

Recent information on worldwide illegal fisheries for sea cucumbers

Chantal Conand¹

Introduction

Sea cucumber fisheries mostly target Chinese consumers who consider the dried body wall of holothurian species a delicacy. For a long time, they were limited to the Pacific (temperate and tropical) and the tropical Indian Oceans (Conand 1989; Lovatelli et al. 2004). During the last decade they have expanded worldwide (Purcell et al. 2013; Conand 2017a) and recently have developed in the temperate seas and oceans (Gonzalez-Wanglemert et al. 2017). To address problems linked to the management of these resources, FAO and other international and regional agencies have evaluated and proposed better practices for these small scale fisheries (SSF) (Lovatelli et al. 2004; Toral-Granda et al. 2008; Purcell et al. 2012). Nevertheless, during the same period, illegal fisheries have bloomed. Firstly, they must be reported and categorised. This paper presents recently documented cases of illegal fisheries of sea cucumbers from many countries worldwide and discusses the best ways to fight them (Conand et al. 2015). To collect this information, we have monitored scientific literature on sea cucumbers by using a Google alert on 'holothurian' (see the contribution in this issue), checked ResearchGate publications, contacted scientists belonging to web lists such as 'Aspidol-ist' and used information from newspapers or provided by colleagues. Several cases from 2015–2017 are reported here, listed by regions. They allow us to describe the characteristics of the poaching.

Results

Illegal fisheries for sea cucumbers are now found worldwide, where they are abundant and exploited. Examples for the last three years are reported here.

1. Western Pacific Ocean

Northern Australia

The illegal fisheries by Indonesian and Vietnamese fishers in Australian waters (northern and Great Barrier Reef) have a very long history (Conand 1989; Conand et al. 2015; Purcell and Eriksson 2016). High-value species, *H fuscogilva* and *T ananas* are mostly collected by Indonesian fishers who avoid apprehension by keeping their bags on the seabed. Elsewhere, the situation is improving with logbooks and fishery data being collected.

Vietnamese 'blue-boats' were apprehended several times north of Darwin, carrying stocks of several holothurian species and of other marine resources, such as turtles, fish and clams. Many cases are reported in Newspapers; for example in 2016 on Torres Strait: (<http://www.cairnspost.com.au/news/cairns/ten-foreign-fishermen-detained-with-sea-cucumber-haul-in-torres-strait/news-story/80904c7c4b37f2f72cf40e5951128a85>) and on the Great Barrier Reef: (<http://www.theguardian.com/environment/2016/mar/30/vietnamese-fishing-boats-caught-with-sea-cucumbers-in-great-barrier-reef>).

Hawaii

The fishing of holothurians was previously allowed if fishers had a licence, but exploitation was at modest levels and a management plan was not developed for commercial harvests. But then large quantities were taken at Maui and Oahu, apparently unreported, prompting public concern. These indiscriminate harvests prompted a temporary ban on collection. Authorities are working to develop a management plan for sustainable harvests (Ilima Loomis, 'The Sea Cucumber's Vanishing Act,' *Hakai Magazine*, 30 March 2016, accessed 30 March 2016 at: <http://bit.ly/1PAS1PZ>).

Palau

The harvesting was once restricted to subsistence consumption, but in June 2015, Vietnamese fishers in 'blue-boats' were caught fishing sea cucumbers. The authorities burned four Vietnamese boats which 'sent a very strong message' to illegal fishers.

Several other examples of arrests of Vietnamese blue-boats with illegal catches of sea cucumber are reported from Malaysia: (<http://www.thestar.com.my/News/Nation/2015/04/23/Vietnamese-held-for-poaching-sea-cucumber/>).

New Caledonia

In January 2017 (after previous observations in 2016), several 'blue boats' were apprehended by the

¹ Emeritus Pr. La Reunion University and Honorary Attached at MNHN Paris. Email: chantal.conand@mnhn.fr

French Navy (FANC). Many details are provided in an article by Francisco Blaha (<http://www.franciscoblaha.info/blog/>) in SPC Fisheries Newsletter 151:20–23 (<http://purl.org/spc/digilib/doc/mgpz3>). The author discusses the problems for authorities when boats are boarded and their crew arrested; and those for local fishers when they are not. There are no easy solutions, but in international rules it is the flag state's responsibility to control illegal fishing fleets. The local newspapers have largely reported on this actuality.

2. Western Indian Ocean

Madagascar

The ancient fishery for sea cucumbers recently attracted attention with several projects and legislation to manage the resource (COI programme, Wiomsa/Masma: Conand and Muthiga 2007; Muthiga and Conand 2014). Nevertheless, some local fishers migrated to new settlements to capture holothurians illegally; some also went to neighbouring countries. They use prohibited equipment such as scuba diving to collect sea cucumbers. Poaching has even been noticed in mariculture enclosures, by night, at low tides and therefore surveillance towers have been built. Many poachers have been arrested in the sea pens of the Indian Ocean Trepang Company, south-west of Madagascar. Thefts in Madagascar are one of the biggest challenges for solving because they could lead to the cessation of sea cucumber aquaculture: the cost of day and night guardians protecting sea pens is one of the highest parts of the functioning cost of the company (Eeckhaut pers. comm.). Poachers are local coastal villagers or inland villagers. They sell their stolen products to known local buyers.

Îles Éparses (Mozambique Channel)

These islands are isolated, scattered and without a permanent population, which is a situation that provides good conditions to study biodiversity, but also makes them vulnerable to poaching. Several cases of illegal fishing have been reported by French Authorities (TAAF 2014), local newspapers from La Reunion (LINFO.RE) and scientists (Conand et al. 2015). A collaboration between French and Australian authorities was organised and information was obtained on poaching near Juan de Nova in 2014, at Glorieuses Islands in 2015 and Juan de Nova again 2016. A new boat 'Ile de La Réunion' will survey and control the marine environment in the zone (TAAF 2017).

Several earlier observations of illegal fishing activities have come from other countries and are useful for the present study.

Tanzania, Chumbe Island Marine Park and Mafia Marine Park in 2014: boats (dows) arrested; *Kenya*,

Mombasa MPA in 2013: fishers were arrested, got a fine, but explained that they had got an order from a Chinese dealer whose name was not recorded! (N. Muthiga pers. comm.). For these two countries and *Mozambique*, Eriksson et al. (2012) have presented detailed maps of the spatial scale of scuba diving fishing operations and trade in East Africa, documenting the processes and emphasising the need for regional management. In the *Chagos* archipelago (Price et al. 2010) the holothurian resources were under increasing pressure through heavy and illegal harvesting.

3. Eastern Indian Ocean

India

Important recent publications and a report on the conservation and sustainable use of the resources in India (Asha et al. 2017) detail the history and the present situation of the clandestine exploitation since the ban imposed by the Government in 2001, which put an end to the sea cucumber fishery and trade from the country. Its social and economic impacts are discussed and the authors note that 'a controlled mechanism of collection and trade might be a preferred policy solution and put an end to the thriving illegal trade'. Guidelines are also detailed for a sustainable use.

4. Eastern Pacific Ocean

Galapagos

Fishing activities for sea cucumbers started in 1994, after the collapse of the fishery in mainland Ecuador (1991). Despite the ecosystem-based spatial management plan put in place in the Galapagos Marine Reserve, conflicts have been serious and illegal fishing has not stopped (Toral-Granda 2008). *Isostichopus fuscus* is still the only holothuroid species put on CITES Appendix III (2003). The shortcomings were evaluated and governance issues analysed, but despite a participatory management structure, illegal captures were still going on in June 2015.

5. Atlantic Ocean

The sea cucumber fisheries are more recent in this ocean, but illegal fisheries have been noticed both in tropical and temperate countries.

Mexico

The species *Isostichopus badionotus* is currently fished and there are plans to start fishing *Holothuria floridana*. A management plan is in place with detailed information on biology, ecology and distribution of both species. Yet, corruption, illegal fisheries and smuggling of sea cucumbers happens in Mexico. ('Smuggling, diving and death: the Mexican rush for sea cucumbers' by John Holman <https://www.youtube.com/watch?v=43P1Zxo-mTQ>).

Colombia

In Colombia (Eeckhaut pers. comm.), both fishing and exportation of sea cucumbers are prohibited by law; however, important illegal fishing has been reported in the region of Santa Marta (Caribbean Coast). The dried sea cucumbers would pass through Venezuela before being exported to China. The main collected species seems to be *Isostichopus badionotus*.

Portugal

Several species, including *Holothuria arguinensis*, are new targets of fisheries and scientific projects in ecology and mariculture (Gonzalez-Wanglemert et al. 2016; Gonzalez-Wanglemert et al. 2017). Poaching has been noticed several times.

Madeira and Canarias

Recent mentions of illegal captures have been published for these islands (Gonzalez-Wanglemert pers. comm.). (<https://funchalnoticias.files.wordpress.com/2017/03/pepinos-mar.png> and <https://www.canarias7.es/sucesos/incautados-83-kilos-de-pescado-y-900-pepinos-de-mar-de-pesca-ilegal-FD647153>).

Discussion

Characteristics of illegal fisheries

From the recent examples presented here, it appears first that they share some common characteristics, depending on the situations and regulations. They have been apprehended as:

- local people, within countries composed of isolated islands, with some examples being within Marine Protected Areas ... or when different regulations exist between regions of a country, as in, for example, Tanzania ; and
- mostly foreign divers, poachers coming in remote sites, who are very mobile in order to escape the controls – ‘roving bandits’ (Osterbloom 2014; Eriksson et al. 2015a).

Different categories of illegal fisheries

From recent examples, illegal sea cucumber fishing mostly takes place in:

- countries where there is a permanent ban on exports;
- countries where management plans and regulations for export are weak;
- less developed countries where poverty drives poachers to smuggle illegal catches to nearby ports where they can be sold legally; and
- countries with remote fishing areas where enforcement is difficult.

How to fight illegal fisheries

Several general principles and methods of management and conservation are necessary, such as:

- raising awareness at international, regional and national levels, through programmes of organisations such as ACIAR, FAO, SPC, WIOMSA, WorldFish, as well as at regional (Eriksson et al. 2015b, Conand 2017b) and national meetings;
- increasing scientific input to monitor the changes in species that are exploited and countries involved in the fisheries;
- providing fishery statistics at different levels, to enable comparisons with market statistics, therefore facilitating the evaluation of illegal products entering the market; and
- encouraging collaboration between the different stakeholders, administrations and scientists.

Many other actions can be useful at international, regional or national levels, such as:

- supporting the actions of international organisations and conservation bodies, such as IUCN that have already assessed nearly 400 species (Conand et al. 2014) and CITES that discusses the possible addition of holothurians to follow up on previous listings for sea cucumbers (Bruckner et al 2006);
- establishing random inspections at sea and on land;
- informing police and land-based enforcement bodies of regulations;
- setting stern pre-determined penalties in management plans;
- enforcing penalties as a visible deterrent to illegal fishers;
- publicising seizures of sea cucumbers in media; and
- encouraging fisheries agencies to work with coast guards and border security to intercept foreign vessels and identify poaching.

The list could easily be extended, and should take the role of poverty into account. It is also hoped that with the use of new technologies, some of these problems will be solved.

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