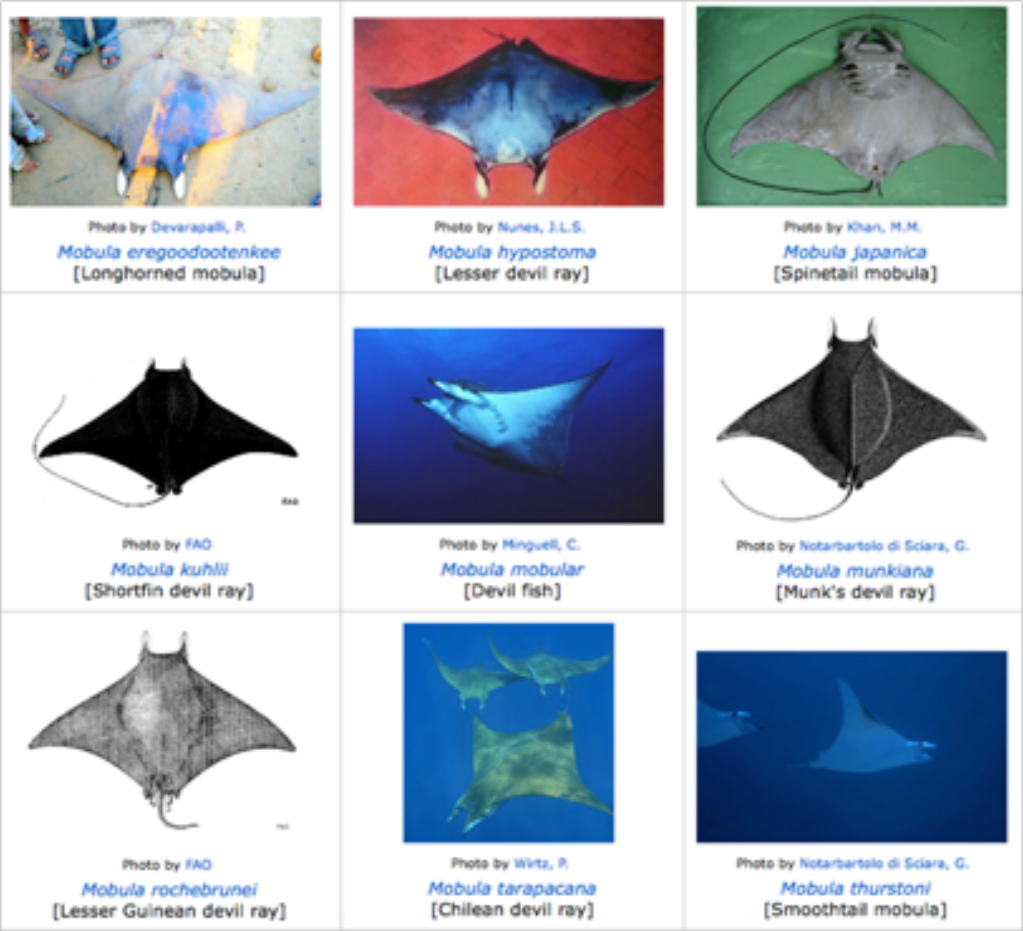


Figure 2. The nine different species of *Mobula* Rays (FishBase, 2016). 9 Species of Family *Myliobatidae* with Genus *Mobula* (Eagle and manta rays).

are exported from Indonesia to Hong Kong, Taiwan and Singapore for use in traditional Chinese medicines. The skins, cartilage and flesh are also used for human consumption—specifically, its cartilage is often a 'filler' for low-grade shark fin soup (Clark et al., 2006).

Atlantic Pygmy Devil Ray

Habitat and Ecological Role. The IUCN lists the Atlantic Pygmy Devil Ray, *Mobula hypostoma*, as data deficient (Bizzarro et al., 2009). Atlantic Pygmy Devil Ray is a species endemic to the western Atlantic, and it range is from North Carolina (USA) to northern Argentina, and it also lives in Gulf of Mexico, and Greater and Lesser Antilles. Atlantic Devil Rays reach a maximum size of approximately 120 cm disc width.

Use and Threats. In the Western Central Atlantic, people value *Mobula hypostoma* for their flesh, and sometimes people use their body parts for the production of oil. None of the Western Atlantic Devil Ray species are abundant enough to be considered important for commercial fisheries, but they are still taken as bycatch in longline and net fisheries (Bizzarro et al., 2009).

Guinean Pygmy Devil Ray

Habitat and Ecological Role. The IUCN lists the Guinean Pygmy Devil Ray, *Mobula rochebrunei*, as vulnerable (Clark et al., 2006). This Devil Ray lives in the eastern Atlantic from Mauritania to Angola (researchers also have two records of sightings off the coast of Brazil in the Southwest Atlantic). Additionally, *Mobula rochebrunei* is a pelagic species that is usually found at the surface or close to the bottom. Like all *Mobula,* this species is viviparous, giving birth to one young per litter. No other information is available on its biology.

Use and Threats. The branchial plates and cartilage of mobulid species in Indonesia are exported for the Asian market (for consumption) and are used in traditional Chinese medicine. Detailed information on *Mobula rochebrunei* fisheries is poorly documented (Clark et al., 2006).

Munk's Pygmy Devil Ray

Habitat and Ecological Role. The IUCN lists the Munk's Pygmy Devil Ray, *Mobula munkiana*, as near threatened (Bizzarro et al., 2006). *Mobula munkiana* is an inshore Devil Ray, and is known to form large aggregations. It is endemic to the Eastern Pacific from the Gulf of California, México to Peru and reaches 110 cm disc width.

Use and Threats. The major threat to this species is that it is taken as by-catch via pelagic driftnets in several locations within its range (Bizzarro et al., 2006).

Consumer Education Initiative led by WildAid

WildAid, who operates under the slogan, "when the buying stops, the killing can too", is a non-profit organization which aims to reduce the demand for wildlife products. Through consumer education, it uses a social media including China's version of Twitter, Weibo, to encourage the Guangzhou trade market to voluntarily discontinue the trade and consumption of Peng Yu Sai. This initiative began in Guangzhou in May 2014 and aims to address the extreme vulnerability of manta and mobula rays through informing consumers of the lack of medical evidence from consumption (Manta Trust, 2015).

Political Issues: Governmental Inaction

In general, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) has been so slow to engage with regulating international trade in marine fishes (Vincent et al., 2014). Vincent et al. clarifies that some parties have been opposed to listing marine species due to (a) the appropriateness of CITES involvement and/or (b) the capacity for CITES Parties to implement a listing (Vincent et al., 2014). In 1999, The Food and Agriculture Organization of the United Nations (FAO) developed a non-binding International Plan of Action for sharks (IPOA-SHARKS) in response to the expanding catches of sharks and potentially negative impacts on shark populations. This prompted a proposal at the 22nd session of the FAO Committee on Fisheries (COFI) in March 1997. IPOA-SHARKS aims to ensure the conservation and management of sharks.

While manta rays were included in Appendix II of CITES at CoP 16 in 2013, the Parties did not address devil ray, even though they are closely related to the similar manta rays. To make matters worse, this new regulation of manta rays under CITES is likely to lead an increase in gill plates trade of devil rays because they are not regulated (Pardo, et al, 2016). The Fijian government changed this trend by successfully persuading the Convention on Migratory Species (CMS) to add all devil rays to its international convention list of protected species (WWF, 2014). Prior to this, no other international body provided protection for devil rays (Morell, 2014).

Economic Issues: High Demand in China

Fisherman in Indonesia, Malaysia, the Philippines, Sri Lanka, India, Myanmar, and Mozambique target *Mobula* due to the growing demand for their dried gill plates, which are mainly exported from the abovementioned regions to China for use in health tonics. However, in 2013, Chinese vendors reported that Vietnam, Thailand, Japan, Africa, South America, the Middle East and Europe also have a high demand for gill plates for the purpose of consumption (Manta Trust, 2015). Nevertheless, to assess the trade in dried mobulid gill plates (product name 'Peng Yu Sai'), and its potential impact on populations of these highly vulnerable species, WildAid researchers conducted market surveys throughout Southeast Asia in 2009-10 and identified Gaungzhou, China as the epicenter of the plate trade, representing over 99% of the market (WildAid, 2014). According to WildAid, Chinese demand for Peng Yu Sai in the Guangzhou, more than doubled from early 2011 to late 2013. Furthermore, WildAid found that in 2010, the Guangzhou gill plate market had 61,000 kg of gill plates, amounting to $11 million in value. This volume and price in 2013 increased to 138,000 kg and $30 million reflecting a 127% and 168% increase, respectively (WildAid, 2014).

Table 1. Regulation of Devil Ray Species by Some Countries. (Couturier, Marshall, Jaine, Kashiwagi, Pierce, Townsend, & Richardson, 2012).

Devil Ray Species	Country	Content of Regulation
Sicklefin Devil Ray	Mexico	- Regulation of fisheries in Mexican waters (May 2007~)
	Ecuador	- Ban on fishing, taking, keeping incidental catch (August 2010~)
	Republic of Maldives	- Export ban on ray products (June 1995~) - Export ban on ray skins (January 1996~)
Spinetail Devil Ray	Mexico	- Regulation of fisheries in Mexican waters (May 2007~)
	Ecuador	- Ban on fishing, taking, keeping incidental catch (August 2010~)
	Republic of Maldives	- Export ban on ray products (June 1995~) - Export ban on ray skins (January 1996~)
	New Zealand	- Fully protection within New Zealand waters (2010~)
Giant Devil Ray	Mediterranean	- Protection under U.N. (Barcelona) Convention for the Protection Of The Mediterranean Sea Against Pollution (1995~)
	Republic of Maldives	- Export ban on ray products (June 1995~) - Export ban on ray skins (January 1996~)
Bentfin Devil Ray	Mexico	- Regulation of fisheries in Mexican waters (May 2007~)
	Ecuador	- Ban on fishing, taking, keeping incidental catch (August 2010~)
	Republic of Maldives	- Export ban on ray products (June 1995~) - Export ban on ray skins (January 1996~)
Longhorned Pygmy Devil Ray	Republic of Maldives	- Export ban on ray products (June 1995~) - Export ban on ray skins (January 1996~)
Shortfin Pygmy Devil Ray	Republic of Maldives	- Export ban on ray products (June 1995~) - Export ban on ray skins (January 1996~)
Atlantic Pygmy Devil Ray	Mexico	- Regulation of fisheries in Mexican waters (May 2007~)
	Republic of Maldives	- Export ban on ray products (June 1995~) - Export ban on ray skins (January 1996~)
Guinean Pygmy Devil Ray	Republic of Maldives	- Export ban on ray products (June 1995~) - Export ban on ray skins (January 1996~)
Munk's Pygmy Devil Ray	Mexico	- Regulation of fisheries in Mexican waters (May 2007~)
	Ecuador	- Ban on fishing, taking, keeping incidental catch (August 2010~)
	Republic of Maldives	- Export ban on ray products (June 1995~) - Export ban on ray skins (January 1996~)

Devil Rays' Relationship to CITES

Fiji Government Proposal. The Government of Fiji has submitted a proposal to list all 9 species of *Mobula* rays on Appendix II of the CITES at the next Conference of the Parties in 2016—the Fijian government believes that, although all of these species are not necessarily threatened with extinction, many may become so unless trade is closely controlled (CITES, 2016). According to Ms. Eleni Tokaduadua, the Principal Environment Officer and Head of the Fijian CITES Management Authority, "*Mobula* rays are facing global population declines due to growing, unregulated international trade" (Manta Trust, 2015). On February 5, 2016, CITES secretariat notified its members, proposing to amend the Appendices related to marine species (CITES, 2016). One of the main issues Fijian government seeks to address is are the previously discussed threats to Devil Rays as a result of directed or bycatch.

As stated previously, the devil rays are not currently listed in the CITES Appendices, so there is no information regarding range state export quotas from the past, or regarding violations (Manta Trust, 2015).

Recommendations for Policy & Best Management Practices

Local Level.

Educational Outreach and Conservation Policies. China is the largest consumer of dried mobulid (manta and mobula) gill plates. Partner organizations, such as WildAid, carries out work in areas like Guangzhou, to reduce demand for these species though social media (see the following case study). These efforts, in concert with conservation policies, have to be scaled up by the help of other non-profit organizations and local governments.

National Level

Domestic Protection Policies. Although devil rays are not regulated under CITES, some countries have already introduced management measurements and regulation to protect this species. These measures range from banning directed fisheries to establishing marine protected areas (Couturier et al., 2012). Countries like Mexico, Ecuador or Republic of Maldives have introduced some sort of regulation of devil ray species as provided in table 1. However, the level of enforcement and commitment to these regulatory measures remains uncertain in many areas (Couturier et al., 2012) and would need to be further strengthening to be effective.

International Level

Conservation and Domestic Protection Policies. The Fiji Government has been a strong proponent in the conservation and protection of the devil ray population. Fiji has already committed to CMS's international treaty, which has proposed the inclusion of all species of devil rays Appendices I and II (WWF, 2014) (CMS, 2014).

The listing of a species under CMS Appendix I obliges consenting countries to strictly protect species; a listing under Appendix II encourages international cooperation towards conservation. In 2014, 21 species of sharks and rays were listed under Appendices I and II of CMS and was made official in the final Conference of Parties (CoP). Through the listing of these species, member countries agreed to grant strict protection to the 9 devil rays as well as manta rays and other species.

Under CITES, in order to qualify for an Appendix II listing, it would require Non-Detriment Findings (NDF) prior to an issuance of an export permit. A CITES listing would contribute towards controlling international trade and would in effect help decrease the pressure in the trafficking of this species in its target areas. Along with its benefits, the implementation of CITES would pose new challenges, namely in the procedures of monitoring and collecting of trade and population data. Additionally, NDFs would help parties obtain further information that would help these fisheries operate under more sustainable practices.

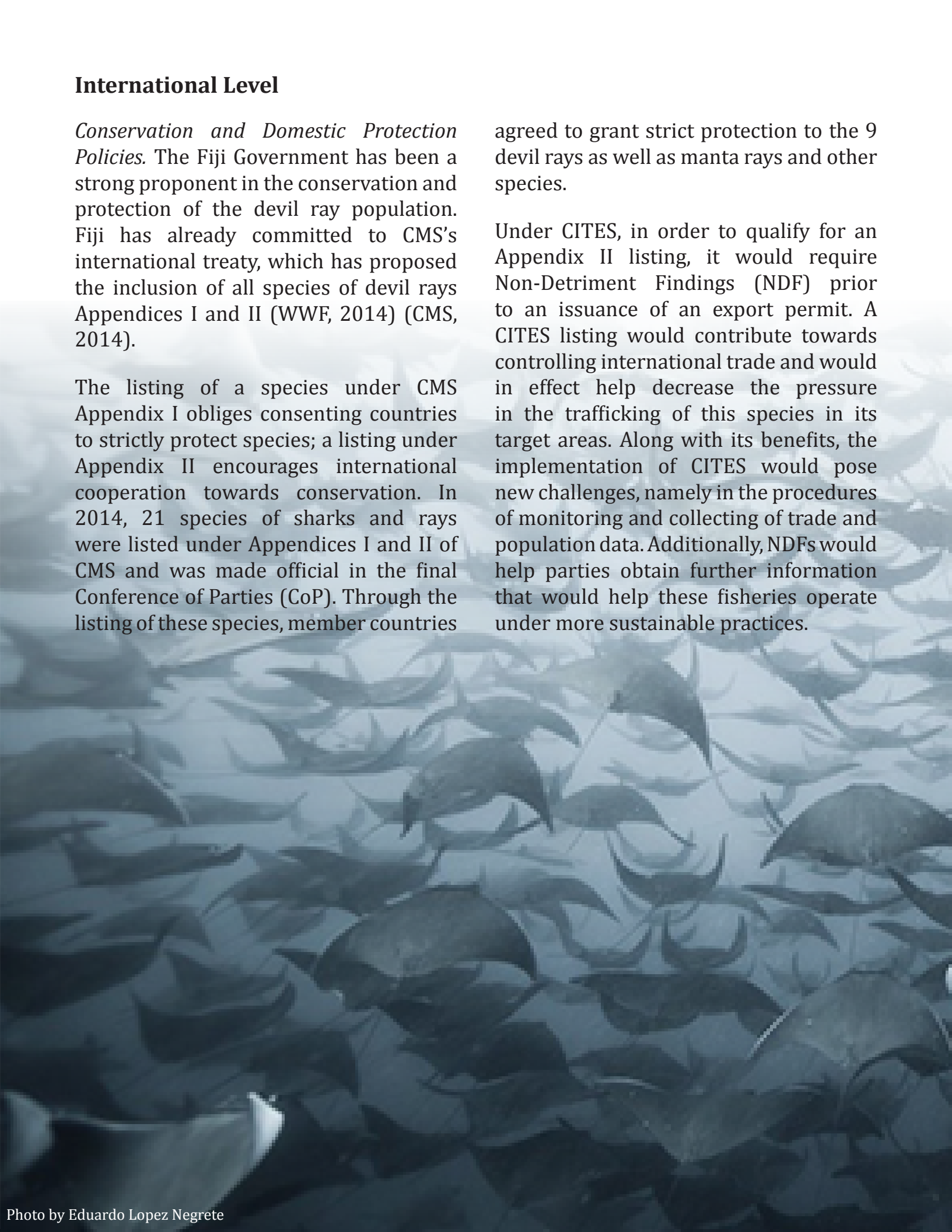
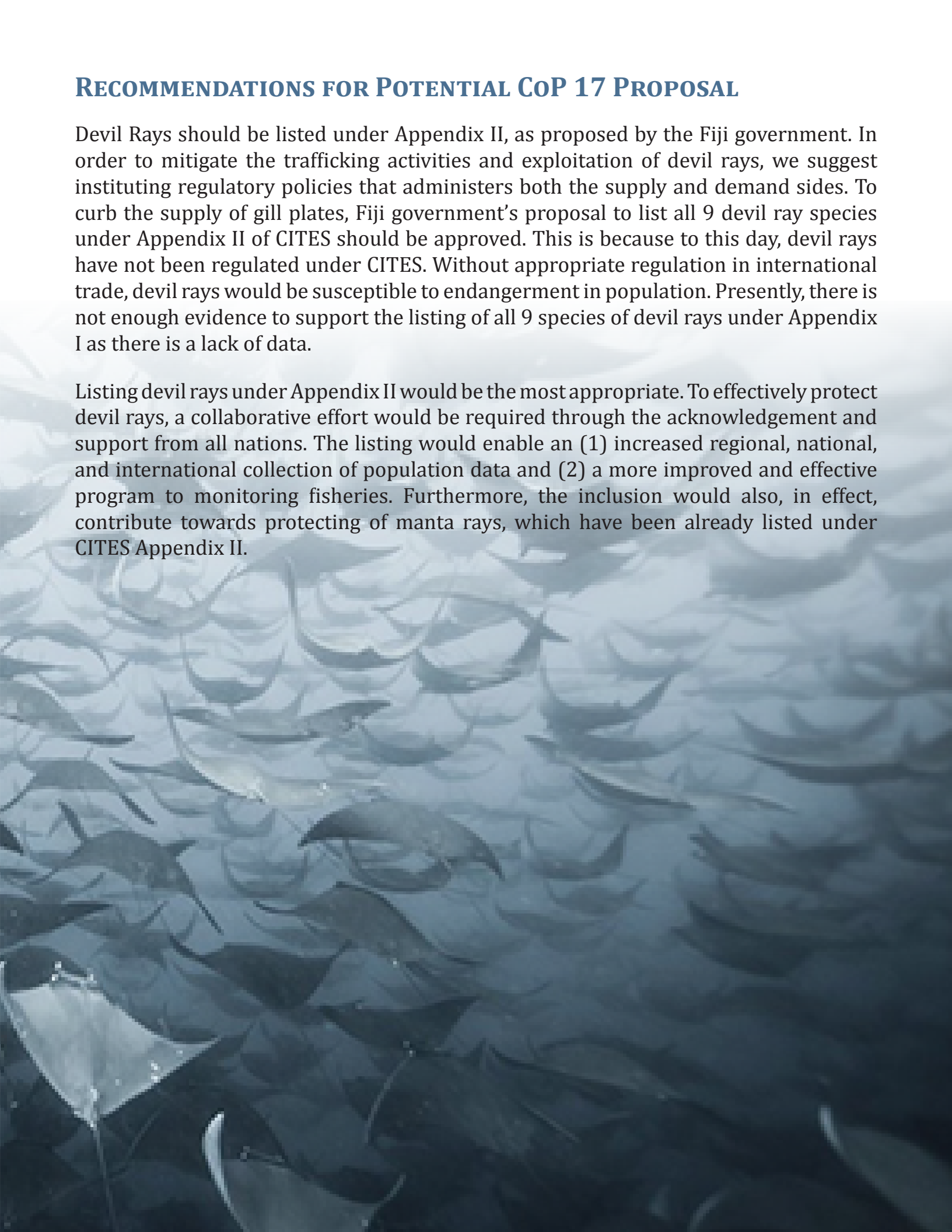


Photo by Eduardo Lopez Negrete

Recommendations for Potential CoP 17 Proposal

Devil Rays should be listed under Appendix II, as proposed by the Fiji government. In order to mitigate the trafficking activities and exploitation of devil rays, we suggest instituting regulatory policies that administers both the supply and demand sides. To curb the supply of gill plates, Fiji government's proposal to list all 9 devil ray species under Appendix II of CITES should be approved. This is because to this day, devil rays have not been regulated under CITES. Without appropriate regulation in international trade, devil rays would be susceptible to endangerment in population. Presently, there is not enough evidence to support the listing of all 9 species of devil rays under Appendix I as there is a lack of data.

Listing devil rays under Appendix II would be the most appropriate. To effectively protect devil rays, a collaborative effort would be required through the acknowledgement and support from all nations. The listing would enable an (1) increased regional, national, and international collection of population data and (2) a more improved and effective program to monitoring fisheries. Furthermore, the inclusion would also, in effect, contribute towards protecting of manta rays, which have been already listed under CITES Appendix II.



References

Bizzarro, J.J., Smith, W.D. & Clark, T.B. (2006). Mobula munkiana. *The IUCN Red List of Threatened Species 2006*. Retrieved from http://www.iucnredlist.org/details/60198/0

Bizzarro, J., Smith, W., Baum, J., Domingo, A. & Menni, R. (2009). Mobula hypostoma. *The IUCN Red List of Threatened Species 2009*. Retrieved from http://www.iucnredlist.org/details/161737/0

CITES (2016, February). Seventeenth meeting of the conference of the parties: proposals to amend the Appendices related to marine species. Paper presented at CITES, Geneva,. Retrieved from https://cites.org/sites/default/files/notif/E-Notif-2016-003_0.pdf

Clark, T.B., Smith, W.D. & Bizzarro, J.J.(2006). Mobula japanica. *The IUCN Red List of Threatened Species 2006*. Retrieved from http://www.iucnredlist.org/details/41833/0

Clark, T.B., Smith, W.D. & Bizzarro, J.J.(2006). Mobula kuhlii. *The IUCN Red List of Threatened Species 2006.* Retrieved from http://www.iucnredlist.org/details/161439/0

Clark, T.B., Smith, W.D. & Bizzarro, J.J.(2006). Mobula mobular. *The IUCN Red List of Threatened Species 2006*. Retrieved from http://www.iucnredlist.org/details/39418/0

Clark, T.B., Smith, W.D. & Bizzarro, J.J.(2006). Mobula rochebrunei. *The IUCN Red List of Threatened Species 2006*. Retrieved from http://www.iucnredlist.org/details/161510/0

Clark, T.B., Smith, W.D. & Bizzarro, J.J.(2006). Mobula tarapacana. *The IUCN Red List of Threatened Species 2006*. Retrieved from http://www.iucnredlist.org/details/60199/0

Clark, T.B., Smith, W.D. & Bizzarro, J.J.(2006). Mobula thurstoni. *The IUCN Red List of Threatened Species 2006.* Retrieved from http://www.iucnredlist.org/details/60200/0

Couturier, L. I. E., Marshall, A. D., Jaine, F. R. A., Kashiwagi, T., Pierce, S. J., Townsend, K. A., ... & Richardson, A. J. (2012). Biology, ecology and conservation of the Mobulidae. *Journal of Fish Biology*, 80(5), 1075-1119. Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/j.1095-8649.2012.03264.x/full

De Klemm, C. (1993). *Guidelines for legislation to implement CITES* (No. 26). IUCN. Retrieved from https://portals.iucn.org/library/efiles/edocs/EPLP-026.pdf

FishBase (2016). Fish Identification: Find Species. Retrieved from http://www.fishbase.org/identification/SpeciesList.php?genus=Mobula

Manta Trust (2015). Devils in Distress The Plight of Mobula Rays. A fact sheet from THE MANTA TRUST. Retrieved from http://www.mantatrust.org/wp-content/uploads/2015/10/Devils_in_Distress_brochure_v10_low-res.pdf

Manta Trust (2016).Gill Plate Trade. *Manta Trust Website*. Retrieved fromhttp://www.mantatrust.org/threats/gill-plate-trade/

Morell, V (2014). Global body extends protection to 31 migratory species. Science on 2014, November 12. Retrieved from http://www.sciencemag.org/news/2014/11/global-body-extends-protection-31-migratory-species

Pardo, S. A., Kindsvater, H. K., Cuevas-Zimbrón, E., Sosa-Nishizaki, O., Pérez-Jiménez, J. C., & Dulvy, N. K. (2016). Devil in the details: growth, productivity, and extinction risk of a data-sparse devil ray. bioRxiv, 043885. Retrieved from http://www.biorxiv.org/content/biorxiv/early/2016/03/17/043885.full.pdf

Pierce, S.J. & Bennett, M.B. (2003). Mobula eregoodootenkee. *The IUCN Red List of Threatened Species 2003*. Retrieved from http://www.iucnredlist.org/details/41832/0

Shark Advocates International (2014). Historic Advances in International Shark and Ray Conservation. Retrieved from http://www.sharkadvocates.org/historic_advances_shark_ray_conservation.html

SharkTrust (2009). Giant Devil Ray. Retrieved from https://www.sharktrust.org/shared/downloads/factsheets/giant_devil_ray_st_factsheet.pdf

Vincent, A. C., Sadovy de Mitcheson, Y. J., Fowler, S. L., & Lieberman, S. (2014). The role of CITES in the conservation of marine fishes subject to international trade. Fish and Fisheries, 15(4), 563-592.

Ward-Paige, C. A., Davis, B., & Worm, B. (2013). Global population trends and human use patterns of Manta and Mobula rays. PloS one, 8(9), e74835. Retrieved from http://search.proquest.com/docview/1431991479?pq-origsite=summon&accountid=10226

WildAid (2014). The continuing threat to manta and mobula rays. 2013-14 Market surveys from Gaungzhou, China. Retrieved from http://wildaid.org/sites/default/files/resources/The%20Continuing%20Threat%20to%20Manta-Mobula%20Rays_2013-14%20Report_FINAL.pdf

WildAid (2016). Ray Reproduction. Retrieved from http://www.sharksavers.org/en/education/rays/ray-biology/

WWF (2014). Fiji's bid for CMS protection of manta and devil rays. WWF Blog post on 26 June 2014. Retrieved from http://wwf.panda.org/wwf_news/?224310/Fijis-bid-for-CITES-protection-of-manta-and-devil-rays

Photo by Musiime Muramura

Background on Species

Biological Description. Psittacus erithacus is a charismatic parrot species with a recently contested taxonomy. The species is generally recognized as having two sub-species or, as BirdLife recognised in 2012, two separate species: The Grey Parrot, *Psittacus erithacus,* and Timneh Parrot, *Psittacus timneh*. Both of these parrots are listed as Vulnerable on the IUCN Red List "because of the extent of the annual harvest for international trade and the rate of ongoing habitat loss in the region" (Birdlife International, 2016b). For the purposes of this report, we focus on *Psittacus erithacus*, unless otherwise stated-- wherein we will specify "the Timneh parrot".

Psittacus erithacus is a parrot species with an average length of 33cm. It is regarded as a medium sized parrot, primarily grey in color with a black bill, white face mask, yellow eyes, and bright red vent and tail (Birdlife International, 2016a).

Geographical Distribution. The distribution of this parrot is found in the center region of the African continent, "extending from southeastern Côte d'Ivoire east through the moist lowland forests of West Africa to Cameroon, and thence in the Congo forests to just east of the Albertine Rift (up to the shores of Lake Victoria) in Uganda and Kenya and south to northern Angola (Juniper and Parr 1998), as well as on the islands of Principe (Sao Tomé and Principe) and Bioko (Equatorial Guinea)"(Birdlife International, 2016a).

Population Estimation. According to Birdlife International, (as reported by Dändliker 1992a and 1992b, Collar 1997, Fotso 1998b, among others) the total species population estimate is a wide possible range of between 560,000 and 12.7 million, excluding the P. timneh subspecies (2016a).

Main Threats. Psittacus erithacus is principally threatened by the wild bird trade, both legal and illegal, and forest habitat loss, fragmentation and/or degradation. This bird became popular as a pet, due to its long lifespan, its ability to mimic human speech, and the ease with which large numbers can be captured to fuel


Photo by Reto Kuster

the trade. For instance, in Cameroon, surveys indicate population reductions of 50% or greater (Tamungang and Cheke, 2012). Surveys conducted by Annorbah et al. (2016) from 2012 to 2014 showed that declines have been quite severe in Ghana with population losses of 90-99% observed as compared to 1990s levels. In Burundi, Guinea, Guinea-Bissau, Kenya, Rwanda, Tanzania and Togo, this species is now rare or locally extinct.

History of the Ecological, Political, and Economics Issues

Ecological Issues: Deforestation Pressures and Population Vulnerabilities

Habitat and Ecological Role. This species is found in West and Central Africa in forested areas. It is endemic to lowland moist primary forests, but also occupies other forested regions such as secondary, mangrove, and gallery forests, in addition to some savannah woodland, and cultivated areas (Collar, 1997). *P. erithacus* is known to have a wide home range within forests, dependent upon year-round access to fruit and adequate nesting areas in the form of tree cavities. This parrot is also thought to play a role in seed dispersal (Tamungang and Ajayi, 2003; Tamungang and Cheke, 2012).

Life History, Habitat Use, & Population Vulnerabilities. As found within other parrot species, *P. erithacus* has a relatively long lifespan and slow reproductive rate. Wild populations of this species are assumed to have an annual breeding success of 1-1.8 fledglings, based on observational studies in Ghana, Gabon, and Principe. (Dändliker, 1992a; Brosset & Erard, 1986; Naurois, 1983). The recruitment rate is likely far lower than the fledging rate in the population. It is known that reproductive sexual maturity occurs between three to four years of age in this parrot species (Luft, 2007), with generational time estimated at 15.5 years,

based on captivity data (IUCN Standards and Petitions Subcommittee, 2011).

This long generational time and slow reproductive rate has resulted in population decline due to habitat loss and poaching for the trade. This parrot is known to move in large flocks that regularly use easily located roost trees, watering holes, and mineral licks. Due to this predictable flocking behavior, trappers can quickly and easily capture and remove many adult individuals or nestlings from the population, as reported by Emma Stokes, the Regional Advisor and Conservation Scientist for Africa of the Wildlife Conservation Society (E. Stokes, personal communication, February 23, 2016).

Dr. Steve Boyes, a conservation biologist describes these flocking behaviors: "Imagine yourself standing in front of over 1,000 African grey parrots drinking together in the Congo forest. The deafening squawks, the chaos of vibrant life, the grey storm when they all take off together in fright! A combination of nets and snares set around this waterhole the next morning would wipe out most of this local population. Never to be seen again (Boyes, 2012)."

Deforestation, degradation, fragmentation, and conversion of the African grey parrot's home is one of the two primary reasons for this parrot species' decline in many parts of its range and a fragmented, patchy distribution of populations. The destruction and degradation of ecosystems worldwide reduce the survival prospects of the parrots (Snyder et al., 2000).

Forest Loss, Conversion, and Fragmentation. Historically, in many range states of the African grey parrot, deforestation rates have been critically high and primary forests continue to decline.

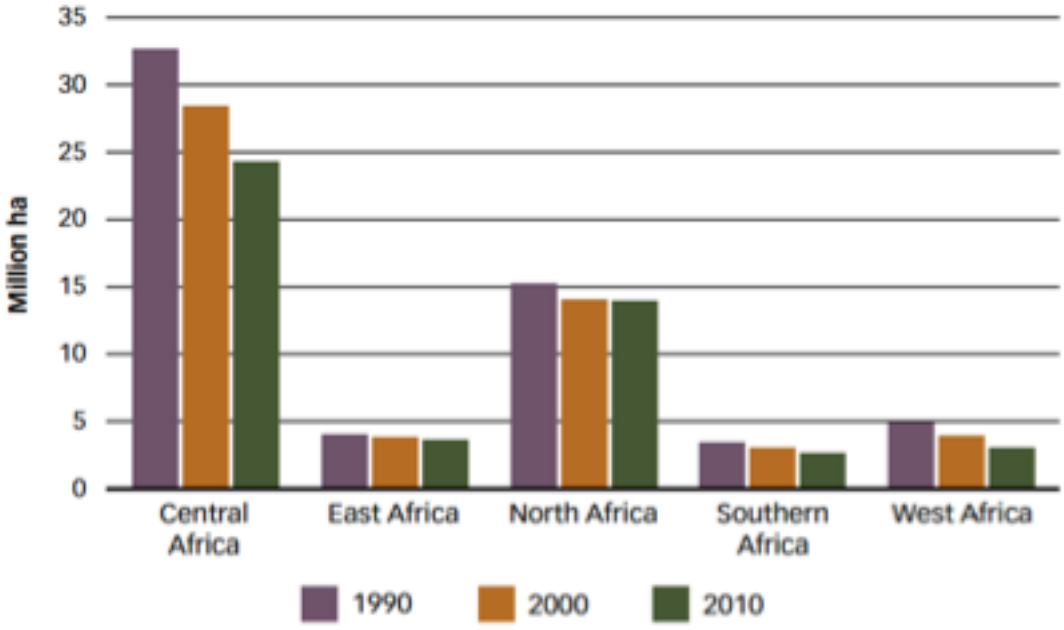


Figure 1. Area of primary forest in Africa, 1990–2010 in million ha. (FAO 2011)

The African grey parrot is dependent on diverse and mature tree assemblages, most often found in primary forestlands (i.e. forests of native species in which there are no clearly visible indications of human activity and ecological processes are not significantly disturbed [FAO, 2010]). This makes this species of parrot especially vulnerable to anthropogenic changes that threaten forest composition and increase patchiness of suitable habitat. Gabon, one of the range states, is a top-five nation reporting largest decreases in primary forests over the last 20 years, which is particularly concerning for its potential negative impacts on the African grey (FAO, 2010).

A large source of forestland change is due to local overuse of trees for firewood and charcoal production. As the FAO 2012 State of the Forests Report points out --the total volume of forestlands currently being used for fuelwood in the DRC exceeds commercial timber industry us by 200 fold (FAO, 2012).

The timber industry, is however, a particular threat due to the targeting and extracting of mature old-growth trees-- the same which *P. erithacus* relies on for cavities to construct their nests. These trees have a very slow natural regeneration time, so even if regrowth of forest area occurs, this extraction leads to less suitable habitat for this species (Martin 2014b; McGowan, 2001; Clemmons 2003).

Beyond timber harvests, agriculture expansion also constitutes another important driver of forest loss (Ickowitz et al., 2015). As surveyed in Tamungang and Cheke (2012), the roost sites of the African grey in Cameroon were under threat from palm oil tree plantations. The DRC's forests may also be under threat from this and other ag-based encroachment. Kim et al. states, in an analysis of global Landsat-based forest-cover change from 1990-2000, that the DRC had the highest forest cover loss among all African countries, "showing elevated deforestation rate later on which may suggest the expansion of agro-industry in this region (2014)".

A recent report indicates that beyond the impact of deforestation, degradation and fragmentation have also contributed to a rapid reduction in key resources by increasing the distances parrots have to fly between resource patches and ultimately disconnecting populations (Tamungang and Cheke, 2012).

Table 1 shows range states that have reported significant primary forestland losses in the FAO Global Forest Resources Assessment from 2010. Table 2 shows overall trends in forestlands (regardless of whether that forest is deemed primary or secondary forest cover type) in range states. Both tables show that forest assessment data is often missing, incomplete, or not reported and a general decline of forest cover. This general trend does not bode well for populations of this forest-dwelling parrot in range states.

Overall, Martin et al. stated that rates of deforestation in both the African grey and Timneh parrots' range states averaged 8.3% (2014b). Additionally, as reported by Ernst et al., rates of forest loss in the

Table 1. African Grey Range States and Percentage Primary Forest Area Loss Reported from 1990-2010 (FAO 2010).

Selected Range State	Primary Forest Loss Reported (%)		
	1990-2000	2000-2005	2005-2010
Angola	-	-	-
Benin	-	-	-
Burundi	-9.62	0	0
Cameroon	-	-	-
Central African Republic	-2.16	-2.57	-2.94
Côte d'Ivoire	-	-	-
DRC	-	-	-
Equatorial Guinea	-	-	-
Gabon	-1.7	-1.95	-2.16
Ghana	0	0	0
Guinea	0	0	0
Guinea-Bissau	-	-	-
Kenya	-0.29	-0.30	-0.30
Liberia	0	0	0
Mali	-	-	-
Nigeria	-7.21	-15.03	-
Republic of Congo	-	-	-
São Tomé e Principe	0	0	0
Rwanda	0	0	0
Sierra Leone	-3.49	-3.26	-3.21
Tanzania	-	-	-
Togo	-	-	-
Uganda	-	-	-

Congo Basin (Cameroon, Central African Republic, Democratic Republic of the Congo, Republic of the Congo, Equatorial Guinea, and Gabon) will likely increase in the near future, with 14.7% of its landscape slated for timber harvests as part of designated logging concessions (2012).

Relationship Between Forest Changes, the Parrot, Trade and Parrot Populations. It is well established that correlative population declines and forest declines have been observed throughout this species range. Indeed, estimated rates of population decline are probably conservative (BirdLife International, 2015). It must be noted that human encroachment and alteration into forested area leads to both increased forest loss and increased trapping pressure-- "when people chop down trees to remove nestlings, the wild bird trade can exacerbate habitat loss by removing nesting sites, which may be a limiting factor for parrot populations (Pain et al, 2006)." While many areas are data deficient and the complexity of the above factors in population loss are difficult to individually assess, it has been stated that overall, parrot population densities are higher in more pristine forested habitats in Príncipe and Cameroon (Juste 1996; Tamungang and Cheke 2012; Martin et al., 2014b).

Table 2. African Grey Range States and Reported Trends in Forest Area Extent from 1990-2010 (FAO 2010)

Selected Range State	Trends in Extent of Forest Area (%)[1]		
	1990-2000	2000-2005	2005-2010
Angola	-0.21	-0.21	-0.21
Benin	-1.29	-1.01	-1.06
Burundi	-3.71	-1.78	-1.01
Cameroon	-0.94	-1.02	-1.07
Central African Republic	-0.94	-1.02	-1.07
Côte d'Ivoire	0.10	0.15	-
DRC	-0.20	-0.20	-0.20
Equatorial Guinea	-0.65	-0.67	-0.71
Gabon	0	0	0
Ghana	-1.99	-1.97	-2.19
Guinea	-0.51	-0.53	-0.54
Guinea-Bissau	-0.44-	-0.46	-0.49
Kenya	-0.35	-0.34	-0.31
Liberia	-0.63	-0.66	-0.68
Mali	-0.58	-0.60	-0.62
Nigeria	2.68	-3.33	-4.00
Republic of Congo	-0.08	-0.08	-0.05
Sâo Tomé e Principe	0	0	0
Rwanda	0.79	2.28	2.47
Sierra Leone	-0.65	-0.68	-0.70
Tanzania	-1.02	-1.10	-1.16
Togo	-3.37	-4.50	-5.75
Uganda	-2.03	-2.39	-2.72

Political Issues: Complex Trade Concerns and Species Protection Efforts

P. erithacus has been included in CITES Appendix II since 1981 and the international trade is regulated by Article IV of the Convention. Since 1975, the total number of birds removed from their natural habitat for the legal trade is estimated to be between 2.1-2.5 million. According to the IUCN and Birdlife International in 2010 and 2011, 21% of the global population was being harvested yearly (IUCN, 2010; Birdlife International, 2010; Birdlife International, 2011)

For several decades, *P. erithacus* had been traded in large numbers principally in Europe, the United States, and the Middle East. Due to an international concern for the state of wild parrot populations around the world, the United States banned the import of wild African grey parrots and other wild birds, as part of the Wild Bird Conservation Act in 1992. The EU followed suite in 2007. Even so, captive breeding is connected to wild population decline due to the many suspected and observed captive breeding facilities that source breeding pairs from the wild (Steyn, 2016).

Several range states have reported significant exports of captive-bred specimens (CITES Source code 'C') even though no commercial captive breeding facilities are known in these countries. Between 2008 and 2013, more than 7,000 specimens of *P. erithacus* were reported as 'C' by Guinea, Central African Republic, Republic of Congo, Ivory Coast, Liberia, Cameroon, and Democratic Republic of Congo, meaning this trade had been in violation of CITES and had involved the use of fraudulent permits.

Currently, the majority of legal exports are reported to originate in Central Africa, and in 2015 the only countries with national quotas were Cameroon (3,000) and Democratic Republic of Congo (5,000). However, both these countries have consistently exceeded quotas in recent years (Boyes, 2012).

In 2012, CITES notified Parties of multiple recent cases of fraudulent permits originating from Cameroon and recommended that Parties do not accept any CITES export permit issued by Cameroon unless its validity has been confirmed by the Secretariat (CITES, 2012). In 2014, CITIES gave the same warning to Parties regarding fraudulent permits from the Democratic Republic of Congo (Reeve, 2015). On March 16th, 2016, the CITES Standing Committee eventually recommended to suspend trade in *P. erithacus* from DRC, until the country provides more data on population status, and develops and implements a National Management Plan for the African grey parrot (CITES, 2016).

Due to the trade, populations of *P. erithacus* have declined or gone extinct locally even in the presence of suitable habitat, such as in Lobéké National Park in Cameroon , in the Salonga National Park in the Democratic Republic of Congo, and in the Nimba Nature Reserve in Liberia (Martin et al., 2014b; Hart, 2013; Dowsett-Lemaire & Phalan, 2013).

Most of this trade is fueled by international demand for exotic parrots as pets. However, internal, domestic trade of *P. erithacus* in local markets occurs in most range countries appears to be limited, and has only been reported as moderate to considerable in a few countries such as Cameroon and Nigeria (Tamungang and Cheke, 2012;McGowan, 2001). The purpose of internal trade may differ from the predominate exotic pet demand that fuels the international trade. *P. erithacus* has been observed being hunted as bushmeat and in rarer cases, for use as medicine or in 'black magic' practices (Fa et al., 2001; Clemmons 2003; McGowan, 2001). In Cameroon, feathers of *P. erithacus* are also placed on the cap of chiefs to represent power and as protection against evil spirits (CITES Scientific Authorities of Cameroon, personal communication, March 24, 2016).

International demand for this species for non-pet purposes also exists, albeit at lower levels than for the pet trade. According to Paul Steyn, in an article published in Wildlife Watch section of National Geographic News, there are emerging market demands for this parrot in Singapore, Bahrain, and Pakistan due to a local belief that this and other parrots' have "spiritual powers." In these places, there are reports of people using African grey parrot heads and feathers as "fetish and ritual objects" (2016).

Photo by James Akena, Reuters

Table 3. National conservation status within Range States of the African Grey Parrot (Mcgowan, 2008)

Range State	National Protection status
Angola	Totally Protected
Benin	N/A
Burundi	N/A
Cameroon	Requires Permits for Capture
Central African Republic	N/A
Congo	Requires Permits for Capture and Possession
Côte d'Ivoire	Hunting/Trapping Prohibited in Protected Areas
Democratic Republic of Congo	Requires Permits for Capture
Equatorial Guinea	N/A
Gabon	Requires Permits for Capture
Guinea	Hunting is Prohibited, Trapping is Legal
Guinea-Bissau	Totally Protected
Kenya	Totally Protected
Liberia	N/A
Mali	N/A
Nigeria	Totally Protected
Rwanda	Exports are Prohibited
Sierra Leone	Requires Permits for Captures that are Exported, Domestic Use Prohibited
Togo	N/A
Uganda	Totally Protected

Several range countries developed national legislation aiming to protect this species (i.e. no trade allowed), such as in Angola, Kenya, Nigeria, and Uganda, while other countries only partially protect *P. erithacus* (i.e. permits required for trade), such as in Cameroon, Central African Republic, Republic of Congo, Ivory Coast, Democratic Republic of Congo, Gabon, Guinea, Guinea Bissau, Rwanda, and Sierra Leone (Mcgowan, 2008).

Economic Issues: Analyzing the International Trade Supply-Chain

Introducing the Trade. According to Snyder, McGowan, Gilardi, & Grajal, "No other group of birds has been subjected to more exploitation, numerically and financially, than parrots (2000)".

In the case of *P. erithacus*, it is known that this species is one of the most traded of all CITES-listed birds (Bush et al. 2014). From 1975 to 2013, reported gross exports from range states totaled 1,550,197 according to the UNEP-WCMC Trade Database 2016 (See Section iii. - 2 of this report for Range State Export Quotas). However, BirdLife International stressed that official figures represented minimum levels of harvesting, since they do not encompass mortality in capture and confinement before export (2013). Indeed, several studies show significant mortality rates of this species from capture to export, with estimates ranging from 60-66% in Nigeria, 40-50% in Democratic Republic Congo, and 30-50% in Cameroon (McGowan, 2001; Fotso, 1998a; Fotso, 1998b).

Dr. Steve Boyes, the Scientific Director of the Wild Bird Trust, summarizes the inhumane treatment and export/import process this species is subjected to in the African wildlife trade to fuel a profitable illicit business: "Thousands of these long-lived, intelligent parrots are ripped out of the wild every year, packed into cramped travel crates, fed on moldy peanuts, and then sold into the lucrative wildlife trade. Many die from exhaustion or fatal injury in nets and snares or from dehydration, disease and stress in rudimentary wooden crates when being stored, transported and sold by local trappers. Even more die in crammed travel crates in transit to rural markets were thousands of grey parrots are collected by exporters and quarantined until they are sold, euthanized or die (Boyes, 2012)."

Complexities of 'Captive-Bred' Parrots in the Market. Wild birds often do not fuel the pet trade directly, but instead act as breeding stock for a captive breeding industry that exists primarily in South Africa and the Middle East.

Dr. Fiona Maisels, Conservation Scientist at the Wildlife Conservation Society explained that wild sourcing is obviously cheaper than captive breeding, so there is always a temptation to get some or all birds from the wild and then relabel them as captive bred (F. Maisels, personal communication, March 28, 2016).

Rowan Martin, Director of the World Parrot Trust, confirmed the existence of this process in an interview with this team of researchers. He also was quoted directly, explaining this issue in a recent news article in National Geographic: "It's cheaper for aviculturists to purchase wild caught birds and breed from them rather than from their own stock, because captive birds may take several years before they reach maturity (Steyn, 2016; R. Martin, personal communication, March 25, 2016)."