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Vincent Nijman

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Wildlife trade, CITES and the protection of marine molluscs in Indonesia

Vincent Nijman

Department of Social Sciences, Oxford Wildlife Trade Research Group, Oxford Brookes University, Oxford, UK

ABSTRACT

Indonesia is a significant trader in marine molluscs and has a comprehensive legislative framework in place to protect and use molluscs sustainably. The recent inclusion of nautilus in Appendix II of CITES and the general lack of understanding of the level of protection and regulation Indonesia's marine molluscs receive necessitates a review of current laws and agreements. The most relevant are two legally binding international agreements, CITES and the CBD, and Law No 5, and Regulations 8 and 20, dealing with protection, preservation and exploration, respectively. Over the last 30 years, 12 species of mollusc have been legally protected in Indonesia and 7 are included in CITES Appendix II. Species that are not protected can be traded, provided quotas have been set for their commercial exploitation. Seizure data suggest that the illegal trade is considerable – on average almost 10,000 shells/year are confiscated. Seizures do not lead to prosecutions. It is recommended that (a) those involved in the trade of Indonesian marine molluscs need to familiarise themselves better with current legislation and regulation, (b) monitoring of domestic and international trade in marine molluscs needs to be better coordinated and intensified and (c) prosecutions for those trading illegally in marine molluscs need to increase.

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Introduction

Indonesia is the world's largest archipelago and has a very rich marine molluscan diversity. Molluscs continue to play an important role in the lives of coastal communities throughout Indonesia (for food, jewellery, construction material, etc.) and some species are important trade commodities. Several species, including some of the largest species of mollusc, continue to be traded in large volumes (Whitten et al. 1996; Butcher 2004; Nijman et al. 2015). Indonesia has set aside significant areas of its marine environment for conservation purposes; there are 216 marine protected areas, occupying ~180,000 km^2 or 3.0% of Indonesia's Exclusive Economic Zone (Wilson et al. 2011). Some of the more rare, and often larger, species of mollusc are included on the country's protected species list. Finally, Indonesia has ratified several international treaties that are of relevance to marine mollusc protection and management (Prestre 2017; Soehartono and Mardiastuti 2002).

Here I give an overview of various aspects of the protection and regulation of use of marine molluscs in Indonesia, with a strong focus on their relevance to the international wildlife trade (cf. Ezekiel 2018). This review was prompted by the recent inclusion of all species of nautilus in Appendix II of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), regulating all international trade in these species, and the general lack of understanding by traders, government authorities and (marine) conservationists, of the level of protection and regulation that Indonesia's marine molluscs receive, and how this should inform policy and management.

This knowledge and management gap is perhaps best illustrated by the open sale of chambered nautilus (*Nautilus pompilius* Linnaus, 1758) shells as curios at Terminal 2 (international travel) of Jakarta's Soekarno-Hatta International Airport. For at least the last two decades, in the duty free area after travellers have passed through customs but prior to boarding their plane, shops have openly offered threatened wildlife for sale. This includes elephant ivory, sun bear *Helarctos malayanus* (Raffles, 1821) gall bladders, paws and claws, large cat canines and claws, and birdwing and nymph butterflies. All these are from legally protected species that cannot be traded, apart from the butterflies that can, provided they are second generation captive-bred and have appropriate CITES permits. Better international trade regulations, protection and (real or perceived) rarity may place an exaggerated (monetary) value on wildlife (Courchamp et al. 2006; Rivalan et al. 2007) and this may have played itself out at Jakarta's International Airport. Until recently, chambered nautilus shells were not offered for sale, but this changed after January 2017, when all species of nautilus were included on CITES Appendix II, and several duty free shops added them to their selection.

CONTACT Vincent Nijman vnijman@brookes.ac.uk Department of Social Sciences, Oxford Wildlife Trade Research Group, Oxford Brookes University, Oxford OX0 1BP, UK

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For instance, in January 2018 19 shells were openly offered for sale in three different shops and in July 2018 13 shells were present in two of these shops. Considering size and quality, prices were about double that compared to shops in tourist resorts on Java and Bali (Rp1,000,000–1,250,000 or US$ 70–88 vs Rp350,000–500,000 or US$ 24–35; Nijman and Lee 2016). Chambered nautilus is a protected species in Indonesia and the species, or its parts, cannot be traded legally. With the species being included on CITES Appendix II it also requires an export permit from the Indonesian CITES Management Authorities if one wants to take it out of the country. In none of the shops were sales people aware of the protected status of the species or the illegality of this trade, and no CITES paperwork or certificates accompanied the shells if they were to be purchased. It appears that, at least to the traders at the airport, the CITES listing of chambered nautilus and with it greater awareness about its rarity, made their shells attractive commercial commodities. Any checks of CITES permits would have taken place before going through customs, thus placing a premium on CITES-listed species that can be purchased after these checks. In the absence of proper enforcement – evidenced by the omnipresence of other high-value and easily identifiable protected wildlife in the duty free area – the efforts to better regulate international trade in nautilus through CITES made them more valuable (cf. Rivalan et al. 2007).

Most Indonesian laws, regulations and relevant government documents are only available in Bahasa Indonesia, the language spoken by over 200 million of the 260 million Indonesians, whereas international treaties and agreements, to which Indonesia acceded, are only available in English or other European languages. This hampers communication, potentially leading to misunderstanding of what legal instruments are available for the management of and the trade in marine molluscs.

This overview starts with a summary of major global conventions to which Indonesia is signatory, such as CITES and the Convention on Biological Diversity (CBD), focussing only on those aspects that are of direct relevance to the conservation of marine molluscs. Second, I focus on domestic legislation, including those laws dealing with protected species and the Fisheries Act. Third I present practical information on how Indonesia implements CITES, undertakes species protection, regulates trade and attempts to ensure harvests are sustainable, again focussing specifically on marine molluscs. I give an overview on how effective Indonesia has been thus far with implementing these rules and regulations, and how it deals with lawbreakers, focussing on recent seizure data. Finally, I present a series of practical recommendations to better regulate the trade in marine molluscs in and from Indonesia.

Materials and methods

Over the period 2012–2019, I conducted regular market surveys in three tourist areas where marine molluscs are traded, i.e., Pangandaran in West Java, Pasir Putih in East Java and Bali (Nijman and Lee 2016; Nijman et al. 2015, 2016). Unrelated to this, between 2005 and 2017 I was member of the Dutch CITES Scientific Authority, with the Netherlands being one of Indonesia's major trading partners for marine animals (Janssen and Blanken 2016) giving me a good insight into wildlife trade in Indonesia.

Information was obtained from the official texts of conventions, agreements and primary legislation (cf. Ezekiel 2018). Quotas and other policy documents were obtained from the websites of various government institutions in Indonesia (Ministry of Maritime Affairs and Fisheries, Ministry of Environment and Forestry, Regional Nature Conservation Agencies and Directorate General of Customs).

When laws, agreements or codes of conduct overlapped with other agreements, only the ones with the most regulatory power were included. For instance, the Food and Agriculture Organization's Code of Conduct for Responsible Fisheries was signed by Indonesia in 1995, but most of its provisions are similar to those included in the United Nations Convention on the Law of the Sea (UNCLOS) that came into force in Indonesia a year earlier. The Code of Conduct is non-binding whereas the UNCLOS is binding, and thus I only included the latter in this overview. Exchange rates are those of 1 May 2019, i.e., 1 US$ equals 14,209 Indonesian Rupiah. Conventions that are potentially relevant for marine mollusc conservation but that have not been ratified by Indonesia, e.g., the Convention on Migratory Species, were excluded from the review. While Conventions are legally binding, it is important to note that within the Convention texts, there are numerous recommendations, guidelines or expressed aspirations that countries may wish to adopt but that do not carry penalties when not implemented.

Data on seizures and enforcement of protected species laws was obtained from newspapers, government press releases, district court files and the literature. I restrict this analysis to large seizures, defined here as seizures of more than 100 shells. In December 2013, November 2017, September 2018 and February 2019 I conducted an online search for documents reporting the illegal trade in protected shells and any subsequent prosecution of offenders in Indonesia. Search terms included the Indonesian names of the species (e.g., *kerang kima*, *kerang kepala kambing*) in combination with the words 'seizure' or 'confiscation' (root: *serah*, *sita*), the acronyms of the agencies that do most of the confiscations (*bksda, phka*) or customs (*bea cukai*). When a seizure was reported online,

searches were conducted for the period following the seizure for successful prosecution using specific details reported in the original seizure reports (dates, names of companies, specific locations, names of suspects, etc.). The websites of the organisations that were responsible for the seizure (e.g., BKSDA in East Java) were searched for evidence of successful prosecution. A similar search was conducted on Indonesian local government sites that report on the outcomes of court cases dealing with environmental crimes where seizures were made (for instance, proceedings from the district courts of North Jakarta or Jepara). One of the reasons for prosecuting and sentencing lawbreakers is to send a clear message to society about what is and what is not tolerated, and as such prosecuting and sentencing acts as a deterrent to future offenders. When government agencies make public announcements about the seizure of protected wildlife, we can expect these same agencies (as well as journalists covering this) will inform the public when the lawbreakers are indeed successfully prosecuted.

At the request of one of the reviewers in September 2018, and to ensure that these searches were as comprehensive as I could possibly make them, I contacted 10 experts via email to ask if they had any knowledge of successful prosecutions over this time period, and if so, to provide me with details. In addition, also via email, I contacted 10 people from the Indonesian CITES Management Authority (general, section on trafficking, section on animals), the CITES Scientific Authority (animals, marine species, enforcement) and the Enforcement Authorities in the Ministry of Forestry for the same information.

Information on the international trade in CITES listed species (*Hippopus* spp., *Tridacna* spp, *Nautilus* spp.) for the period 2010–2017 was obtained from the CITES trade database in September 2018. Data for 2018 were not yet available. For each year and for each species I compare what importing parties reported and what was reported by Indonesia as the exporter. For calculations on revenues obtained from these exports I used the data as reported by Indonesia.

All translations are mine.

Results

International agreements

Indonesia has several obligations under two major global marine and fisheries agreements. Central to these agreements is the notion that regulation of national and international waters, including fisheries activities, is vital for properly protecting and managing populations of marine species including molluscs. Individual countries must be able to control fishery activities within their waters and by their nationals outside these waters. Because Indonesia formally ratified both these agreements over 20 years ago, it is legally obliged to enforce the provisions within them.

United Nations Convention on the Law of the Sea (UNCLOS)

UNCLOS is a legally binding agreement for standards of conduct on the open seas (i.e., main body of a sea or ocean, especially the part that is outside territorial waters and not enclosed, or only partially enclosed, by land); this includes the conservation of the ocean's living resources. UNCLOS came into force in 1994 with Indonesia ratifying it in 1995. Importantly, UNCLOS seeks agreement on activities in the Exclusive Economic Zones (EEZs) extending 200 miles from a country's coastline and where countries have exclusive jurisdiction over management and exploitation of natural resources. Having exclusive jurisdiction over an area of ocean means that national legislation related to the protection and management of marine species and ecosystems can be implemented and enforced in EEZs. Foreign vessels harvesting in another country's EEZ need to comply with the relevant laws and regulations. Under UNCLOS, signatories must ensure that living resources in their EEZ are not endangered through over-exploitation. While they can aim for maximum sustainable yield of target species, they must consider the exploitation regime, the protection of the marine environment and any (negative) effects of harvesting on other species (Friedman et al. 2018).

FAO agreement on port state measures

The Food and Agriculture Organization Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing, ratified by Indonesia in 2016, is aimed at reducing or eliminating illegal, unreported and unregulated fisheries. Countries should deny port entry and services to vessels suspected of illegal, unreported or unregulated fishing.

International conventions

A number of major global conventions are directly relevant to the conservation of marine molluscs in Indonesia. These include three legally binding agreements: CITES, the CBD and the Convention on Wetlands of International Importance (Ramsar Convention).

Convention on International Trade in Endangered Species of Wild Fauna and Flora

CITES is a multilateral environmental treaty aiming to regulate the international, cross-border trade in wild species to ensure that this trade does not threaten their survival. International trade under the definitions of CITES includes 'export, re-export, import or introduction from the sea'. CITES is a legally binding agreement.

Failure to comply with the Convention, including regulations or resolutions adopted by the Conference of the Parties, may lead to enforcement sanctions. Indonesia joined CITES from its inception in 1975. CITES-listed species are regulated through a system of permits and certificates; the level of documentation needed to import and/or export required depends on which of the Appendices a species is listed on. Given that no marine molluscs are listed on Appendix I (requiring the most extensive level of documentation), I here focus on Appendix II species only. Appendix II lists species that, while not necessarily considered globally threatened at present, may become so in the near future unless (international) trade in these species is strictly regulated. This Appendix also lists species for which any trade must also be controlled in order to effectively regulate trade in species that are formally listed. This can include, for instance, look-alike species that resemble listed species and that could therefore be used to conceal or launder shipments of the listed species. International trade in Appendix II species is permitted, but only provided that the specimens have been legally obtained and that their trade will not detrimentally affect the species' survival. Valid permits issued by both exporting and importing countries must accompany any trade in these species.

Indonesia, as for any other Party to CITES, has the obligation to prohibit all types of trade in violation of the Convention; this is usually achieved through the country's national legislation. In general, all trade in listed species requires a CITES permit, but one exception is captive-bred (or maricultured) specimens which require a captive breeding certificate. Captive-bred individuals are those that are born in a controlled captive environment and are the offspring of individuals that themselves were born in such a setting (i.e., captive-bred individuals are second generation offspring). The CITES Management Authority of the exporting county needs to certify that the shipment contains animals that are bred in captivity. Those CITES listed molluscs that are claimed to be captive-bred, i.e., giant clams *Tridacna* spp. and two *Hippopus* clams, are legally protected (see below) and traders also need permission from the local Regional Nature Conservation Agency to breed them commercially.

In total, nine marine molluscs that occur in Indonesia are included in Appendix II: seven clam species and two nautilus species, i.e., seven species of clam (five giant clams *Tridacna* spp. and two *Hippopus* clams), chambered nautilus (*Nautilus pompilius* Linnaeus, 1758) and crusty nautilus (*Allonautilus scrobiculatus* Lightfoot, 1786). In 1994, a proposal was prepared to request Triton's trumpet *Charonia tritonis* (Linnaeus, 1758) to be included in Appendix II as well, but the proposal was withdrawn prior to the Conference of Parties, partly because of a lack of international trade data (CITES 1994). Four of the seven species of CITES listed clams are maricultured in Indonesia and large quantities are exported as captive-bred animals (Table 1).

Convention on Biological Diversity

The CBD is a broad, legally binding multilateral agreement that seeks to conserve the wide variety of life on earth, promote sustainable use of biological resources and allow for equitable sharing of biotechnology and natural resources. The Convention entered into force in 1993. Parties are obliged to implement a series of measures, 'as far as possible and as appropriate', including the regulation and management of natural resources from the wild in order to avoid threatening wild populations or ecosystems. Parties are also required to identify aspects of biodiversity within their borders that should be conserved and monitor the sustainable use of, and adverse impacts on, these resources. Parties must promote the sustainable use of biological resources and must develop or maintain necessary legislation and/or other regulatory provisions for the protection of threatened species and populations. The most significant decision with relevance to the management of marine molluscs is the adoption of the Strategic Plan for Biodiversity 2011–2020, that includes 20 targets, the Aichi Biodiversity Targets. Two of these targets (6 and 10) call for the management and use of aquatic stocks sustainably, legally, and using an ecosystem-based approach, and to minimise anthropogenic pressures on coral reefs and other vulnerable ecosystems. Aichi Target 12 deals with preventing the extinction of known threatened species and improving their conservation status, and this is of relevance for two of the *Tridacna* species, i.e., southern giant clam *T. derasa* (Röding, 1798) and giant clam *T. gigas* (Linnaeus, 1758), that are listed as Vulnerable on the IUCN Red List. There is no specific article on marine or coastal biodiversity in the CBD. The 1995 Jakarta Mandate on the conservation and sustainable use of marine and coastal biodiversity is the specific policy decision of the Conference of the Parties (CoP) that dealt with these issues and is considered to represent a new global consensus on the importance of marine and coastal biodiversity (Nurhidayah 2018).

Convention on wetlands of international importance

The Ramsar Convention is a legally binding agreement that entered into force in 1975, with Indonesia joining in 1992. Wetlands are defined broadly and include 'marine water not deeper than 6 m at low tide', and this can be relevant for the protection of some marine molluscs. One of the five goals of the Ramsar Strategic Plan covers the wise use of wetlands (Matthews 1993). Importantly, these goals are not legally binding and are to be used as guidelines

only. Parties have to list at least one wetland of international significance and promote its conservation and, as far as possible, wise use. Indonesia has designated seven Ramsar sites, three of which have some relevance for the conservation of marine molluscs as they cover estuarine wetlands (Rawa Aopa Watumohai National Park in South Sulawesi, Sembilang National Park in eastern Sumatra and Wasur National Park, in West Papua).

UNESCO World Heritage Convention

A World Heritage site is a place that is listed by the United Nations Educational, Scientific and Cultural Organization (UNESCO) as having special cultural or physical significance. This designation provides a clear indication that these sites are legally protected pursuant to the Law of War, under the Geneva Convention, together with other treaties including the Hague Convention for the Protection of Cultural Property in the Event of Armed Conflict and international law. As with the Ramsar Convention, it has limited direct relevance for the protection or sustainable use of marine molluscs, but at least two Indonesian UNESCO World Heritage Sites, Ujung Kulon in western Java and Komodo in the Lesser Sunda Islands may provide important habitats for marine molluscs as they cover estuarine wetlands.

Domestic legislation

There are several pieces of Indonesian legislation that are relevant to the protection of marine molluscs, including laws, regulations and ministerial decrees.

Regulation 20 of 2018

This regulation came into force in July 2018 and replaces Regulation 7 concerning the Preservation of Plants and Animals Act of 1999. However, its implementation is postponed as the Ministry has introduced a grace period (of unknown duration) for newly protected species. The most important part of this Regulation is that it lists all species that are protected. Twelve species of marine molluscs were added to Indonesia's protected species list in 1987 but seven of these are no longer included on the new 2018 list (Table 1). Guidance on how to implement the Regulation and what penalties to impose are given in Regulation 8 and Act No. 5 (see below).

Regulation 8 on wild flora and fauna exploitation

Species that are not protected under Regulation 7 (1999) or Regulation 20 (2018; see below) can be exploited sustainably following a series of rules set out in Regulation 8. The most important of these are that (a) the Government is responsible for providing

Table 1. Overview of legal protection and regulation of commercial trade in selected marine molluscs from Indonesia.

Species	Protected 1982–2018	Protected 2018	CITES II	Quota	2010	2011	2012	2013	2014	2015	2016	2017
Bear paw clam *Hippopus hippopus* (Linnaeus, 1758)	yes	yes	yes	no	0	314/442	235/230	0	0	13/0	220/440	20/0
China clam *Hippopus porcellanus* (Rosewater, 1982)	yes	yes	yes	no	0	0	0	0	0	0	0	0
Saffron-coloured giant clam *Tridacna crocea* (Lamarck, 1819)	yes	no	yes	no	100/260	350/380	145/170	533/740	1045/895	1615/0	2165/2720	773/0
Southern giant clam *Tridacna derasa* (Röding, 1798)	yes	no	yes	no	440/920	225/210	190/260	90/110	25/0	0	0	0
Giant clam *Tridacna gigas* (Linnaeus, 1758)	yes	no	yes	no	0	0	0	0	0	0	0	0
Small giant clam *Tridacna maxima* (Röding, 1798)	yes	no	yes	no	0	85/110	642/910	256/290	108/90	100/0	821/1050	329/0
Fluted giant clam *Tridacna squamosa* (Lamarck, 1819)	yes	no	yes	no	264/509	350/380	1017/1520	1410/1250	1142/1195	537/0	2043/2630	950/0
Triton's trumpet *Charonia tritonis* (Linnaeus, 1758)	yes	yes	no	no								
Horned helmet *Cassis cornuta* (Linnaeus, 1758)	yes	yes	no	no								
Commercial top shell *T. niloticus* (Linnaeus, 1767)*	yes	no	no	yes								
Marbled turban *Turbo marmoratus* (Linnaeus, 1758)	yes	no	no	no								
Chambered nautilus *Nautilus pompilius* (Linnaeus, 1758)	yes	yes	yes	no	0	0	0	0	0	0	0	0
Crusty nautilus *Allonautilusscrobiculatus* (Lightfoot, 1786)	no	no	yes	no	0	0	0	0	0	0	0	0
False trumpet *Syrinx aruanus* (Linnaeus, 1758)**	no	no	no	no								

* Listed as *Trochus niloticus* by Indonesian authorities.

** False trumpet, the largest gastropod, has been included, even though it is not protected, is not listed on any of the CITES appendices and there is no harvest or trade quota. However, in the past large shipments of the species have been seized by the authorities.

Export figures are from the CITES trade database and are presented for only those species that are listed in CITES Appendix II. Data are presented as numbers of individuals reported by Indonesia as being exported/number of individuals reported by other countries are reported being imported from Indonesia. Protection refers to Indonesian legislation (Regulation 8 for 1982 to June 2018 and Regulation 20 for after June 2018).

annual capture quotas, (b) wildlife trade may only be conducted by businesses that have received ministerial approval and (c) licences and certification is required for captive breeding (mariculture) of wildlife. Protected species cannot be commercially traded in their wild form, but licensed and certified companies may breed them and they are allowed to trade second-generation (or above) captive-bred individuals of protected species. Non-protected species for which no capture quota is provided cannot be traded commercially.

Act no. 5 concerning the conservation of living resources and their ecosystems

This Act came into force in 1995 and it gives general rules on how to sustainably use and protect wildlife and how to regulate use in protected areas, amongst other requirements. It stipulates the fines that can be imposed on lawbreakers, including for instance those that trade in protected wildlife. In brief, anyone in Indonesia is prohibited to '(a) catch, […], transport and trade in a protected animal in a live condition; (b) keep, possess, […] transport, and trade in a protected animal in a dead condition; (c) transfer a protected animal from one place to another, within or outside Indonesia; (d) trade, keep or possess […] bodies, or other parts of a protected animal or the goods made of parts of the animal, or transfer from one place in Indonesia to another, within or outside Indonesia'. With respect to the trade in marine molluscs the inclusion of 'bodies or other parts' is of importance as this precludes the trade in shells. Penalties that can be imposed when these laws are broken can total fines of up to IDR 100,000,000 (~US$7025) and imprisonment for up to five years (sentences are lower if the offences were committed unintentionally).

Fisheries Act no. 31

Adopted in 2004 and amended in 2009, the Fisheries Act relates to all fishery related activities in Indonesia, including within the EEZ. 'Fish' is defined as all organisms that occur in water for all or a part of their life cycle. 'Fish' thus also includes marine molluscs. Commercial fishing requires a licence, but small-scale fishers are exempt provided they are registered as such. Transporting fish also requires a licence. Operating a fishing business without a licence is punishable by 8 years imprisonment and/or a fine of IDR1.5 billion (US$105,385) and illegally transporting fish can lead to a prison term of five years and/or an IDR1.5 billion fine.

Customs Law no. 10

The Customs Law of 1995 was amended in 2006 and deals, among other things, with the importing or exporting of goods without declaring them or intentionally declaring them incorrectly. This is a criminal offence and carries a maximum, penalty of imprisonment for to 10 years and/or a fine of IDR 5 billion (~US$351,284) (Anonymous 2009).

Quota settings and the special case of commercial top shells

Following Regulation 8, trade of all non-protected species, whether listed on CITES or not, is regulated by a harvest and export quota system. These quotas are set on an annual basis for all species at a meeting of various stakeholders including the Directorate General of Forest Protection and Nature Conservation (PHKA, also acting as the CITES Management Authority), the Indonesian Institute of Sciences (LIPI, the CITES Scientific Authority), non-government organisations and traders. The quotas are based on requests submitted by the regional offices for the Natural Resources Conservation Agency (BKSDA) as well as requests from traders, to the PHKA. Prior to the quota setting, an assessment needs to be made to establish the sustainable off-take for any given species in any given area; in reality, however, this rarely happens (Soehartono and Mardiastuti 2002).

Protected species cannot be traded, but in a 1999 Ministerial Decree (No. 385) an exception was made for the top shell *Tectus niloticus* (Linnaeus, 1767) (referred to by its synonym *Trochus niloticus*). The most recent commercial quotas for 2018 are: 3 tonnes for the province of North Sumatra, 3 tonnes for Bengkulu, 5 tonnes for South Sulawesi, 10 tonnes for Central Sulawesi, 5 tonnes for Maluku, 2 tonnes for East Nusa Tenggara, 5 tonnes for Papua and 3 tonnes for West Papua. In total, this is a quota of 36 tonnes for Indonesia as a whole. If any commercially harvested top shell was exported, exporters are liable to a tax of Rp35,000 (US$2.46) per kg of shell; using 2018 quota figures this could bring in an annual revenue of |Rp 1,155,000,000 (US$81,147). At present, it is unclear how the 2018 change in protected status (from protected to no longer protected) will affect conservation and management of commercial top shell.

Maricultured specimens of *Hippopus* and *Tridacna* clams can be exported provided they comprise second-generation offspring (captive-bred in CITES terminology). In the period 2010–2017, Indonesia reported the export of 17,736 shells of these species (Table 1) or, on average, just over 2500 shells each year. In order to export these, traders are liable to a tax of Rp50,000 (US$3.51) per individual shell, thus creating a tax revenue of Rp 126,685,714 (US$8,901) per year. There are clear discrepancies in what is reported by Indonesia as being exported and what is reported by importing parties as being imported from Indonesia (Table 1). Over the 8-year period from 2010 to 2017, the numbers reportedly exported amount to only 4.5% of the total number reported by importers (835/18,571).

Seizure data and prosecutions

Between August 2005 and December 2018, a total of 19 large (>100 shells) seizures were made in Indonesia. The smallest seizures were 100 and 200 shells, whereas the largest were estimated at 20,000 and 22,000 shells, resulting in an overall average of just over 6000 shells per seizure (Figure 1). Seven seizures comprised a mixture of different species whereas the other 12 consisted of single species. Smaller seizures are less likely to be reported in the media and are less likely to be publicised by the relevant authorities (airports, customs, regional nature conservation agencies, police, etc.) so these are probably under-represented here. The total number of marine mollusc shells seized over this 12-year period amounted to 104,654 (Figure 1). For 93% of the seizures, the exact composition was reported, with the most common of the eight species recorded being horned helmet (60% of total number of shells), commercial top shell (27%), giant clams (11%) and chambered nautilus (2%). Using mean prices requested for these species at Pangandaran market (Nijman et al. 2015), the total value of these seized shells amounts to Rp15,564,600,000 (US $1,093,520), or, on average, Rp1,111,755,000 (US $78,108) a year.

Most of the seizures comprised protected species, but at least one, of two containers in Surabaya in June 2012 bound for China, included 768 false trumpets (*Syrinx aruanus*, Linnaeus, 1758). Given the number of false trumpets in these containers and in the absence of any capture quota for the species, the shells would have been seized for violating of Regulation 8 on Wild Flora and Fauna Exploitation that prohibits the commercial exploitation of non-protected species beyond the limit of the agreed quotas.

In the various media outlets and government documents reporting on these 19 seizures, including the initial seizures and follow-up reporting, for only two of the seizures it was specified that arrests had been made. These were of three men in 2007 in Surabaya, Java and two men in 2009 in Denpasar, Bali. On one occasion it was specified why no one was arrested. A repeat offender in Bali, carrying 12 sacks containing amongst others 1515 chambered nautilus shells, was allowed to walk free as according to the seizing authorities, he was accompanied by a child. Twice it was reported that the suspects had fled or were on the run, and twice it was reported that the authorities did not know the suspect's name. While several of the larger seizures were brought to the attention of the world by public press releases organised by the authorities (harbour police, customs, forestry department) I was not able to find any information on prosecutions that followed. Likewise, for none of the seizures of >100 shells was I able to find any evidence of traders being fined or receiving custodial sentences. The CITES Scientific Authority of Indonesia acknowledged receipt but did not respond otherwise to my requests for information on successful prosecution. None of the ten experts I contacted had information on successful prosecution specifically related to the large-scale illegal trade in marine molluscs. In this regard, the authorities deal with the illegal trade in shells similarly to that of more charismatic species such as orang-utans, *Pongo* spp., in that offenders are rarely if ever successfully prosecuted (Nijman 2017).

In 2016, one person from Cilacap, Central Java, was sentenced to 8 months gaol and given a Rp7,500,000 (US$527) fine for trading a large collection of protected wildlife, including 8 whole hawksbill turtles *Eretmochelys imbricata* (L. 1766), 3 hawksbill turtle carapaces, 382 items made out of becko ('hawksbill turtle shell'), 4 sawfish *Pristis* spp. heads, 8 pieces of black coral *Antipathes* spp., as well as 42 Triton's trumpets (this seizure was not included in the above analysis as it was <100

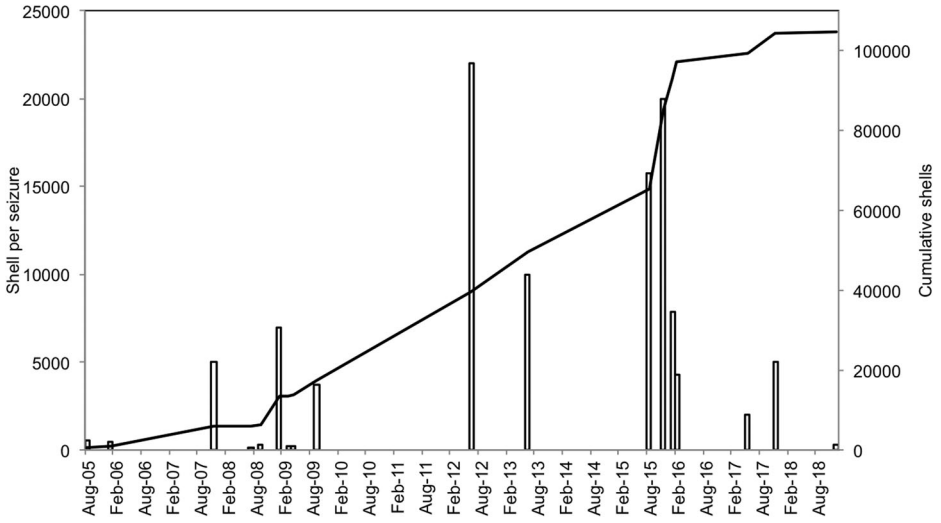

Figure 1. Seizures of protected marine molluscs in Indonesia between April 2005 and December 2018, showing individual seizures (bars) and the cumulative number of shells seized (line). Seizures of less than 100 shells are not included.

shells). The hawksbill turtles and the sawfish are all listed as Critically Endangered, and it seems that these may have been the main reasons for the successful prosecution. Additional fines may have been given to, for instance, tourists at international airports that had small amounts of protected marine mollusc shells in their possession, but no information on this surfaced during my searches.

Discussion

A large number of legal instruments are available to regulate the commercial trade in marine molluscs in Asia and to protect imperilled species (Ezekiel 2018). As explained by Pritchard (2005: 7) with respect to biodiversity conservation conventions, 'they do not feature global courts, enforcement police or sanctions, relying instead on political opprobrium to deal with abuses and on a shared understanding of the real costs of non-compliance to encourage the right action. Much happens at the level of "soft law", that is, pronouncements from intergovernmental conferences and the like, although it is erroneous to apply this term to the Conventions themselves, since they are as legally binding as any other legislation. Conventions also function as "talking-shops" and problem-solving fora, and this in itself is part of their value'. The legal framework on marine biodiversity conservation and sustainable use in Indonesia is fragmented and it is regulated under various legal instruments. It has been suggested that the laws governing coastal resources in Indonesia are sectoral, which has resulted in a series of disconnects (gaps, overlaps, redundancies and conflicts) within the legal framework (Patlis 2005). As highlighted by Nijman and Nekaris (2017), different agencies are involved in regulating the trade (and export) of protected wildlife within Indonesia, including customs, the harbour police, the police, natural resources conservation agency and the directorate general of forest protection and nature conservation. Customs can halt the export of protected molluscs when the export permits are deficient and they have the power to seize and impose fines. The other agencies have the power to seize goods and bring the case to the state prosecutors. However, enforcement of species protection laws in Indonesia is weak, arrests are infrequent, and consequently rarely do violators get prosecuted. Indeed, over the years I have not been able to find any data to suggest that exporters or owners of seized marine molluscs, even when it involved large-scale and widely publicised seizures, have indeed ever been prosecuted, let alone convicted. Likewise, I have not been able to find any report of government officials being implicated in these cases even though, given the organised nature of the trade and the complexity of the trade networks, it seems difficult to envision a lack of such involvement. Seizures and confiscations are often just that: the goods are seized but offenders are able to walk away without standing trial. I urge the Indonesian authorities to follow through with prosecution of offenders, and for the Indonesian media to continue to cover the cases they so widely report, as mere seizure of goods will not be enough of a deterrent to persuade unscrupulous traders to discontinue to export Indonesia's protected wildlife.

While enforcement of protected species legislation is done nationally, with a high degree of decentralisation in Indonesia, local governments can do more. Nurhidayah (2018) noted that the failure to conserve marine biodiversity effectively lies in implementation weaknesses, including (1) a lack of capacity of local government and lack of community participation and (2) inadequate enforcement of law and the failure to integrate the ecosystem management approach with community livelihood aspirations since most of marine areas in Indonesia are utilised by local communities and subject to mixed uses rather than simply being managed for conservation. Some of the open markets, such as Pangandaran and Pasir Putih, where protected marine molluscs are openly offered for sale (Nijman et al. 2015, 2016), are run by the local government. The provincial government in Lombok, an island adjacent to Bali, recently began actively promoting handicrafts made out of chambered nautilus shells (Nijman 2018). The local responsible agencies must be made aware that it is against national policy to allow or even promote the sale of protected wildlife, and enforcement efforts and prosecution of offenders needs to be increased.

It is imperative that the open trade in protected molluscs continues to be monitored, ideally both by government agencies, local and international NGOs, and the public, including domestic and foreign tourists (for a similar example on the lack of monitoring of marine aquarium fish, see Lunn and Moreau 2004). The latter can act as the eyes and ears on the ground and serve as advocates for imperilled wildlife. A continued or sustained presence of independent monitors means any violations or breaches of rules or regulations can be swiftly (or even in real time) reported to the authorities as well as other interested parties including the media. The resulting pressure might act as a force for good when it comes to protecting and preserving Indonesia's marine molluscs. Similarly, given that wildlife traders are increasingly switching to online trading, a coordinated online monitoring system needs to be devised whereby both the responsible government agencies and third party members can track the online trade in marine molluscs. This can be done within Indonesia but given that online communications for international trade are normally conducted in English, also elsewhere in the world.

By and large, the protected species legislation in Indonesia is sufficient to restrict exploitation of rare marine molluscs, if more comprehensively enforced. It is unclear if the removal of several species of giant clam from the protected species list was intentional and when or even if this will be implemented. Even in the light of this uncertainty, however, inclusion of two additional marine molluscs on the country's protected species list may be warranted. One is the false trumpet which is not formally protected in Indonesia despite being the largest extant gastropod with a slow life history and a restricted distribution in the Indo-Pacific region. Moreover, the numbers of false trumpet observed in trade (Nijman and Lee (2016) reported it to be the second most common large marine mollusc shell in trade in Bali) and its perceived rarity in trade suggested by the high price at which the species is advertised (Rp 500,000–1,000,000 or US$35–70; Nijman and Lee 2016) clearly indicate a greater need for legal protection and as such there is room for improved legislation by including the species on Indonesia's protected species list (Noerjito and Maryanti 2001). In light of their slow life histories, the availability of false trumpets in the wholesale market suggests that international trade could indeed pose a threat to its survival. Inclusion on the protected species list in itself may not lead to increased protection. However, it may act as an initial step towards limiting over-exploitation. Second, given the similarities in appearance between crusty and chambered nautilus (crusty nautilus has a more pronounced umbilicus, i.e., the depressed central area of the shell) it may be appropriate to include this species on the list of protected species as well (in fact, had it been known in 1987 that the species occurred in Indonesian waters it may well have been included in the initial list of protected species in 1987; Nijman et al. 2015). Given that all species of nautilus are now included in Appendix II of CITES, legal protection for populations of crusty nautilus in Indonesia may create a greater level of consistency between international regulation and national protection.

Finally, it is clear that large volumes of legally protected marine molluscs from Indonesia are exported. Some of the largest seizures (Figure 1) were bound for destinations like Vietnam, the USA, New Caledonia and China. At least part of the responsibility of adherence to wildlife protection laws lies with the importing countries. For instance, between 2005 and 2010, the USA imported 74,096 items and 2776 kg of chambered nautilus from Indonesia (De Angelis 2012), despite the species being protected in Indonesia and no trade (domestic or international) being allowed. Likewise, the CITES trade database shows that in 2010 the USA imported 122 carvings from wild-caught bear paw clams, and in 2017, China imported 480 shells of wild-caught giant clam shells for commercial purposes from Indonesia, despite both these species being protected in Indonesia. I urge agencies in these countries to no longer unhesitatingly accept imports of wildlife without checking the legality of this trade.

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ORCID

Vincent Nijman http://orcid.org/0000-0002-5600-4276

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