

Illegal trade of
Marine Species
in India

2015–2021



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The publication is an assessment of publicly available online open-source newspaper articles. Analysis within this report is to be interpreted with consideration to the variability in availability and reporting of newspaper articles. An increase in media reporting of illegal wildlife trade incidents may be an indication of effective enforcement capacity.

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Vision

WCS-India envisions a world where wildlife thrives in healthy lands and seas, valued by societies that embrace and benefit from the diversity and integrity of life on earth.

Mission

WCS-India's mission is to conserve wildlife and wild places through science, conservation action, education, and inspiring people to value nature.

To learn more about WCS-India, visit <https://india.wcs.org>

Counter Wildlife Trafficking Programme, WCS-India

Wildlife Conservation Society-India's Counter Wildlife Trafficking (CWT) programme aims to support government agencies by building and improving their access to information, skills, technology, and expert support to tackle wildlife crime in India. Illegal wildlife trade is recognised as a serious transnational crime with an overall turnover of billions of dollars every year, requiring a coordinated effort by various enforcement agencies to tackle it effectively.

What We Do

We work with government agencies to reduce wildlife crime and dismantle wildlife trafficking networks in India by:

- Conducting capacity building workshops for officers on effective detection, investigation, and prosecution of wildlife crime.
- Providing technical support to law enforcement officers in multiple aspects of wildlife crime.
- Carrying out and disseminating research on wildlife crime to refine knowledge in this field.

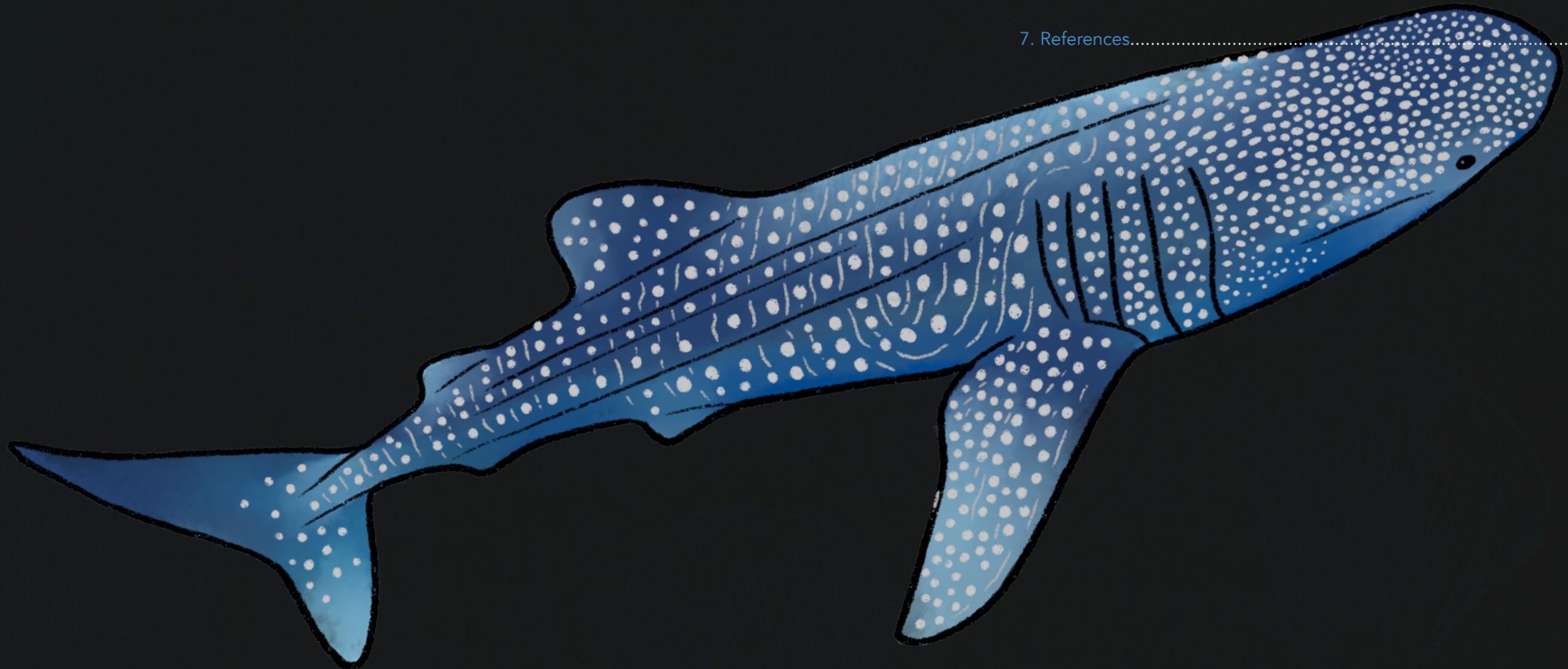


Glossary of Terms

CITES	Convention of International Trade in Endangered Species of Wild Fauna and Flora
IUCN	International Union for Conservation of Nature
IWT	Illegal Wildlife Trade
WLPA	Wild Life (Protection) Act, 1972
IUU	Illegal, Unregulated and Unreported

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EXECUTIVE SUMMARY

Overharvesting of marine wildlife to sustain a burgeoning demand from global markets has threatened marine biodiversity around the world. Trade in commercially important marine species has defined the recovery of the wild populations, threatening the survival of several species. And although many marine species have been accorded legal protection, illegal trade in these species continues. India, under its laws, has accorded protection to 42 individual species and six groups of marine species, including all sea cucumber, coral, syngnathidae (seahorse and pipefish), gorgonian (sea fan), calcarea (calcareous sponge), Indo-pacific cetaceans (marine mammal) species, prohibiting harvest and trade in these species. Despite legal measures, poaching and illegal trade persist, threatening the local population of such species and subsequently the coastal habitats they thrive in. The assessment within this report aims to provide a brief overview of illegal marine trade in India between 2015 and 2021, using online media reports. One hundred eighty-seven media reports citing marine wildlife seizures in India were documented in this assessment. Illegal marine trade in seven species groups was recorded from

the assessment, namely sea cucumber, coral, seahorse and pipefish, shark and ray, seashell, sea fan and sea turtle. Sea cucumbers were documented as the most frequently seized marine species group. Tamil Nadu recorded the highest enforcement action with 126 seizure incidents documenting marine species. The results of this study need to be read with consideration of the availability and variability of online media reports. A high number of seizure incidents alone does not always indicate a high frequency of wildlife crime, and it may be a result of effective enforcement or more media interest. Also, the numbers and volumes generated by such reports are likely to be a gross underestimate, as we do not have an understanding of marine wildlife crime incidents that are neither reported by the media nor detected by enforcement agencies. However, information from media reports on marine wildlife seizures does offer a glimpse of the nature and volume of the trade, which is otherwise poorly understood. This information can be valuable in guiding policy and enforcement strategies to combat the problem of illegal trade in marine species.



In image: A juvenile Olive Ridley (*Lepidochelys olivacea*) trapped in a ghost net. Photo: Vardhan Patankar

INTRODUCTION

Globally, marine capture fisheries cater to various economic sectors, namely the seafood industry, pharmaceuticals, pet or aquarium trade, ornamental, curio, fashion and animal feed. International trade in marine animals exists over and above the consumption of seafood and legal trade in marine species. Overharvesting to meet the flourishing demand has threatened the marine biodiversity around the world; resource exploitation has depleted wild populations faster than the ability of governing agencies to respond^{1,2}. As a result, several species and species groups are now categorised as endangered and vulnerable by the International Union for Conservation of Nature (IUCN). While the Convention on International Trade in Endangered Species (CITES) works with member states to regulate the trade and commerce of more than 35,000 species, a significant share of the trade continues to be sourced through illicit activities such as illegal, unregulated and unreported fishing (IUU)³.

Providing an overall assessment of marine wildlife crime is challenging due to varying levels of protection across countries and irregularities in dealing with harvest methods, clandestine markets and supply chains leading up to the consumer. Similarly, tackling wildlife crime on the ground is complex as consignments are often sourced illegally and are moved into legal markets⁴. Global illegal trade networks are also particularly opaque in species hunted for preserved parts, such as turtle shells or shark fins, as these commodities are disaggregated and stockpiled by globally

distributed buyer networks before arriving at their final destination⁵.

India is a biodiversity hotspot and has predominantly played the role of a source country within the international market for marine wildlife trade^{6,7,8,9}. It is the 3rd largest exporter of shark and ray products and was recently identified as one of the hotspots for illegal trade in sea cucumbers to southeast Asian countries having a demand for *bêche-de-mer*^{10,11}. The earliest documented records of trade in sea cucumbers were carried out with the help of Southeast Asian exporters in the late 1890s¹². Similarly, after several years of illicit fishing by Japanese vessels in the 1920s, the government regularised the trade of Trochus (*Trochus niloticus*) and Turbo (*Turbo marmoratus*) shells off Andaman and Nicobar Islands in 1935¹³. Targeted harvest to meet the demands of a growing market led to high volumes of trade in sea cucumbers, trochus and turbo shells during the 1980s¹⁴. In 2001, with an amendment to the Wild Life (Protection) Act, 1972 (WLPA), the government of India afforded legal protection to several threatened and commercially important marine species against any form of harvest, rendering collection, and sale of such species a punishable offence. Currently, the WLPA protects ten species of elasmobranchs (including sharks, rays, etc), the giant grouper (*Epinephelus lanceolatus*), all species of seahorses and sea cucumbers, 24 species of molluscs, all scleractinian corals including organ pipe corals, sea fans, sponges, and a number of cetaceans, marine turtles, otters, crocodiles

and sea snakes across four schedules (I, II, III and IV) with varying levels of protection. Despite legal measures, poaching and illegal trade persist, threatening the local population of such species and subsequently the coastal habitats they thrive within. Only a handful of studies have focused on quantifying illegal marine trade in India, identifying gaps and suggesting interventions to strengthen enforcement action and build capacity towards combating illegal trade^{3,14,15,16,17,18,19}. Lack of awareness amongst stakeholders, internal capacity to identify protected species, unregulated fishing, and challenges in patrolling vast expanses have been significant limitations in tackling marine wildlife trade. While there is an urgent need to strengthen enforcement action, build awareness amongst stakeholders and amend laws cementing gaps within harvest regulations, it is also essential to build an understanding of marine wildlife trade. Understanding the nature of this trade, exploring important trade routes and identifying hotspots could bolster enforcement action towards infiltrating existing networks within the trade and curb trafficking.

Media often report enforcement action against marine wildlife trade through outlets such as print press, news articles and social media platforms. In the age of digital print, media-reported incidents have become an accessible form of wildlife seizure data²⁰. There are several caveats surrounding the reliability of media-reported seizure data and the type of inferences that can be made²⁰. Acknowledging the biases that come with such a database, media-reported incidents

on wildlife trade can help generate baseline information on commonly traded species, frequency and distribution of seizures across the country and geographic routes utilised to trade wildlife contraband within and outside the country. In a data-deficient landscape, baseline information on illegal trade in marine species can encourage further research on the ecological, social and political parameters of illegal marine wildlife trade in India.

In this context, we assessed the extent of illegal marine trade in India by analysing open-source online media reports on wildlife crime incidents that involve the trade and illicit harvest of protected marine species in India. We collected media articles reporting wildlife crime incidents involving marine species between the years 2015 and 2021 to better understand the illegal marine trade in India. In particular, we attempt to:

- Identify commonly traded species.
- Identifying trends and enforcement hotspots for illegal marine trade in India.
- Explore trade routes and networks assessing the extent of illegal trade for various groups of protected marine species in India.
- Describe the nature of illicit activities related to illegal marine trade in India.

This data provided a snapshot of illegal marine trade in the country. However, the results of our study need to be interpreted with caution due to the biases associated with media report data, namely bias due to variability in media reporting and enforcement efforts across regions^{21,22}.



In image: Bullmouth shell (*Cassis cornuta*) Photo: Vardhan Patankar

METHODOLOGY

We scanned Google Search Engine for online media reports of marine wildlife trade incidents between January 2015 and December 2021. Data was collected using the Google advanced search tool by combining keywords. The keywords consisted of 'species' + 'action' terms; e.g., 'sea cucumber + seize', 'seahorse + poach', 'sea fan + smuggle', search for each keyword combo (if relevant) was continued until the last page on the browser after which the next keyword was utilised. Opportunistic scouting of articles was done using various other browsers and social media platforms like Tor browser, Firefox, Google alerts, Facebook, Twitter and Instagram.

The marine groups involved in these searches include corals, sea fans, elasmobranchs (sharks and rays), sea cucumbers, seahorses, sea turtles, seashells. We added a state-wise filter to our searches, including all maritime states and islands of India. From each media report, we extracted information on the date of reporting, seizure location, species seized, product type (live, dead, dried, processed, animal parts - shell, fin, bones, meat, etc.), product quantity, other commodities seized (vehicle, gear/nets), source/transit/destination locations (if mentioned), detecting authorities. Not all of this information was available for each entry^{22,23}.

We further used the data collected from 2015 to 2021 for interpretations made within this report. Identification and

categorization of marine species groups was carried out using the information provided within the media report for each incident, or by verifying images shared within the same media report. Additionally, other media reports from different news outlets documenting the same incident, were analysed to compare and cross-verify the information regarding the identification of the species groups. Images from media reports that contained seizures with enforcement and the marine wildlife contraband within the same image were preferably selected to verify identification of marine wildlife at the species group level. Therefore, sea cucumber, seahorse and pipefish, shark and ray and some coral species were not identified at the species level in this report. Seashell species were often mislabeled or not mentioned specifically within media reports containing marine wildlife seizures. Hence, images within media reports documenting marine wildlife seizures were additionally scanned to verify crime incidents involving seashell species within this assessment. This was possible when images of seized marine contraband were clear and visible.

To analyse the trade network and flow of marine wildlife contraband within and out of the country, we assessed media reports for any mentions of source, transit and potential destination locations. We considered media reports that contained route information and mentions of locations, apart from the seizure location. Media reports containing information on

Species Keywords

sea cucumber, seahorse, pipefish, shark, shark fin, manta ray, mobula ray, coral, seashell/sea shell, conch, sea fan, indrajaal, sea turtle

Action Keywords

Seize, seizure, poach, arrest, smuggle

originating, last transit, onward transit or potential destination locations were documented. Specifically, incidents containing location information from outside India were marked as potential international routes for marine contraband. Media reports often post generic statements of consignments being sent to China or southeast Asia. Such mentions were not included in this assessment. We observed media reports documenting domestic movements of consignments without any international destination recorded, which could either indicate that the species has a local demand or the report lacks information on the onward destination of the demand country.

Data was analysed using RStudio Version 1.4.1106 ([RStudio Team, 2022](#)). Maps were made on QGIS 3.20.0-Odense ([QGIS Development Team, 2022](#)).

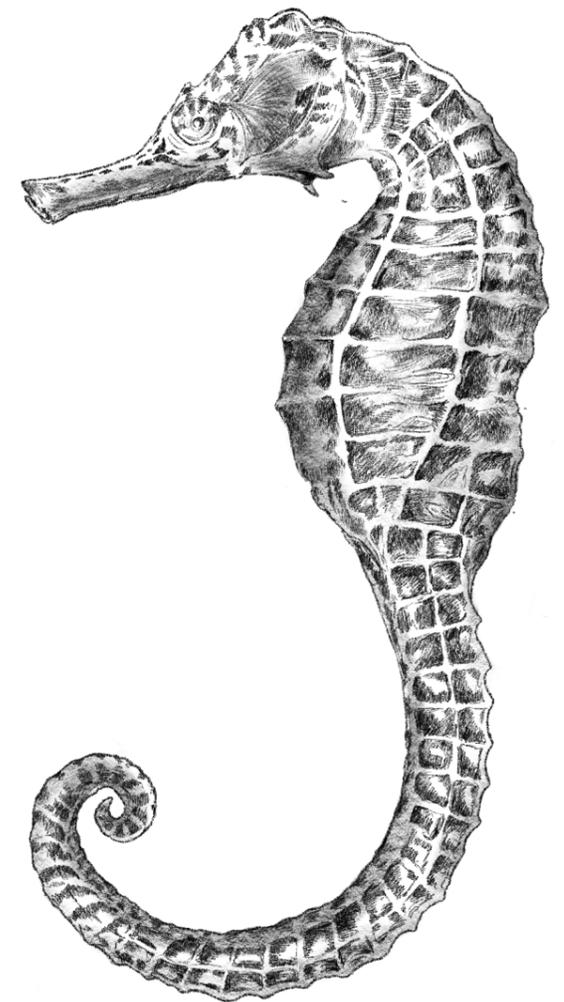
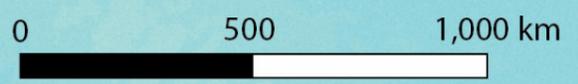
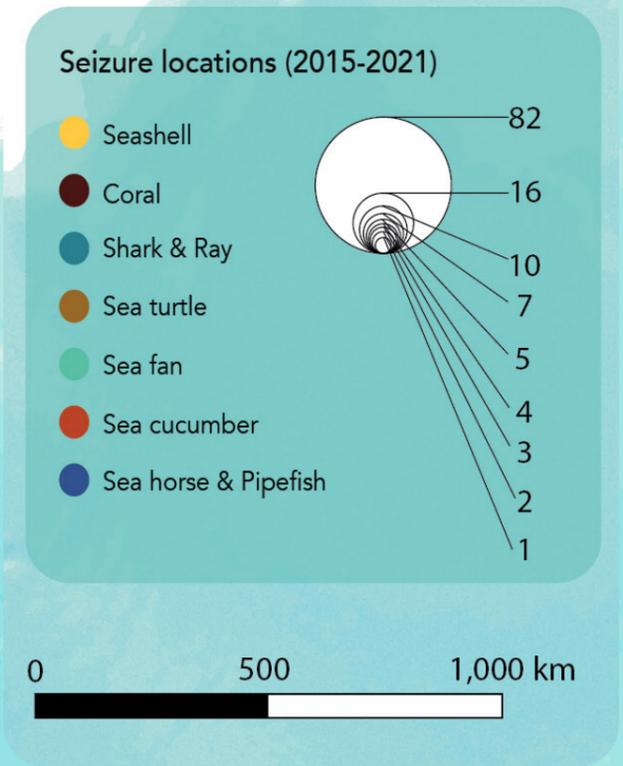


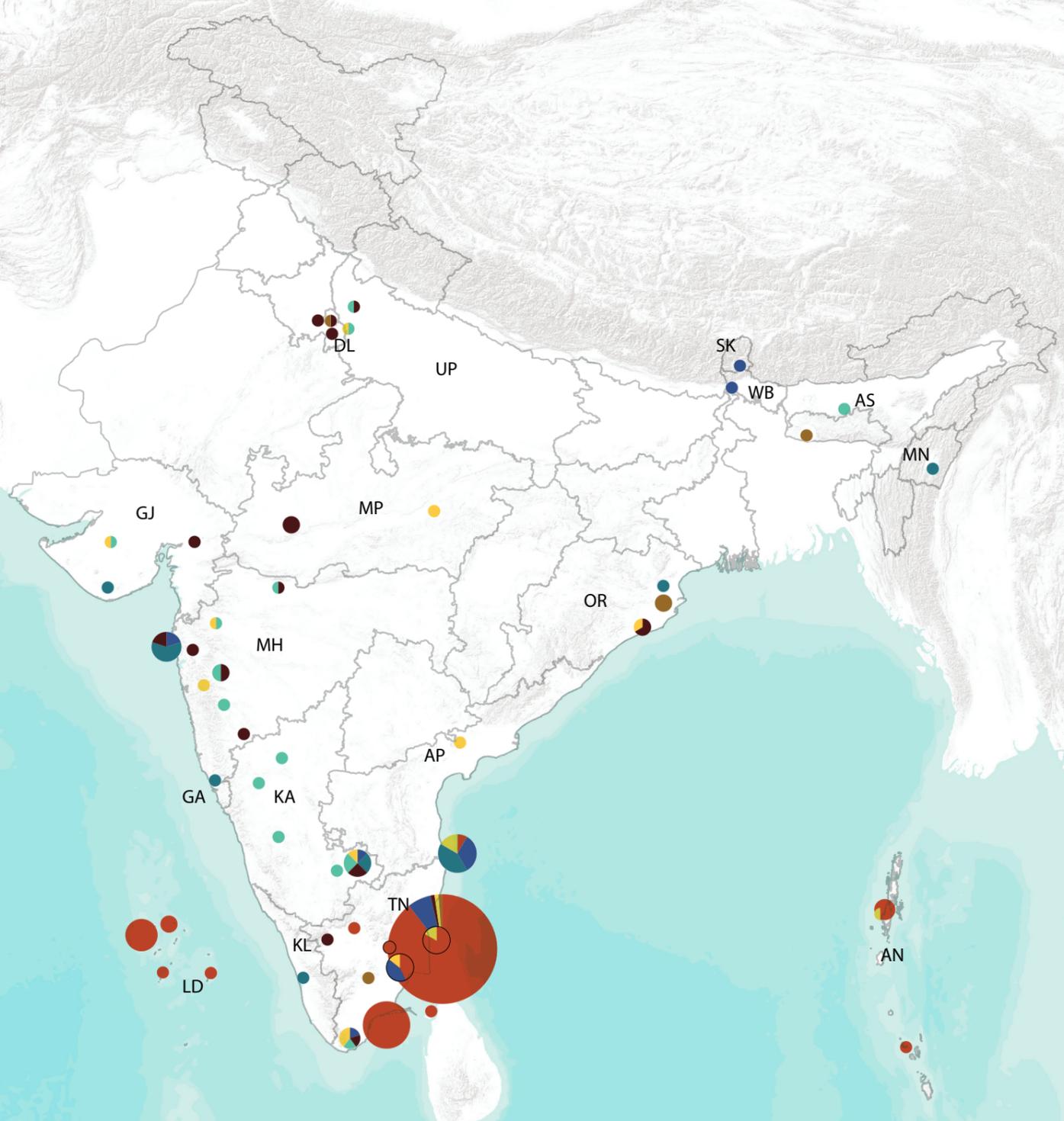


Figure 1: District wise spatial distribution of illegal trade of marine species recorded between 2015-2021



State Codes

AN - Andaman Nicobar
AP - Andhra Pradesh
AS - Assam
DL - Delhi
GA- Goa
GJ - Gujarat
KA - Karnataka
KL - Kerala
LD - Lakshasweep Islands
MH - Maharashtra
MN - Manipur
MP - Madhya Pradesh
OR - Odisha
TN - Tamil Nadu
SK - Sikkim
UP - Uttar Pradesh
WB - West Bengal



RESULTS

Overview

We recorded 187 media reports citing marine wildlife seizures by various enforcement agencies in India from 2015 to 2021. These media reports in turn recorded IWT (Illegal Wildlife Trade) in seven groups of marine species during this period, namely sea cucumbers (live, dried and processed), corals (scleractinian corals), syngnathidae (seahorse and pipefish), elasmobranchs (shark meat, processed fin and bones; dried ray skin

and mobulid gill rakers), seashells (trochus, spider conch, helmet shell etc.), sea fans and sea turtles. Sea cucumbers recorded maximum incidents (122 incidents), followed by sea fan (20 incidents), seahorse and pipefish (18 incidents) and seashell (18 incidents). Marine wildlife incidents were reported across 18 states, including eight coastal states and two island territories. Tamil Nadu recorded the highest number of enforcement incidents (126 incidents), followed by Maharashtra (13 incidents), Lakshadweep (12 incidents) and Karnataka (eight incidents) (Figure 1).

Of the 187 incidents, 169 recorded single-species seizures, whereas 18 recorded multi-species seizures (involving more than one marine species group). We further analysed the reported scenario within each incident to explore the type of activities supporting illegal trade. Enforcement agencies made seizures across multiple entrepôts of the trade chain; the maximum number of seizures (70 incidents) were conducted during attempts to transport marine wildlife contraband. Attempts to transport included inter-district and intra-district transportation of harvested species, inter-district transport of processed products and attempts to transport consignments outside the country via air and sea routes. The second most common seizure (32 incidents) involved activities such as hoarding or stockpiling, where arrested individuals or detained facilities were found to be in possession of species protected under the WLPA.

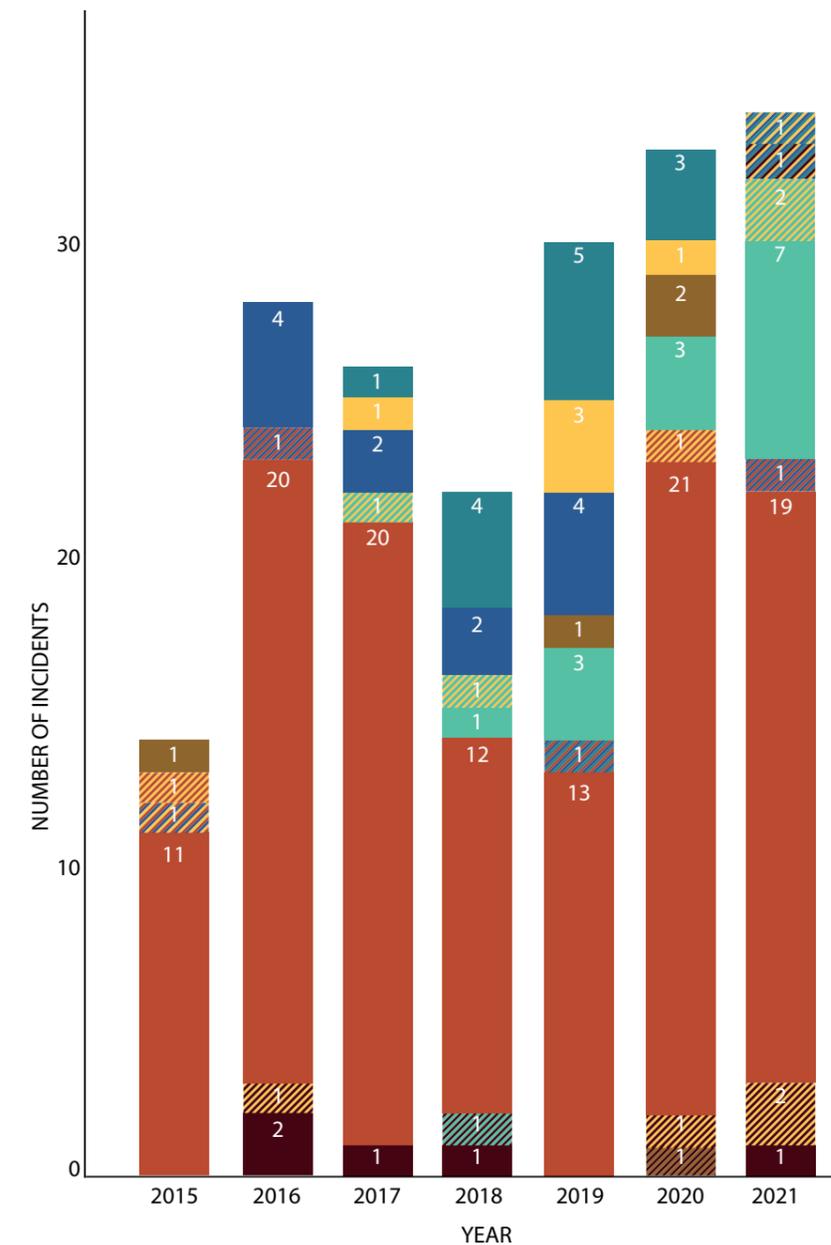
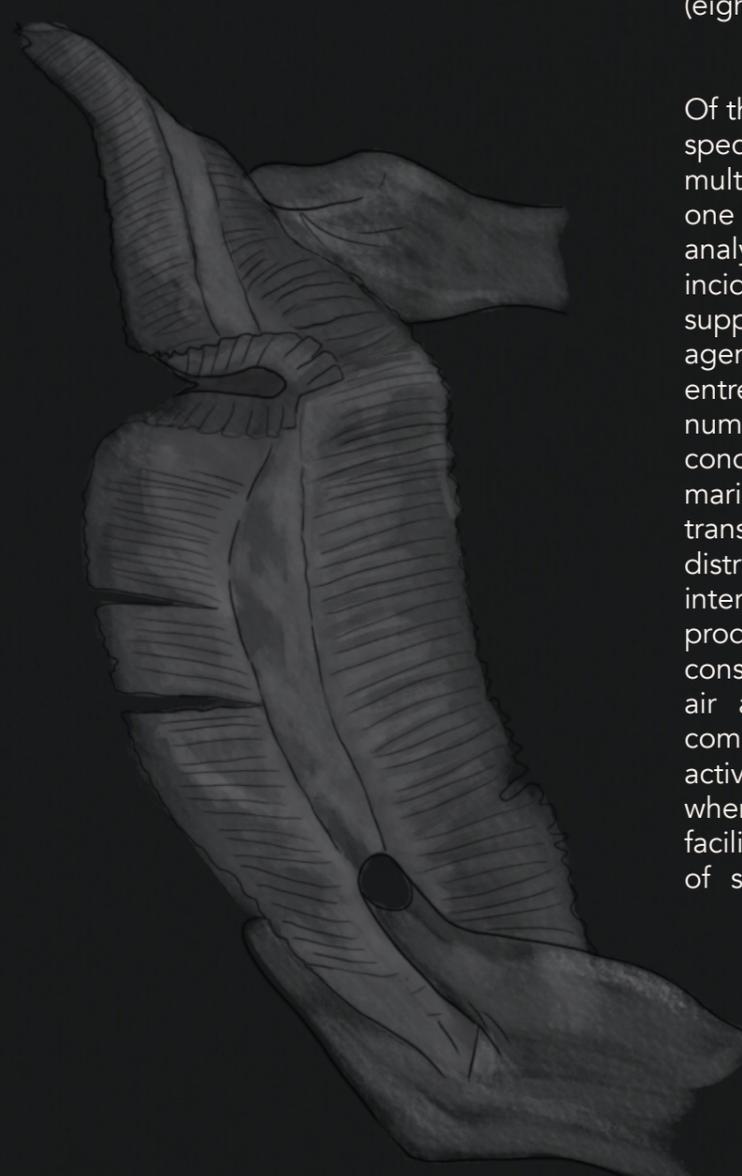
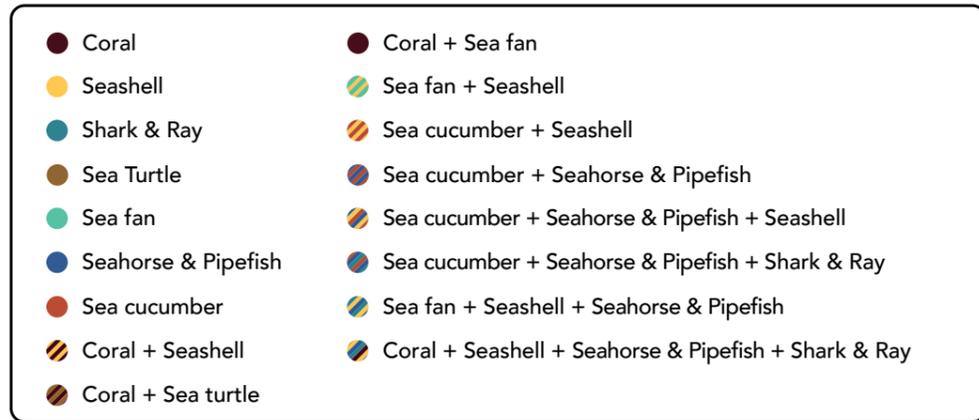


Figure 2 : Year-wise number of illegal marine wildlife trade incidents recorded between 2015-2021



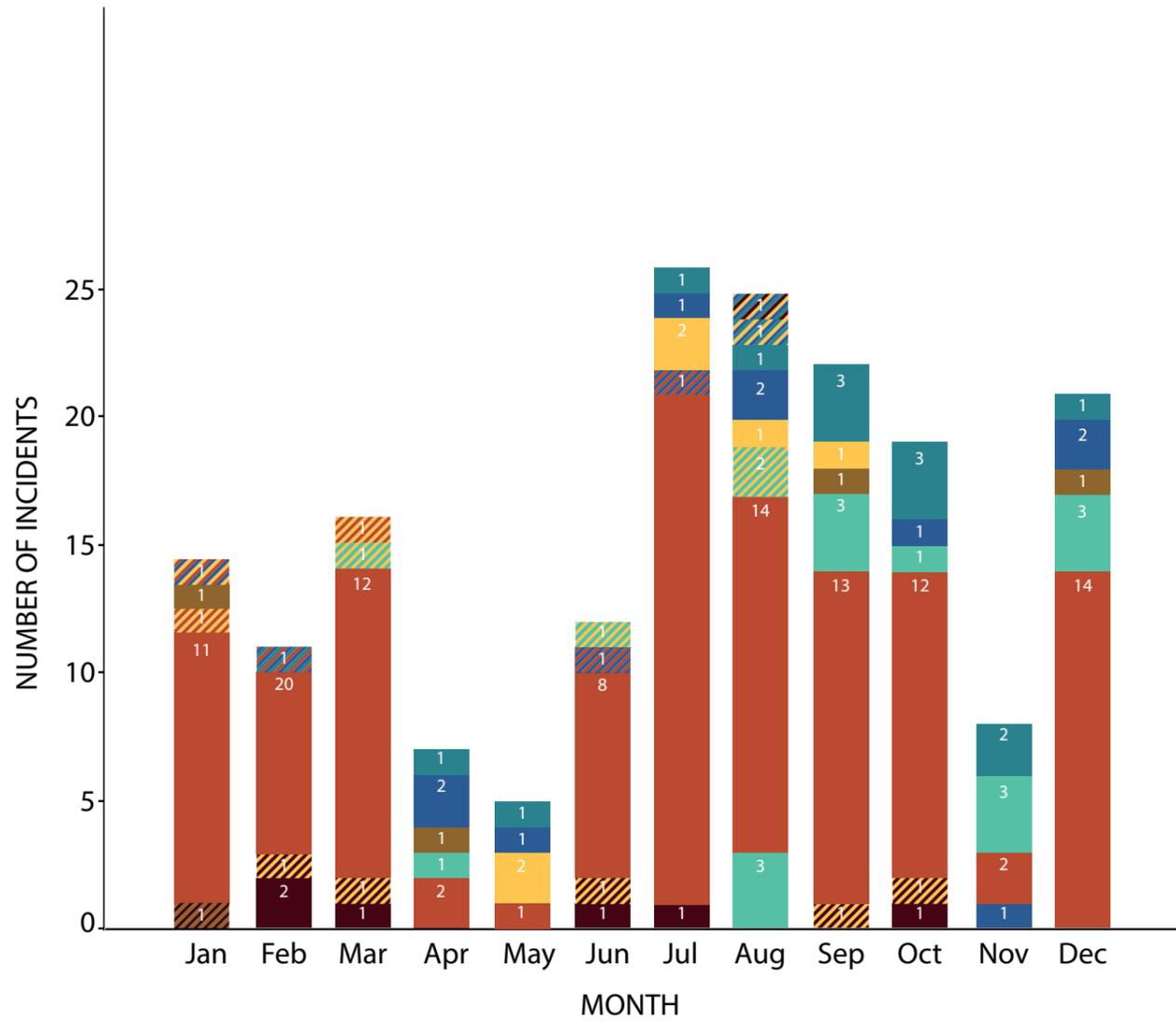
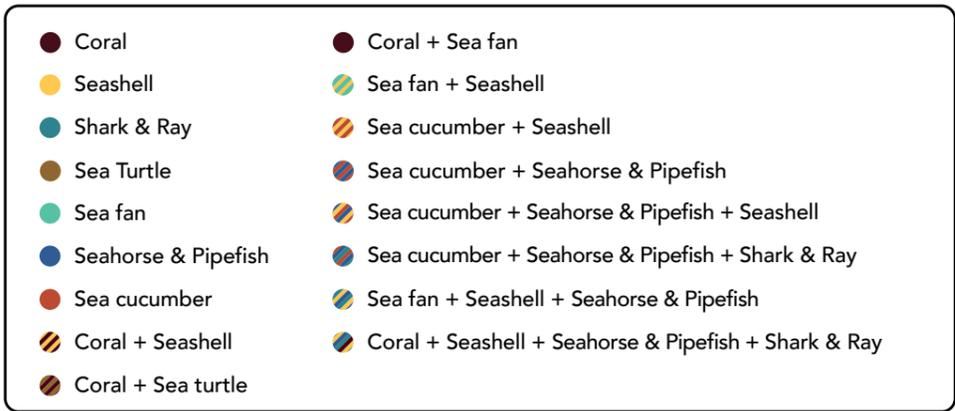


Figure 3 : Month-wise number of illegal marine wildlife trade incidents recorded between 2015-2021



Other reported activities include the arrest of individuals caught processing harvested species or in possession of processed products (19 incidents) and arrests where the accused participated in the sale of marine wildlife contraband (19 incidents). While a majority of the reported incidents yielded information on the type of activities being conducted, 47 incidents were merely reported as seizures without mentioning any circumstances or activities that described the event.

About 80% of the incidents reported trade in marine wildlife contraband that does not have commercial markets in India; (example - sea cucumbers and their associated products are not sold within the country, whereas sea fans and seashells are recorded to be sold locally in markets). Contrabands meant to be exported outside the country are reported to have demand from markets that include exotic

cuisines, traditional medicines and curio; for example, sea cucumber and shark fin are a delicacy, whereas seahorses are believed to have medicinal properties. Conversely, contrabands meant to be traded domestically are reported to have demand supported by superstitious beliefs, ornamental trade and curio markets; for example, the possession of sea fans is believed to bring good fortune.

We did not observe any temporal trend in the number of media-reported marine wildlife trade incidents from 2015 to 2021 (Figure 3). There was no noticeable change in the species groups traded across the years or months. April, May (pre-monsoon), and November recorded fewer incidents than other months of the year (Figure 2); but we could not identify any particular reason for this observation.

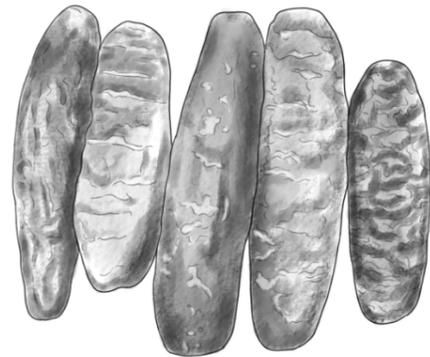


In image: Pineapple sea cucumber (*Thelenota ananas*) Photo: Vardhan Patankar

Commonly Traded Species

Based on media reports, sea cucumbers are the most frequently traded species in India, recording 122 incidents from 2015 to 2021 (Figure 4). Collectively, 64,172 kg plus 988 individuals (unweighted) of sea cucumbers were seized by enforcement agencies in Tamil Nadu, Lakshadweep Islands and the Andaman Islands. One in three incidents described the form in which sea cucumbers were seized, i.e., 11,441 kg reported as either live or freshly harvested, 11,546 kg reported as either dried or processed, and 41,185 kg did not contain details of sea cucumber form. The additional unweighted 988 sea cucumber individuals were not considered for the above assessment. Seized articles were collectively reported as 'sea cucumbers' and were not identified to a species level.

The state of Tamil Nadu reported the maximum number of sea cucumber seizures (105 incidents), followed by the Lakshadweep Islands (12 incidents) and the Andaman Islands (five incidents). At least 11 sea cucumber incidents were reported each year, with 2020 recording the most number of incidents (21 incidents), followed by 2016 and 2017 (20 incidents). Month-wise distribution of sea cucumber incidents did



not reflect any pattern amongst incidents. On an average, every month, at least one sea cucumber incident was recorded throughout the study timeline (Figure 2), although the distribution of seizures varied with each year.

Sea fans (20 incidents) and Syngnathidae, i.e., sea horses and pipefishes (18 incidents) were the second and third most commonly traded groups. Unlike sea cucumbers, where media-reported incidents were recorded every year, trade in sea fans was not recorded during 2015-2016. Similarly, no seahorse and pipefish incidents were recorded in 2020. Sea fans were often reported in multi-species incidents along with seashells (five incidents), corals (one incident) and other wildlife contraband belonging to terrestrial species (nine incidents). Having a domestic market guided by [superstitious beliefs](#), incidents reporting illegal trade in sea fan (known in the domestic market as 'Indrajal') were not restricted to coastal areas but also recorded from states such as Assam, Uttar Pradesh, Rajasthan and central Karnataka. Collectively, 4,487 individual sea fans were seized in seven years, with the largest seizure event involving 920 sea

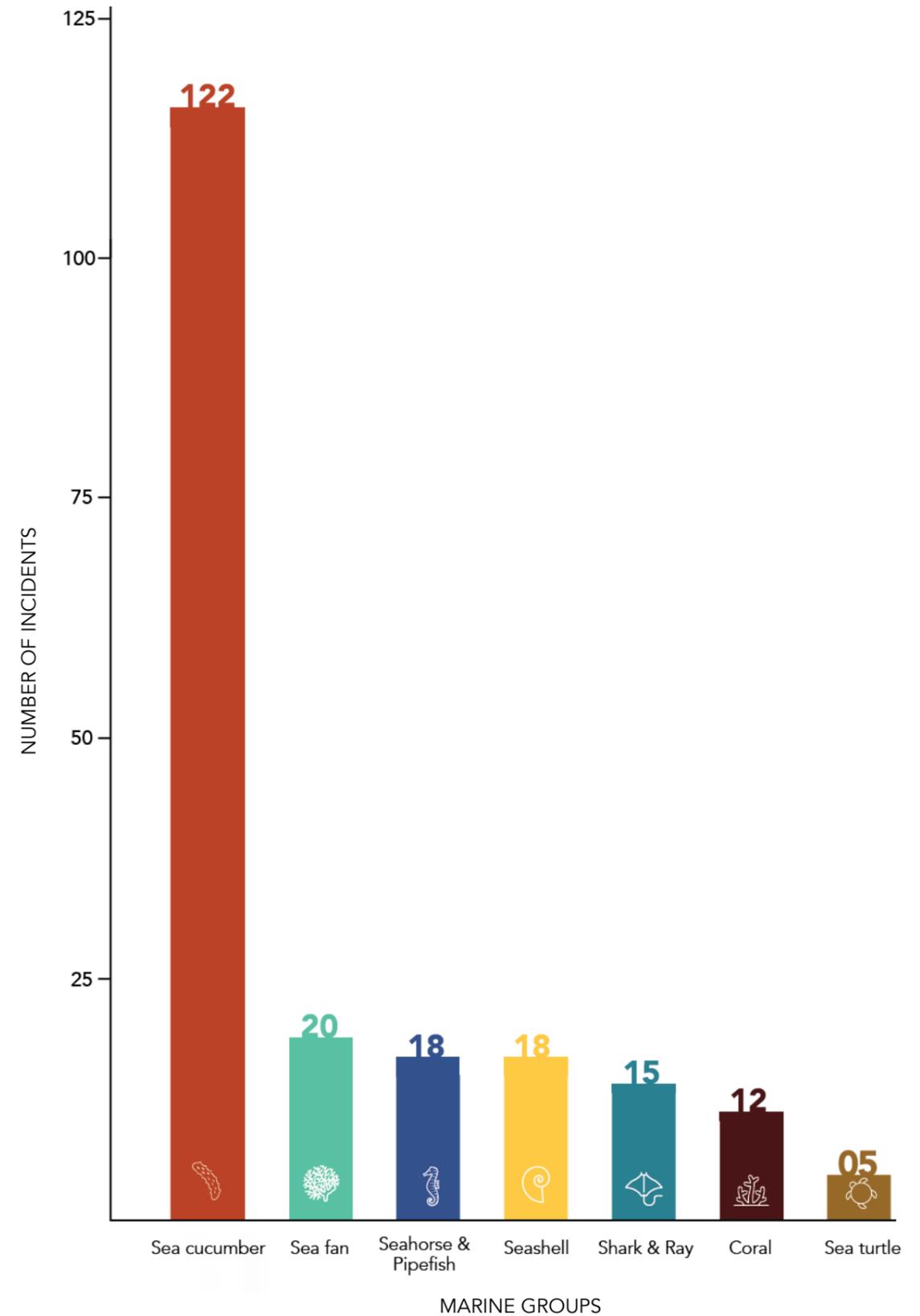


Figure 4 : Species-wise frequency of illegal marine wildlife trade incidents recorded between 2015 - 2021.

fans found in possession of two individuals that attempted to sell the contraband in the Mumbai Metropolitan Region (MMR). Seized articles were collectively reported as 'sea fans' and were not identified to a species level. We did not identify any particular duration of the year where sea fan incidents were prominent, and there was no noticeable trend in the distribution of sea fan incidents between 2017-2021. Our research has also shown that sea fans are regularly available for sale on online marketplaces and are overlooked by enforcement due to their clandestine nature.

Of the 18 seahorse and pipefish incidents, only three reported pipefishes amongst seized contraband. Fourteen incidents were reported from Tamil Nadu; others locations included Sikkim, West Bengal, Karnataka and Maharashtra (one incident each). Eight incidents reported syngnathidae in multi-species seizures along with sea cucumbers (four incidents), seashells (three incident), shark and rays-based products (two incidents). Collectively, 18 incidents reported approximately 665 kg and an additional 4,112 individuals (unweighted) of sea horses and pipefishes from 2015 to 2019 and 2021. The largest seizure event involved a combined 340 kg seahorses and pipefish confiscated by the Customs officials from a warehouse in Manaddy, Chennai. Seized articles were reported as processed seahorses and pipefish, and were not identified to a species level.

From 2017 to 2021, 15 incidents reported attempts to trade meat, fins, gill rakers, dried skin and teeth belonging to elasmobranchs (sharks and rays) protected under WLPA and CITES. Shark fins were the most commonly recorded product, reporting a total of 14,188 kg of processed

and dried fins across eight incidents. A single case reported 8000 kg of processed fins being seized by the Directorate of Revenue Intelligence from export agency warehouses located in two locations, i.e. Sewri, Mumbai (3000 kg) and Veraval, Gujarat (5000 kg). An additional 6000 kg of processed fins were seized from another export agency in Karivelippady, Kochi, indicating high volume trade, stockpiling and involvement of export companies in the illegal trade of elasmobranch products. Incidents recording trade in elasmobranch parts other than fins included cases of whale shark meat (three incidents), a multispecies case involving gill rakers and fins along with processed sea cucumbers and syngnathidae (one incident), a case involving dried ray skin (one incident), a case involving dried shark bones via air (one incident), a case involving mobulid gill rakers across the Indo-Myanmar border via road (one incident), and another multispecies case involving shark teeth collected along with other marine and terrestrial species (one incident). All incidents reported seized articles as parts belonging to either sharks or rays and could not be identified to or confirm its association with any particular species.

Media articles reporting incidents of corals and seashells combined for a total



of 25 incidents across ten different states, including land-locked states such as Delhi, Madhya Pradesh, Andhra Pradesh and Uttar Pradesh. A variety of species were seized across the 15 recorded seashell illegal trade incidents; such as Trochus shells (*Trochus niloticus*), Horned helmet shells (*Cassis cornuta*), Nautilus shells (*Nautilus pompilius*), Bullmouth shell (*Cypraeacassis cornuta*), Windowpane oyster (*Placuna placenta*), Horse conch shell (*Pleuroploca trapezium*) and unidentified species of Spider conches (*Harpago spp.* and *Lambis spp.*). Other species of shells that were seized alongside WLPA listed species but do not share a protected status in India include Queen conches (*Strombus gigas*), Cowrie shells (*Cypraea spp.*) and unidentified shells belonging to Family Tegulidae and Arcidae. An estimated 83,666 kg, and an additional 1655 individual (unweighted) shells were seized across 15 incidents. The largest seizure event recorded 80,000 kg of Windowpane oyster (*P. placenta*) being transported by four trucks, intercepted in Ulwe, Raigad district of Maharashtra.

Media reports recorded 12 incidents of trade in corals across six states; reporting Schedule I species belonging to the order Scleractinia and contraband described as Organ pipe corals (unconfirmed identification). The largest seizure event reported a raid on an unauthorised shipment carrying 15,450 kg of what was described as red corals (Genus *Corallium*); a group of corals listed under appendix II of CITES.

Seashells and corals were often recorded in multi-species seizures, alongside sea cucumbers (three incidents), sea fans (four incidents), seahorses and pipefishes, sharks and rays, and an incident reporting a Hawksbill turtle (*Eretmochelys imbricata*) (one incident each).





In image: A boat anchor causing damage to healthy coral colonies Photo: Vardhan Patankar

International Illegal Marine Trade Routes

Out of the 187 incidents recorded between 2015 and 2021, less than 50% of the media-reported seizures i.e., 78 incidents recorded information on trade routes; shedding light on the source, transit and potential destination of the seized contraband. We documented details of locations besides what was mentioned about the seizure location, which usually contained where the consignment was originating from or where it was heading towards. Sea cucumber, seahorse and pipefish, shark and ray incidents had maximum route details and are further explained below. Species groups such as sea fans, seashells and corals had some information on domestic or interstate

routes, with the exception of three incidents mentioning international connections. Sea turtle incidents did not record any trade route information within media reports.

Sea Cucumber International Trade Routes

Out of the 122 sea cucumber incidents recorded between 2015 and 2021, 34 incidents either mentioned attempts to illicitly export sea cucumbers to neighbouring countries or countries with established markets for trade. Sri Lanka (26 incidents), China (six incidents) and Malaysia (two incidents) were recorded as countries that are either transit locations or destinations of the intended trade. Consignments meant to be exported

Figure 5 : Documented sea cucumber illegal trade routes recorded between 2015 - 2021

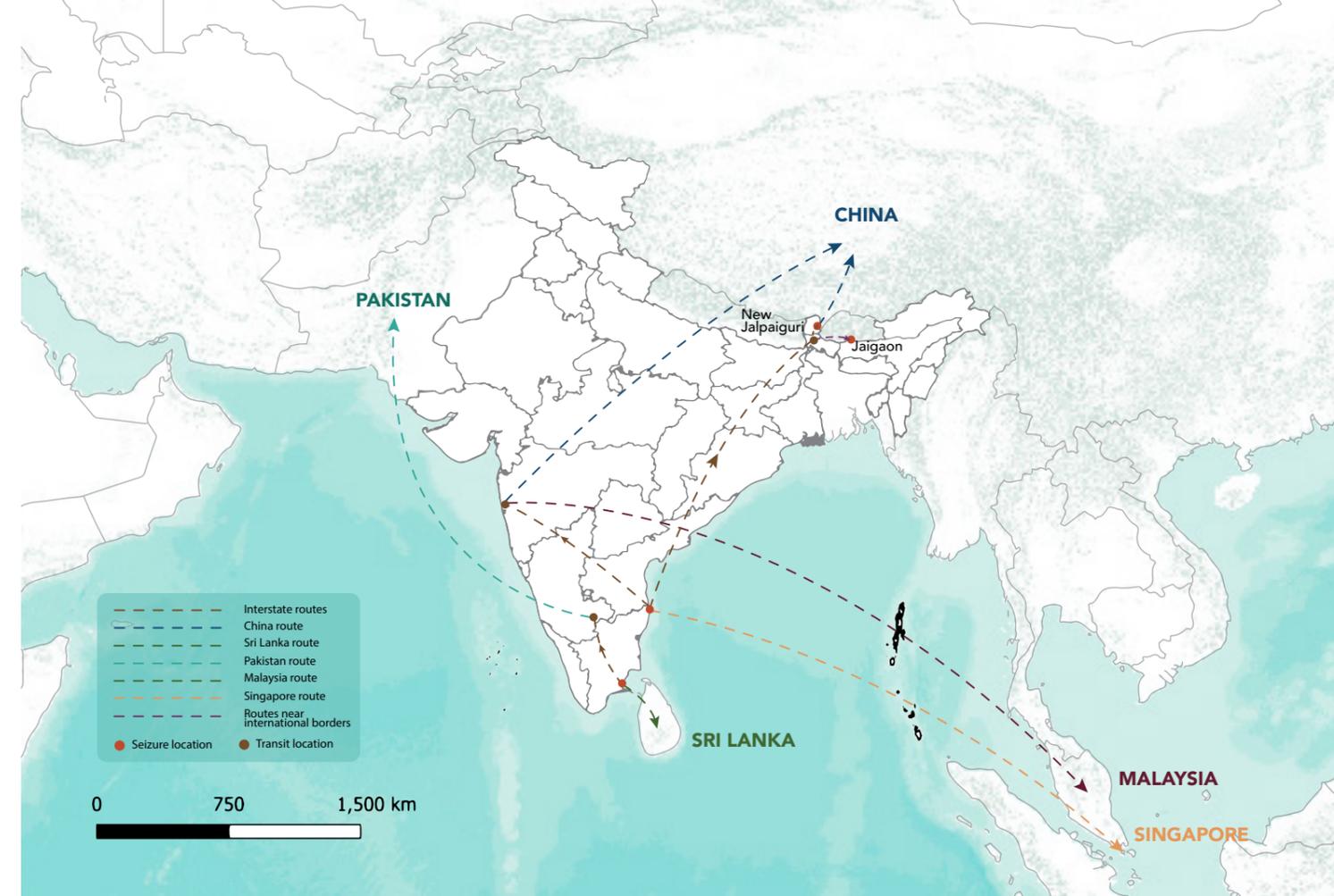
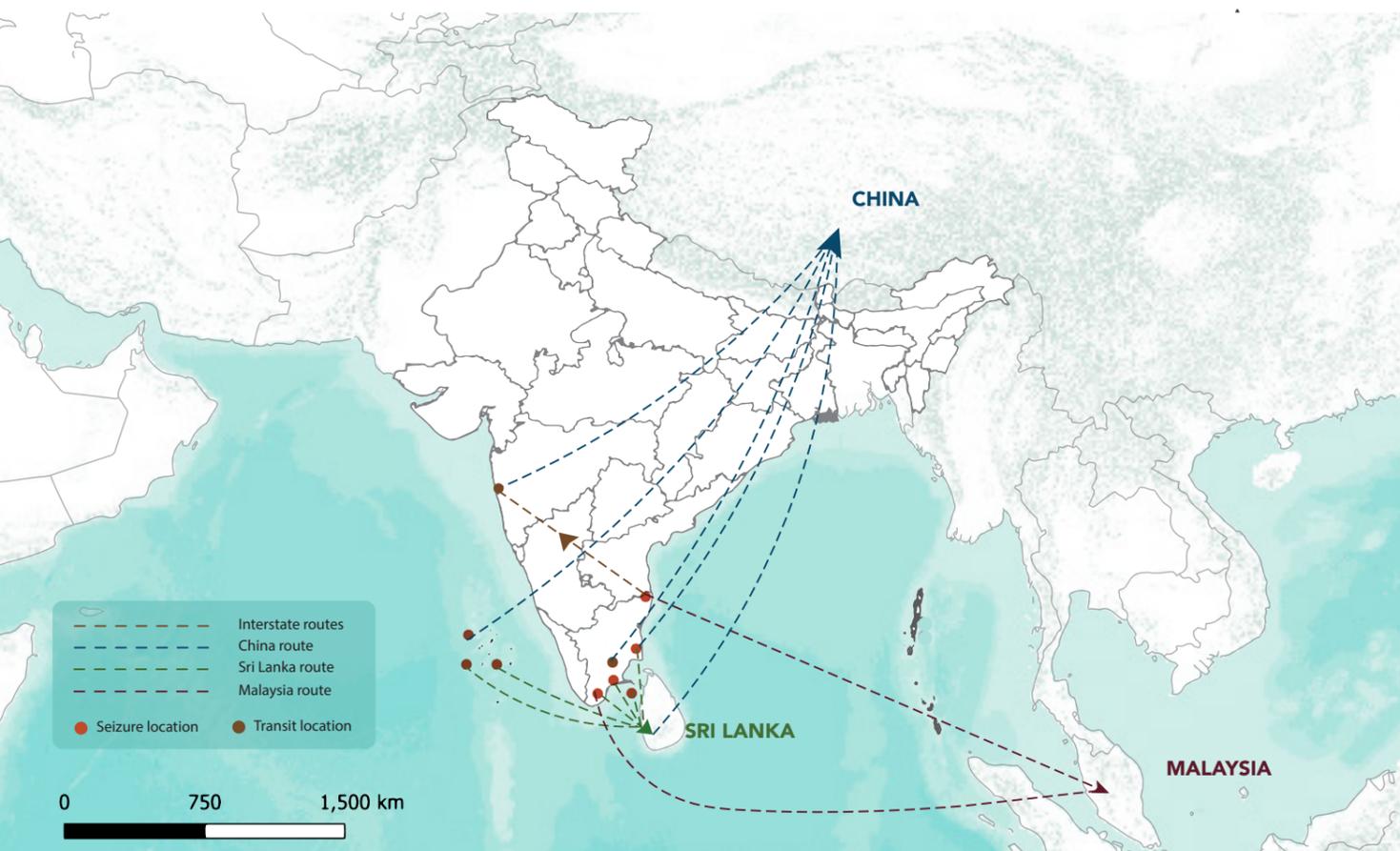


Figure 6 : Documented seahorse and pipefish illegal trade routes recorded between 2015 - 2021.

to Sri Lanka were documented originating from Tamil Nadu in 24 incidents, and the Lakshadweep Islands in two incidents. While Sri Lanka was recorded as the most common international location, it is intended to be a transit location for further transport towards destination countries in southeast Asia¹¹.

Out of the 34 incidents that contained international trade route information of sea cucumbers, the most commonly documented mode of transport was via sea route (12 incidents; all onwards Sri Lanka). Transport mode was undetermined for the remaining 22 incidents.

Seahorse and Pipefish International Trade Routes

Out of the 18 recorded seahorse and pipefish incidents, six incidents either mentioned

attempts to illicitly export seahorse and pipefish to neighbouring countries or countries with established markets for trade. International routes with domestic transits recorded were from,

- [New Jalpaiguri, West Bengal to Sherathang, Sikkim \(by road\), onwards China;](#)
- [Thondi, Tamil Nadu to Bangalore, Karnataka \(by road\), onwards Pakistan;](#)
- [Chennai, Tamil Nadu to Mumbai, Maharashtra \(transport mode not documented\), onwards China.](#)

Consignments recorded to be directly transported internationally were from

- [Mumbai, Maharashtra to Kuala Lumpur, Malaysia \(by air\);](#)
- [Thondi, Tamil Nadu to Sri Lanka \(transport mode not documented\);](#)

- [Chennai, Tamil Nadu to Singapore](#) (by air).

Shark and Ray International Trade Routes

Out of the 15 recorded sharks and rays incidents, eight incidents either mentioned attempts to illicitly export sharks and rays to neighbouring countries or countries with established markets for trade. International routes with domestic transits recorded were from:

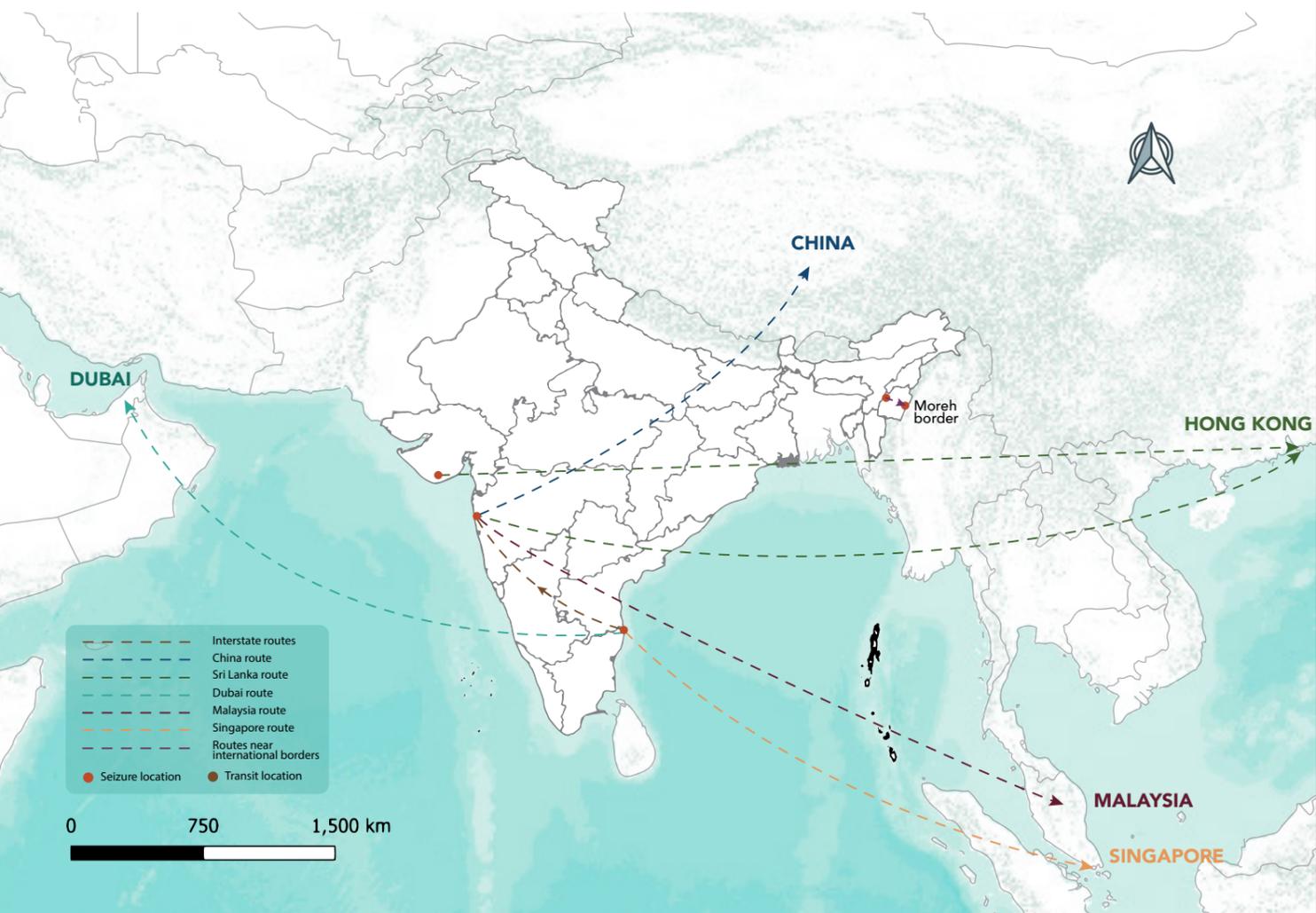
- [Chennai, Tamil Nadu to Mumbai, Maharashtra](#) (transport mode not documented), onwards [Malaysia](#) (by sea);

- [Chennai, Tamil Nadu to Mumbai, Maharashtra](#) (transport mode not documented), onwards [China](#).

Consignments recorded to be directly transported internationally were from:

- [Mumbai, Maharashtra to Hong Kong/China](#) (transport mode not documented);
- [Veraval, Gujarat to Hong Kong/China](#) (transport mode not documented);
- [Chennai, Tamil Nadu to Singapore](#) (by air)*,†;
- [Chennai, Tamil Nadu to Dubai](#) (by air).

Figure 7 : Documented shark and ray illegal trade routes recorded between 2015 - 2021.



Ambergris



Where it comes from:

Ambergris is a solid waxy substance formed in the digestive system of sperm whale.



The sperm whale feeds mainly on squid. It may produce ambergris in its interstitial tract to help the passage of indigestible parts of its prey such as the hard beaks of the squids



Sperm whales live in marine regions globally, and ambergris deposits may be found floating at sea or washed up on shores.



As ambergris ages, it develops an earthy scent and becomes more valuable

Highly prized in the perfume industry. Ambrein (an odourless alcohol extracted from ambergris) is used to make a perfume's scent last longer.

Ambergris-linked seizures were recorded in 38 incidents between 2015 and 2021 (36 incidents in 2021; one incident each in 2018 and 2019). Since this trade does not involve hunting, handling or removal of marine wildlife from its natural habitat, they were excluded from our assessment of illegal marine wildlife trade within this report. Of the 38 media-reported seizures of ambergris, 16 incidents were recorded in Maharashtra, eight incidents in Tamil Nadu, six incidents in Karnataka, five incidents in Kerala and one incident each from Delhi, Gujarat and Andhra Pradesh.

In 2021, the first seizure incident of

Ambergris was reported in April (from Chennai). Following this, a chain of similar seizure incidents of Ambergris took place throughout the year across various states. Ambergris incidents in 2021 were documented from Mumbai (eight incidents), Bengaluru (four incidents), and Thane (three incidents), among other locations. There is also a lot of ambiguity about the authenticity of the products in trade as, an [incident](#) from June 2021 reported that 2.7 kg of ambergris seized was identified as a fake product. Additionally, the accused admitted to having synthesised fake products to meet the high-value demand of the market.

DISCUSSION

The total of 187 media-reported marine wildlife trafficking incidents were recorded between 2015 and 2021. The reported incidents must be considered as an underestimate in comparison to the extent of marine wildlife trafficking in India. Collated scenarios of marine wildlife trafficking cases from media reports indicate a syndicated network of actors participating and facilitating this trade. This network consists of actors with specific roles that form a supply chain for illegal trade, such as collectors, middle agents, and traders. Reported incidents suggest that these organised networks may overlap and are not exclusive to any one particular species group, part or product. Further, we also noted incidents where terrestrial and marine wildlife parts and products were trafficked together. Marine wildlife trafficking was guided by domestic and international demand for marine parts and products. Domestically, demand for marine wildlife products originated from curio and ornamental markets, superstition and tantric uses. Whereas, international demand for marine wildlife products included those from Asian markets for traditional medicines and delicacies that may contain cultural significance. These Asian destinations may also act as transit points for trade to other parts of the world for use or consumption (as in the case of sea cucumbers that are traded as trepang, namako, bêche-de-mer, or balate).

The timeline of this study along with dependence on secondary information might not be sufficient to infer any trends in marine wildlife trafficking such as

evolving trade routes, temporal changes in trade of species, change in activities as response to policy changes, etc. It is important to recognise that data gathered from media reports, albeit representative, only focus on the enforcement aspect of marine wildlife trafficking. To gain a comprehensive understanding of marine wildlife trafficking in India, the results of this report must be interpreted along with available literature, as well as with ground-level context of fisheries, communities and governing agencies.

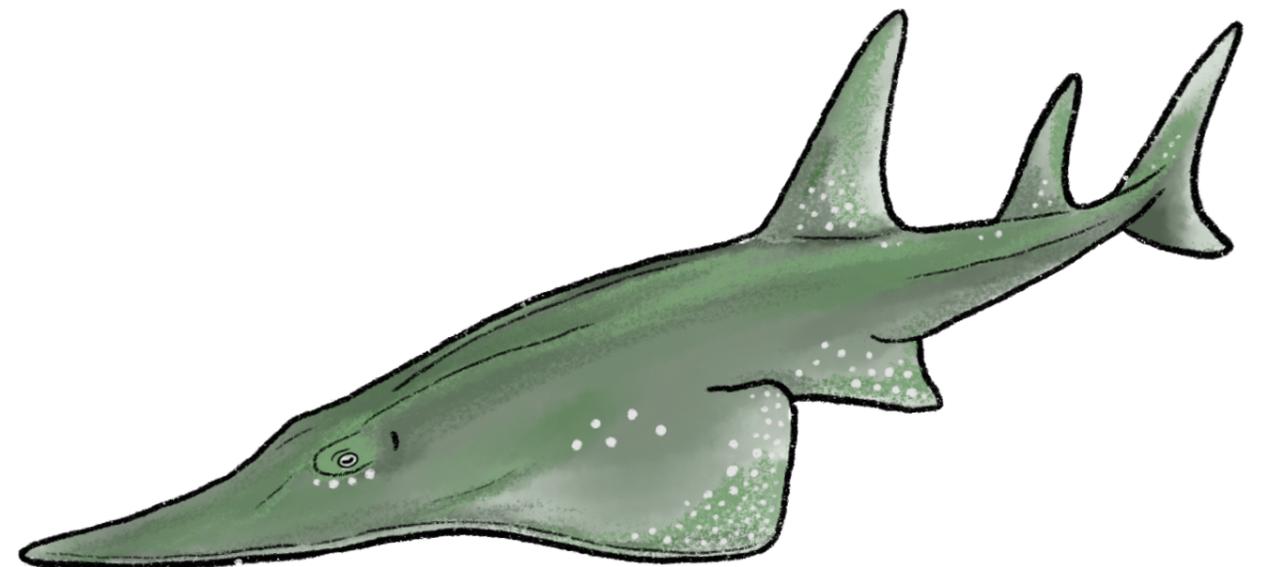
Efforts by law enforcement agencies must be complemented by policies that align with on-ground situations and account for inconsistencies between national and international laws. For example, harvest and trade for mobulid species (i.e. Manta and devil rays) and their parts are required to be regulated under CITES. However, Indian fisheries are largely unmanaged and yield high volumes of incidental catch. As a result, mobulid species - and several other marine organisms - are incidentally caught and landed at major and minor landing centres across the coastline. Irregularities in the enforcement of national and international policies in such cases allow the collection of gill rakers to continue unabated, driving a steady supply of illegal trade to neighbouring countries. Addressing the lack of management in fisheries is critical to efforts to curb marine wildlife trafficking in India.

Besides policy measures, developing effective relationships between enforcement and coastal communities is

paramount to the success of efforts that aim to mitigate illegal trade in marine wildlife. Empowering and involving fishers and other coastal communities in the decision-making process of monitoring and conserving resources can go a long way in uniting stakeholders for a larger cause. Developing models where communities manage their own resources may help control illegal marine trade or even reduce it. While developing such models and ensuring its success can be a task in itself, coastal communities are often at the centre of such activities and ensuring their support is the only way forward.

Finally, generating awareness of marine species, their parts and products that

are protected under the WLPA is essential to mitigate marine wildlife trafficking. Knowledge of protected species and their identification is limited amongst several stakeholders, including enforcement agencies. While awareness workshops with enforcement agencies and communities can be beneficial, it is equally important for consumers to be aware and hold knowledge of the legal consequences of such trade. Emergence of online trade in wildlife products is a growing concern, and receives limited attention. At a juncture where traders and consumers can freely connect across the globe, it is imperative to collaborate across a spectrum of agencies and raise awareness against illegal marine wildlife trade.



ACTOR-BASED CRIME SCRIPT TO UNDERSTAND ILLEGAL TRADE OF SEA CUCUMBERS IN INDIA

We created a partial 'Crime Script' to understand the illegal trade of sea cucumbers in India²⁴. Using 122 media-reported seizures of sea cucumbers, we identified specific steps carried out by the actors involved in sea cucumber poaching and illegal trade. Steps were identified based on secondary information provided in open-source media reports, and applied in sequential order to gain a comprehensive idea of the modus operandi. The step-wise summary of this trade has been illustrated in Figure 8.

Secondary information in open-source media reports include anecdotal notes from the confessions of the offender, testimony of the inspecting officer or officer in-charge and description of the crime or sequence of events that lead to the seizure. Sixty one media-reported incidents described secondary information on the seizure, forming data points for the Crime Script analysis. In addition, we also collected published and grey literature on Indian sea cucumber fisheries and their sale in markets around the world and used them to understand the missing information in media reports on the sale of sea cucumbers. We used this information to determine how sea cucumbers were sourced, processed, stored, transported

and sold. To identify multiple entrepôts within the supply chain, information concerning smuggling of sea cucumbers was broken down into stages, starting from collection at source and continuing until eventual export and sale outside India. In particular, we defined each stage as the following,

- Preparation: which involved planning and coordination in order to procure sea cucumbers;
- Pre-activity: which involved collection and transportation of the sea cucumbers to a warehouse for storage;
- Activity: long distance transporting (sea, land and air) the processed sea cucumbers in large quantities to other transport hubs and potential market places.
- Post activity: Arrival at markets for eventual sale of sea cucumbers for consumption or to international trading hubs

Collectively, these steps aim to give an overview of how the illegal sea cucumber trade operates in India. In addition, we also listed information gaps at each step.

Steps	Spatial	Temporal	Actors	Information gaps
STAGE: PREPARATION				
Planning and coordination to procure sea cucumbers: 1. Traders, middle agent and fishers communicate in anticipation of the next consignment of sea cucumbers OR Traders communicate the demand for new consignment of sea cucumbers	Coast, Sea cucumber habitats	Unknown	Fisher(s) Middle agent(s) Trader(s)	First contact between trader(s) and/or middle agent(s) and fishers Preferable time and location to collect sea cucumbers
STAGE: PRE ACTIVITY				
Collection and transportation of the sea cucumbers to warehouse for storage: 2. Fishers collect sea cucumbers from suitable sea cucumber habitat (this can be targeted collection or incidental catch) 3. Fishers contact middle agent(s) after collecting sea cucumbers 4. Middle agent(s) obtain sea cucumbers from fishers, transporting the contraband to a warehouse via vehicles (rickshaw/tempo/car) 5. Middle agent process (which include de-gutting, boiling and drying) sea cucumbers 6. Middle agent(s) collate small consignments of sea cucumbers; Stockpiling them in barrels/gunny bags in a warehouse	Sea cucumber habitats, Coast Warehouse(s)	Unknown	Fisher(s) Middle agent(s) - Transporter(s) - Processing agent(s)	Fishing gears/equipment used to capture sea cucumbers The percentage of targeted collection (handpicking) versus incidental catch through nets. The preferred species of sea cucumbers caught Information on if sea cucumbers are consumed or sold locally for consumption The location of the warehouse The owner of the warehouse The location(s) used for processing, drying and storing sea cucumbers, whether they are carried out at same or different places

STAGE: ACTIVITY				
<p>Transporting the processed sea cucumbers across borders to other trading hubs and potential market places in large numbers:</p> <p>7. Traders contact middle agents, confirm transport and route</p> <p>8. Middle agent(s) then transport sea cucumbers by road to another location (no specified mode of transport)</p> <p>9. After reaching another district, traders attempt to transport sea cucumbers via sea-routes into international waters OR Trader attempts to transport sea cucumbers via air route</p>	Warehouse(s) Processing unit(s)	Unknown	<p>Trader(s), Middle agent(s) - Stockpiler(s) - Processing - Transporter(s)</p>	<p>The percentage of live sea cucumbers versus processed sea cucumbers transported at this stage</p> <p>The route to transport sea cucumber via road towards port</p> <p>Ports used for transporting consignments into international trade (sea, land and air) Exit points used</p> <p>In order to export sea cucumbers, do Indian boats enter international waters or foreign boats enter Indian waters</p> <p>The exchange of sea cucumbers mid-waters via boat</p> <p>Export companies involved in sea cucumber trade</p>
STAGE: POST-ACTIVITY				
<p>Arrival at markets for eventual sale of sea cucumbers for consumption or to international trading hubs:</p> <p>10. Sea cucumber consignments arrive at countries for further transport and/or to market places such as Sri Lanka, Myanmar, Malaysia, Hong Kong, China</p>	International market(s) (Southeast Asia)	Unknown	<p>Transporter(s) International Trader(s) Customer(s)</p>	<p>In order to export sea cucumbers, do Indian boats enter international waters illegally or vice versa. Is there an exchange of sea cucumbers mid waters via boat</p> <p>Export companies involved in sea cucumber trade</p> <p>The location of international market places</p> <p>Updated market price of bêche-de-mer in international trade</p>



Figure 8 : Actor-based crime script to understand illegal trade of sea cucumbers in India.



In image: Sea Fan (*Gorgonia* sp.) Photo: Vardhan Patankar

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