GIANT CLAM SHELLS, IVORY, AND ORGANISED CRIME: Analysis of a potential new nexus

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Executive Summary

For millennia, giant clams have provided a source of subsistence meat for coastal communities across the Asia and Pacific regions. However, during the past 50 years, the sharp growth in commercial harvesting and illegal poaching of clams as a high-value luxury food, live clams for the international aquarium trade, and shells for the ornamental carving industry has driven the overexploitation and rapid decline of giant clam populations throughout much of their range.

In response to the surge in international commercial trade, all giant clam species are listed in Appendix II under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and are protected by national legislation in most range countries. The world’s largest giant clam species, T. gigas is the most threatened, with about half of its wild populations either severely decimated or locally extinct at some sites.

Despite these protections, large-scale poaching and illegal trade of giant clams continue to pose a serious threat, and a series of high-volume seizures of shells in the Philippines during the past three years suggests there could be a shift in the criminal dynamics behind this trade.

Analysis of satellite imagery in 2016 identified that more than 104 km² of coral reefs in the South China Sea had been destroyed as a direct result of giant clam poaching, equivalent to almost 20,000 football fields. If this criminality is left unchecked, this widespread coral reef destruction could have a significant impact on the viability of fishing grounds in these waters as well as broader impacts for biodiversity loss and ocean health.

Open-source research conducted by the Wildlife Justice Commission found that Philippine authorities made at least 14 seizures of giant clam shells since 2016, with all but one of these cases occurring since 2019. The seizures had a combined weight of 120,639 tonnes and a total estimated value of more than USD 85 million. Most of the cases involved shells that were being stockpiled at coastal locations in Palawan, the westernmost province of the Philippines, in open spaces with little or no concealment. Given the high-volume discoveries and the locations in question, Philippine authorities believe a larger organised crime group is behind the development of the stockpiles, which were intended to be smuggled out of the country by boat. Although so far, the only arrests made have been of local individuals implicated in several of the incidents.

China is the primary suspected destination of the giant clam shell stockpiles, while Japan could be a potential secondary location of concern. However, no direct linkages have been identified yet from the Philippines seizures to either of these countries.

In China, giant clam shells are used in the carving industry to create an array of products such as statues, jewellery, and ornaments, which sell for high values on the Chinese market. Once carved, the translucent white shells are said to resemble ivory, and it has been reported that giant clams may have become a substitute material for elephant ivory, for which the global trade is strictly regulated and domestic trade within China has been banned since the end of 2017. Japan also has an active carving industry and market for giant clam shells, although little is known about it.

The Wildlife Justice Commission’s research found that China was the only country other than the Philippines to have reported giant clam shell seizures in the period since 2016. It was identified that at least 46 seizures were made in China relating to the smuggling or illegal trade of giant clam shells. Only two of these cases related to large quantities of raw shells, while all other cases involved smaller, retail-level quantities of shells and shell crafts.

The reported seizures in China indicate a high rate of convergence of giant clam smuggling and trade alongside other wildlife species, with almost half of the seizures (22 cases) involving parts or products from multiple species. Of particular concern is that 17% of all cases involved carved clam shell products seized with carved elephant ivory and other types of ivory or ivory-like products, including mammoth ivory and narwhal ivory. This convergence could suggest that the same criminal groups are involved in the illegal trade of both commodity types in China. However, the most frequent convergence observed in the seizures was of giant clam shells with other marine products, particularly hawksbill turtle shell crafts.

6 www.wildlifejustice.org

1 https://www.sciencedaily.com/releases/2017/12/171211120442.htm
2 http://www.gov.cn/zhengce/content/2016-12/30/content_5155017.htm
4 http://www.gov.cn/zhengce/content/2016-12/30/content_5155017.htm

Image 1 and Cover photo: Gongbei Customs seized statue mask from giant clam shells, June 2017. Credit: China Customs.

Image 2: A dragon carved from a giant clam shell. Credit: C. Larson.

Image 3: Men upload giant clam shells at a dock in Tanmen, Hainan province, China in April 2013. Credit: Chen Xuelun/IC.
The United Nations Convention against Transnational Organised Crime (UNTOC) defines organised crime by the nature and motivation of the group that commits the act, rather than by the specific types of crime committed. The criteria are: a structured group of three or more persons; that exists for a period of time; and acts in concert with the aim of committing at least one serious crime; to obtain, directly or indirectly, a financial or other material benefit.

While there are uncertainties about the true extent of the illegal retail market for giant clam shell crafts in China, the small volume of crafts evidenced in the seizures could potentially point toward a speculative investment strategy around the raw shells.

Although the Philippines cases represent just one quarter of the total number of reported seizures, the weight of the associated contraband corresponds to 99% of all giant clam shells or carved shell products seized during this period. The Wildlife Justice Commission is concerned that the high volume of shells in the Philippine seizures could indicate the possible involvement of organised crime, due to the level of logistics, organisation, and finance required to coordinate the collection and transportation of such vast quantities of product. Furthermore, the low level of detection of significant quantities of contraband outside of the Philippines suggests that this trade is largely being conducted with impunity.

From this research, the Wildlife Justice Commission has identified a number of key intelligence gaps that should be further investigated to enable a full assessment of the threat posed by the giant clam shell trade. These include:

- **The movement** of the raw contraband along the smuggling chain remains almost completely undetected.
- **Despite suggestions** that China and Japan are the potential destinations for the shell stockpiles, no smuggling routes to either country have been identified.
- **Many questions** remain unanswered about the modus operandi and current consolidation and processing locations.
- **There is almost no information** on the criminal drivers and enabling factors behind the stockpiling phenomenon.
- **The extent and nature** of the role of corruption in the illegal harvest and trade of giant clams is unknown.
- **The true extent and value** of the illegal retail market for giant clam shell products in China (and legal market in Japan) is unknown.

It is known that criminal networks are highly adaptive and can rapidly shift to new commodities or modus operandi in response to strengthened law enforcement efforts or new opportunities. Therefore, it is important that law enforcement authorities in the implicated countries conduct further investigations of this emerging trend to better understand the factors that are driving the surge in the illegal giant clam shell trade and its potential nexus with organised crime. To assist in this regard, the following key issues are highlighted for consideration by the relevant authorities in China, the Philippines, and Japan:

1. **More research** is required to address the intelligence gaps listed above and fully assess the level of threat in the giant clam shell trade, in order to implement an appropriate, targeted, and commensurate law enforcement response.

2. **Physical and online markets** in China provide potential entry points for further investigation and engagement with the trading networks to gather intelligence.

3. **Intelligence analysis** and special investigative techniques should be utilised to develop the intelligence picture and examine the potential role of organised crime.

4. **It is important** to assess the extent of the risk posed by the possible use of giant clam shells as a substitute for ivory, the effect that the sustained trade in ivory substitute materials could have in perpetuating demand for elephant ivory, and the ongoing threat this may pose to elephants in the long term.
Although large-scale poaching and illegal trade of giant clams has occurred for several decades, the recent commercial-scale seizures of shells in the Philippines presents a new cause for concern. The largest seizure to date was reported in October 2019, consisting of 120,000 tonnes of shells with an estimated value of USD 39 million. It took place in General Santos City, the southernmost city of the Philippines on the island of Mindanao, which has a large fishing port and international seaport, and is centrally located in the Coral Triangle marine area. Philippine authorities have made at least another nine major seizures of shells since then, almost all in Palawan, the westernmost province situated between the South China Sea and the Sulu Sea. These seizures involved significant stockpiles of shells in strategic locations, and it is believed they were intended to be smuggled out of the country by boat.

The Philippines' seizures have drawn the attention of the Wildlife Justice Commission as they indicate the possible involvement of organised crime, due to the level of logistics, organisation, and finance required to coordinate the collection and transportation of such vast quantities of product. As such, the Wildlife Justice Commission commenced the following research based on open-source information with a view to understanding some of the factors that may be driving the surge in the illegal clam shell trade.

Apart from the Philippines, the only other country that was found to have reported giant clam shell seizures was China. During the period from January 2016 to July 2021, China reported at least 46 cases relating to smuggling and harming giant clam shells, including illegal transportation, purchase, or sale. However, 96% of these cases involved small, retail-level quantities of shells and shell crafts, and only one case was found to be linked to the Philippines.

The majority of giant clam shells in China are believed to have been sourced from coral reefs in the South China Sea, and notwithstanding geopolitical tensions in this region, until now it could have been viewed as a “domestic issue” involving Chinese fishing fleets in the illegal harvesting of shells for the Chinese market. However, the recent seizures in the Philippines present the possibility that the trade may have taken on a transnational crime dimension.

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Image 5: A National Bureau of Investigation agent inspecting the giant clam stockpile seized at General Santos City, October 2019. Credit: Jun Pulido.

Although the Philippines cases represent just one quarter of the total number of reported seizures identified during this period, the weight of the associated contraband corresponds to 99% of all giant clam shells or carved shell products seized during this period. The potential involvement of organised crime groups in the giant clam shell trade and the lack of major seizures occurring in locations other than the Philippines raises many questions that require further investigation to uncover the full extent of criminality, the smuggling routes, modus operandi, and the key facilitators behind the supply chain.

Organised criminal networks are agile and have the resources to quickly adjust to new environments. Crime displacement can occur as organised crime groups adapt to strengthening law enforcement efforts, find new loopholes or weaknesses to exploit, or as demand for new commodities or opportunities for profits present. As such, it is vital that emerging trends are investigated and closely monitored to understand the criminal dynamics that may be at play behind it.

Giant Clams - Fast Facts

- They are the world’s largest shellfish.
- There are 12 giant clam species.
- The largest species *Tridacna gigas* can measure up to 1.3 m long and weigh up to 225 kg.
- Giant clams build and shape reefs, filter water, and provide food and shelter for other reef creatures.
- They are hermaphroditic, but not self-fertilising – they depend on other individuals in their proximity to reproduce.

Giant clams are native to the tropical waters and shallow coral reefs of the Pacific Ocean, Indian Ocean, South China Sea, and the Red Sea. There are 12 known giant clam species of varying geographical ranges, with the highest diversity of species occurring in the Coral Triangle marine area, which includes the waters of Indonesia, Malaysia, the Philippines, Papua New Guinea, Timor-Leste, and the Solomon Islands.\(^7\)

Harvesting giant clams has been a traditional activity of coastal communities across the Asia and Pacific regions for thousands of years, with the soft clam body a source of subsistence or ceremonial food and the large shells a useful material for a range of purposes. Due to their abundance, shallow distribution, and immobility, it was relatively easy to collect them.

Giant clam harvesting for commercial purposes and illegal offtake by long-range foreign vessels increased dramatically during the 1970s as new markets developed, rising demand for the meat as a high-value delicacy in parts of East Asia and Europe, live giant clams for the international aquarium trade in Europe, United States, Australia, and Japan, and more recently, shells for the ornamental carving industry in China.\(^8\) This has resulted in the overexploitation of giant clams and declining populations throughout much of their range.

The most sought-after species in trade are the true giant clam *Tridacna gigas* (see Image 6), southern giant clam *Tridacna derasa*, fluted giant clam *Tridacna squamosa*, and the maxima clam *Tridacna maxima*. The world’s largest giant clam species *T. gigas* is the most threatened, with about half of its wild populations either severely decimated or locally extinct at some sites.\(^9\)

\(^9\) [https://www.sciencedaily.com/releases/2017/12/171211120442.htm](https://www.sciencedaily.com/releases/2017/12/171211120442.htm)
In response to the surge in international commercial trade of giant clams, in 1983 two species (T. gigas and T. derasa) were listed in Appendix II under CITES. Two years later the listing was expanded to the whole Tridacnidae family (now classified as the Tridacninae subfamily), covering all known giant clam species. However, enforcement of CITES’ regulations for giant clams has been impeded in the past because some major players which were heavily involved in the giant clam trade, such as Taiwan and the Maldives, were not CITES Parties. Another issue is that CITES regulations apply to international trade, but not to local collection and domestic trade within a country, which can also occur at significant levels.

Giant clams are now protected by national legislation in most range countries. Although commercial exploitation of wild stocks is widely banned and various management efforts are being implemented such as the development of mariculture programmes, harvesting quotas and restricted fishing methods, large-scale poaching and illegal trade continue to pose a serious threat.

Open-source research indicates that Philippine authorities have made at least 14 seizures of giant clam shells since 2016, 13 of which occurred in the last three years. The seizures had a combined weight of 120,639 tonnes and a total estimated value of more than USD 85 million (see Figure 1 below). The Wildlife Justice Commission notes that there appears to be a lot of variation in size, quality, and price of giant clam shells in the reported cases, and it is suspected that the real value of these seizures could be even higher.

Among these cases, reported volumes ranged from one tonne to 120,000 tonnes, and eight of the 14 seizures took place in Palawan. Since the size and weight of the shells varies significantly depending on the giant clam species and its age, it is not possible to calculate the actual number of shells seized. No giant clam shell seizures were found to be reported in the Philippines in 2016 or 2018, and only one confiscation of four shells was reported to have occurred in 2017 in Manila. As such, the data indicates a sharp rise in illegal harvesting – or at least its detection, thanks to tip-offs – since 2019.

Recent surge in high-volume seizures in the Philippines

![Figure 1: Giant clam shell seizures in the Philippines reported between January 2016 – July 2021.](https://www.wildlifejustice.org)

<table>
<thead>
<tr>
<th>Year</th>
<th>Weight (kg)</th>
<th>Units</th>
<th>Reported value (USD)</th>
<th>Seizure location</th>
<th>Particularities</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017</td>
<td>4</td>
<td>2,005,671</td>
<td>Manila</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td>3,000</td>
<td>993,243</td>
<td>Cagayan de Oro City, Misamis Oriental</td>
<td>Foreign buyers</td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td>2,000</td>
<td>744,880</td>
<td>Cordova, Cebu</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019</td>
<td>120,000,000</td>
<td>39,690,760</td>
<td>General Santos City, South Cotabato</td>
<td>Stockpiling</td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>144,000</td>
<td>5,958,033</td>
<td>Balabac, Palawan</td>
<td>Stockpiling in coastal location</td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>25,000</td>
<td>517,103</td>
<td>Bulukuyan, Palawan</td>
<td>Stockpiling in coastal location</td>
<td></td>
</tr>
<tr>
<td>2020</td>
<td>1,000</td>
<td>744,880</td>
<td>Taitay, Palawan</td>
<td>Small clams, stockpiling in coastal location</td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>90</td>
<td>2,005,671</td>
<td>El Nido, Palawan</td>
<td>Stockpiling in coastal location</td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>80,000</td>
<td>3,310,966</td>
<td>Johnson Island, Palawan</td>
<td>Stockpiling in coastal location</td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>10,000</td>
<td>1,034,377</td>
<td>Bayawan City, Negros Oriental</td>
<td>Stockpiling</td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>16,467</td>
<td>1,173,066</td>
<td>Narra, Palawan</td>
<td>Stockpiling at a residence</td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>200,000</td>
<td>24,800,000</td>
<td>Sitio Green Island, Palawan</td>
<td>Stockpiling in coastal location</td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>150,000</td>
<td>5,071,150</td>
<td>Kini’s Paradise Island, Palawan</td>
<td>Stockpiling in coastal location</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>120,639,467</td>
<td>USD 85,218,249</td>
<td>USD 85,218,249</td>
<td>USD 85,218,249</td>
<td></td>
</tr>
</tbody>
</table>
Most of the seizures were shells that were being stockpiled at coastal locations in Palawan, in open and apparently public spaces with little or no concealment. Palawan is the only place in the Philippines where scientists have observed *T. gigas* clams in the wild, which along with Palawan’s geographically remote location and access to the South China Sea, could account for it being a major stockpiling location. One report in December 2020 indicated that 144 tonnes of shells had been buried at 27 different locations along the beach in Balabac, Palawan.\(^\text{13}\) It was reported that another stockpile of 80 tonnes of shells seized at Johnson Island, Palawan in March 2021 would likely have taken between six months to one year to amass.\(^\text{14}\) The published images of these stockpiles show predominantly large shells which appear to be semi-fossilised. Two seizure reports explicitly refer to the semi-fossilised state of the specimens.

Given the high-volume discoveries and the locations in question, Philippine authorities believe a larger organised crime group is behind this series of seizures. Authorities have stated that organisers are recruiting local people to illegally collect the shells and build stockpiles at coastal locations in Palawan, in some cases with the supervision of village officials. They say the organisers are deceiving locals by claiming they have government permits to trade in the shells. Middlemen return later to make the payment and collect the shells, which are likely smuggled out by boat. The prevalent market value of giant clam shells in the Philippines is reportedly around PHP 2,000/kg (equivalent to approximately USD 40/kg).\(^\text{15}\)
Many of the Palawan seizures have been made as part of a series of joint operations responding to tip-offs, involving police, marine troops, the coastguard, and conservation officers. This shows the level of seriousness the Philippine authorities are giving to this issue. Law enforcement has successfully arrested multiple individuals implicated in several of the seizures, but so far only locals have been linked to these operations. References to buyers are made without clues to their nationality or a concrete destination for the contraband. Authorities have not publicly stated their hypothesis, but intelligence suggests that China could be the end market for the shells.

**Legal status of giant clams in the Philippines**

In 2001, seven species of giant clams found in Philippine waters were included in the list of rare, threatened, and endangered aquatic species (Fisheries Administrative Order No. 208): *Tridacna gigas, T. derasa, T. squamosa, T. maxima, T. crocea, Hippopus hippopus,* and *H. porcellanus.*

Under Section 102 of the Philippine Fisheries Code of 1998, as amended in 2015, it is an offence to fish or take, catch, gather, sell, purchase, possess, transport, export, forward, or ship out, rare, threatened, or endangered aquatic species. Criminal convictions are punishable by imprisonment of between 12 and 20 years, as well as a fine, forfeiture of the products, and the cancellation of any fishing permits.

**The giant clam** has been referred to as the “king of all shells”, “the jade of the sea”, and the “white gold of the sea”. It has long been valued in China, especially by Buddhists, who regard carvings or prayer beads made from the shells as auspicious.

**Large-scale commercialisation** of the giant clam shell carving industry in China began in the 1990s, when the first processing companies appeared in Tanmen, mainly specialising in Buddhist beads. Tanmen is a fishing village situated on the southeast side of Hainan Island – the southernmost province of China – on the shores of the South China Sea. The coral reefs of the South China Sea are believed to be the primary source of giant clam shells for China’s carving industry.

Decades ago, fishermen captured giant clams for their meat and dumped the shells into the sea afterward. It has been reported that most fishermen knew where to find these abandoned shells to supply the carving industry, and that the shells of long-dead clams that have been hardened from spending years buried in the seabed are preferred as they are more suitable for processing. The translucent giant clam shells resemble ivory when carved, and it is reported that Chinese craftsmen turned to the shells as an alternative medium to keep the lucrative carving industry going, with large shells carved into sculptures and medium-sized shells used for beads and jewellery products. However, as demand escalated sharply in the 2000s, fishermen turned to illegal methods to poach giant clams directly from coral reefs, such as dredging and drilling techniques and using boat propellers and anchors to break

**Image 8:** An artisan carves a design on a giant clam shell in Tanmen, Hainan province, August 2015. Credit: Meng Zhongde/IC.

**Image 9:** Giant clam carving illegally sold in Putian, Fujian province, February 2019. Credit: Zhao Xinyi.

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18 https://www.lawphil.net/statutes/reports/ra2015/ra_10654_2015.html
19 http://www.budaedu.org/budaedu/buda2_11.php - The giant clam is listed as one of the Seven Holy Treasures in Buddhism. The origin of the name of giant clam shells in ancient Chinese (大砗磲 - Da Che Qu) means “big horse carriage wheels”, as the surface of the shells is so large and rough that it was said to resemble the bumpy grooves of horse carriage wheels.
the reefs and release the clams. It is reported that as the shell handicraft industry flourished in Tanmen, vast quantities of giant clams were extracted intensively from reefs across the South China Sea.

By the mid-2000s, Tanmen was the epicentre of the trade, attracting craftsmen from other Chinese provinces who carved the shells with more intricate designs and created products that could sell for much higher prices. As the industry and profits grew, Hainan fishermen and traders who had been working in the industry for years, saying it gave them little time to clear their stock and transition into other livelihoods.

The explosion of the carving industry was likely influenced by a combination of factors, including the strict regulation of the global trade of elephant ivory, improved carving tools and techniques, increasing domestic tourism in China and the growth of e-commerce. On top of this, China introduced a domestic ban on elephant ivory trade which came into effect at the end of 2017 and the strict enforcement of this ban could potentially be driving a new increase in the trade of ivory substitutes, such as giant clams.

Analysis of satellite imagery in 2016 identified that more than 104 km² of coral reefs in the South China Sea had been destroyed as a direct result of giant clam poaching, equivalent to almost 20,000 football fields. If this criminality is left unchecked, this widespread coral reef destruction could have a significant impact on the viability of fishing grounds in these waters as well as broader impacts for biodiversity loss and ocean health. Between 2016 and 2018, ongoing monitoring of the satellite imagery indicated a sharp drop-off in giant clam poaching activity in the South China Sea, likely related to geopolitical tensions in the region. However, it is alleged that a new influx of clam harvesting boats have returned since 2018. While heavy exploitation has devastated many of the reefs and significantly depleted giant clam populations in the South China Sea, the possibility could emerge that additional or new sources of shells may need to be sought to continue supplying the industry.

In response to international and environmental pressures, in January 2017 the Hainan Province People’s Congress passed new regulations that effectively banned the commercial trade of all 10 *Tridacna* species in Hainan. The ban drew criticism from local fishermen and traders who had been working in the industry for years, saying it gave them little time to clear their stock and transition into other livelihoods.

Two years later in 2019, investigators discovered that there were still more than 100 craft shops in Tanmen, although less than 20% of them remained in business. Giant clam shell products were found to be available in secret backrooms of many of the shops and could be ordered on social media platforms such as WeChat for delivery to other locations. Furthermore, in 2019, hundreds of stores were found to be openly selling giant clam shell products in other parts of Hainan Province such as Haikou and Sanya, and further afield in Guangdong and Fujian provinces, with the products believed to have originated from Tanmen. These reported findings show how the illegal giant clam shell trade persists in China in a covert manner with one clear supply area.

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Legal status of giant clams in China

From 1989 up to 2021, Tridacna gigas had been the only giant clam species protected under Chinese law, listed as a Level I protected species on the National Key Protected Wildlife List. Following a major update, in February 2021 five additional giant clam species were added to the list as Level II protected species: T. derasa, T. squamosa, T. maxima, T. crocea, and Hippopus hippopus.31

Under China’s Wildlife Protection Law, Level I protected species cannot be traded under any circumstances, while Level II species are protected and can only be traded with a permit, which can be issued at provincial government level. The law prohibits selling, purchasing, and utilising national protected wildlife and the products made thereof, including through online platforms. Exceptions are given to scientific research, captive breeding, exhibitions, and other special circumstances, in which cases strict permitting rules are established.

According to China’s Criminal Law, harming precious and endangered wildlife and the products made thereof, such as illegally purchasing, transporting, or selling, can result in five years imprisonment and a fine, five to 10 years imprisonment and a fine if the situation is deemed to be serious, or more than 10 years imprisonment and a fine if the situation is especially serious. An individual can also be sentenced to life in prison for smuggling precious wildlife and the products made thereof, if a judge considers the situation to be extremely serious.32

On 1 January 2017, the Hainan Province People’s Congress passed the ‘Regulations on the Protection of the Coral Reef and Tridacna in Hainan Province’, covering all Tridacna species listed in the National Key Protected Wildlife List (only T. gigas at that time) and CITES (10 Tridacna species under Appendix II). The regulations prohibit digging, fishing, selling (including on e-commerce platforms), purchasing, using, and transporting these giant clam species and any products made thereof. The regulations effectively introduced a total ban on the commercial trade of giant clams in Hainan Province, with violations punishable by a fine of two to five times the value of the product involved. Criminal violations may be prosecuted under the Criminal Law.

Analysis of giant clam shell seizures in China

In the period from January 2016 to July 2021, analysis of open sources33 identified 46 seizures reported in China relating to smuggling or harming giant clam shells, including illegal transportation, purchasing, or selling. Of these cases, 21 seizures involved raw giant clam shells, 19 seizures involved carved shell products, and six cases were mixed seizures of both raw shells and carved products. The following analysis of the reported seizures in China can provide a limited picture of some aspects of the trade, but further investigation is needed to identify the trafficking routes and modus operandi of the giant clam shell supply chain.

China reported seizures of giant clam shells or shell products every year in the research period, as illustrated in Figure 3. The number of seizures spiked sharply from six cases in 2018 to 18 cases in 2019, before decreasing in 2020 to 10 cases. This spike appears to be due to a larger number of cases of illegal trade of giant clam shells or shell craft, or the detection of it, compared to previous years. It is possible that this could be the result of increased monitoring and enforcement efforts as a follow on from the enforcement of China’s ivory trade ban. There was a relative decline in reported cases in 2020, which could be a consequence of the restrictions and changed dynamics related to the COVID-19 pandemic, but the number of seizures relating to illegal trade was still high compared to the years 2016-2018.

Although China is a suspected destination of the giant clam shell stockpiles in the Philippines, there have not been any corresponding reports of significant clam shell seizures in China during the same period that could indicate supply chain leaks, and currently only minimal intelligence has been identified that presents a linkage between the two countries. Only two of China’s 46 cases relate to large quantities of shells, while 96% (44 cases) relate to smuggling and illegal trade of smaller, retail-level quantities of shells and shell crafts. Open-source research was also unable to identify any major clam shell seizures made by other countries. The low level of detection of significant quantities of contraband outside of the Philippines suggests that this trade is largely being conducted with impunity.

Sources included convictions recorded on the Chinese Judgements Online official service (https://wenshu.court.gov.cn/) and media reports.

In this chart, illegal trade refers to seizures that involved the illegal transportation, purchase, or sale of giant clams within China. Smuggling refers to seizures that were made upon the detection of giant clam shells or shell products entering China at a border point.
Giant clam shell seizures have been reported in almost every province along China’s east coast, with 41% of seizures taking place in Guangdong province (19 cases), and most of these were in the major cities of Guangzhou and Shenzhen. This was followed by Guangxi Zhuang Autonomous Region (five cases), all of which were giant clams that had been smuggled across the border from Vietnam into China. Only four seizures were reported in Hainan province during the period, despite it being the epicentre of the clam shell carving industry and the provincial ban on giant clam trade enacted since 2017.

Figure 4: Reported locations of giant clam shell seizures in China from January 2016 to July 2021.35

Note: The map identifies 49 locations for 46 cases, as two cases involved multiple seizure locations.

SMUGGLING ROUTES AND METHODS

Almost half of the reported seizures (20 cases) involved the smuggling of raw giant clam shells or shell products into China. Six of these cases were smuggled by air transport, either as air cargo or hand-carried in passenger luggage; five cases were reported to be smuggled by boat or ship, including two cases that were hand-carried in the luggage of cruise ship passengers; four cases used vehicles to smuggle products across land borders; and three cases were detected in international postal parcels. In two cases the transportation method was not specified.

Only a few smuggling cases showed clear links to locations outside of China. Of these, six cases were linked to Vietnam, two to Japan, and one to the Philippines. While these cases may provide some indication of potential entry points and smuggling routes of giant clams into China, at this stage they are too few and small to be considered meaningful.

Only two cases comprised substantial volumes of contraband. In July 2018, a shipment of 2,094 raw giant clam shells was seized from a Chinese fishing vessel at Tanmen fishing port, Hainan province. The boat captain had allegedly seized the contraband from a Vietnamese vessel that had been intercepted at Xisha North Reef in the South China Sea, with the intention of selling the shells in Tanmen. The case was prosecuted.

Image 13: Giant clam shells are unloaded from a boat in Tanmen, Hainan province, April 2013. Credit: Chen Xuelun/IC.

Figure 5: Smuggling methods of raw giant clam shells or shell products into China from January 2016 – July 2021.
in June 2020 and the boat captain sentenced to three years imprisonment and fined RMB 30,000 (USD 4,625). Authorities reported the value of the shipment to be RMB 628,000 (USD 96,825). The source of the shells was not confirmed, but it is likely they were poached from reefs in the South China Sea.

In the second significant case, police seized 200 kg of carved clam shell products (jewellery and ornaments) from a shop in Xianyou, Putian City, Fujian province in May 2021. The seizure led police to identify the processing factory that had supplied the products in Qionghai City, Hainan province. A further 1,300 kg of raw giant clam shells was seized at the factory. Six suspects have been arrested in relation to this case. This seizure occurred following China’s expanded legal protection for an additional five giant clam species, and it is the only case reported during the research period in Fujian province, where an important retail market is believed to exist. Along with the further investigation to identify the processing factory, this could indicate that Chinese law enforcement may be increasing its focus on this issue. The significant seizure of raw shells from the factory also suggests that the supply of shells to the carving industry in Hainan has not stopped, despite the enhanced regulations introduced in 2017.

Several seizures in Dongxing City, Guangxi Zhuang Autonomous Region indicate that smaller volumes of giant clam shells have entered China from Vietnam, both by boat at Dongxing’s wharf and overland by vehicle. For example, a seizure of 26 large raw giant clam shells was made in September 2018, when two Chinese subjects were caught transporting the shells by tractor from Jiujiehe Wharf to an unspecified logistics company for onwards transportation in China. They had been recruited by a third Chinese subject, who was allegedly working for an unknown Vietnamese suspect. All three Chinese subjects were prosecuted and in March 2019 sentenced to two years imprisonment (suspended for two years) and fined RMB 20,000 each (approximately USD 3,076).

However, the general lack of large seizures of raw giant clam shells in the past six years specifically within China, whether harvested by Chinese fishing fleets in the South China Sea or those that may potentially be smuggled by vessel from the Philippines or elsewhere, indicates that shipments are not being detected upon arrival in China or during their distribution once successfully smuggled into the country.

Significant seizure of giant clam shells in 2014

A significant seizure of 250 tonnes of giant clam shells occurred in August 2014, although it took place prior to the research period and has not otherwise been included in the analysis for this report. The Hainan coast guard made the seizure after stopping and inspecting a Chinese ship near the north of Zhongjian Island in the South China Sea. The captain was charged with illegally transporting the shells without a permit, and in November 2018 was fined RMB 1,120,500 (USD 172,344) based on three times the estimated value of the shipment (RMB 373,500, equivalent to approximately USD 57,448). The captain attempted to appeal the case on the grounds that the shipment was not clam shells but “fossils”, and there was no evidence that they were intended for sale, but the court dismissed the appeal. The case is noteworthy due to it being the only example of a large volume seizure that China has previously made, which is on par with the size of the more recent Philippine seizures.

CONVERGENCE WITH OTHER WILDLIFE PRODUCTS

The reported seizures in China indicate a high rate of convergence of giant clam smuggling and trade alongside other wildlife species, with almost half of the seizures (22 cases) involving parts or products from multiple species.

Of particular concern are eight seizures (17% of all cases) that involved carved clam shell products with carved elephant ivory and other types of ivory or ivory-like products, including mammoth ivory, narwhal ivory, and unspecified “whale tooth.” Two of these cases also involved rhino horn products and helmeted hornbill casques. The convergence observed in these eight cases suggests that the same criminal groups are involved in the illegal trade of both commodity types in China. It is not clear from these cases whether the convergence could indicate that the market for other ivory-type products could potentially be used as a cover to launder elephant ivory products in China, or whether the market preference could be shifting to ivory substitute materials due to the strict enforcement of the ivory trade ban, but this hypothesis is further discussed in the section on ‘Japan as a potential location of concern’.

Six of the eight seizures occurred after China introduced the ban, which could indicate these cases may have been detected as part of China’s efforts to crack down on ivory trade. It is also noteworthy that two of the cases involved sourcing giant clam shell and elephant ivory products from Japan, which has a legal domestic ivory market, and then smuggling them into China for illegal trade. These two cases are further described in the section below on ‘Japan as a potential location of concern’.

The most frequent convergence in the seizures was giant clam shells with other marine products, such as dried seahorses. Credit: A. K. Y. Wan.

The products were allegedly smuggled from Vietnam to China via an unofficial border crossing, and in March 2019 transported via SF Express courier service to addresses in Guangdong and Anhui provinces. Law enforcement raids at these addresses resulted in the arrest of three suspects and the seizure of a total of 44,691 dried seahorses (87.15 kg) and 1,815 dried sea-dragons (11.8 kg), along with giant clams, other shells, and suspected sea catfish. All three suspects were convicted in June 2020 and issued with penalties of 10 years imprisonment and confiscation of RMB 1 million (USD 154,237), six years imprisonment and RMB 300,000 fine (USD 46,771), and 3.5 years imprisonment and RMB 150,000 fine (USD 23,135).

The convergence is of interest in this case, as two countries that are known to be major sources in the illegal seahorse trade - Vietnam and the Philippines - also have suspected links to China for giant clam smuggling. Along with the various other cases involving hawksbill turtle products, corals, and other seashells, this could point to a potential convergence in the supply chain for marine products, such as source locations and/or smuggling routes. This hypothesis aligns with findings from the Wildlife Justice Commission’s own investigations, which have identified many wildlife trafficking networks dealing in a multitude of species that converge at common nodes such as key facilitators and smuggling points.

Image 15: Giant clam shells carved into an array of ornaments and jewellery, including imitation elephant ivory tusks - Tanmen, August 2016 Credit: Mei Lin Neo.

Image 16: The most frequent convergence observed in the seizures was giant clam shells with other marine products, such as dried seahorses. Credit: A. K. Y. Wan.

https://wenshu.court.gov.cn/website/wenshu/181107ANFZ0BXSK4/index.html?docId=98031f00b01d4c3a9e5ac2d00311ea7

https://news.mongabay.com/2019/03/seahorse-trade-continues-despite-export-ban-study-finds/
THE USE OF SOCIAL MEDIA AND E-COMMERCE PLATFORMS

Just over half of the reported seizures (26 cases) related to illegal retail trade of giant clam shells or shell crafts. The majority of these (21 cases) involved trade at a physical shop or market stall, while references to online trade were made in 12 cases. In some instances, physical shops were also selling products online, such as a case featuring two “Hainan Shell Factory” stores in Haikou City, Hainan, which were also registered with the online shopping platform Taobao. Among the 12 cases indicating online trade, WeChat was the most common platform used for purchasing or selling giant clam shell products.

Recent reports in China have revealed that many e-commerce websites still sell giant clam shell products from Hainan Province, using code names such as “jade-like shell” and “Nanhai” (South Sea) to get around keyword blocks. Homonyms such as “五爪贝” or “five claw shell” and “车渠”, the miswriting of the Chinese characters for giant clam, are also among the code names used by online sellers. One report stated that after using keywords to search for clam shell products on a particular e-commerce platform, the platform’s algorithm continued to promote clam shell products and “similar” products to the user, including a high-value ivory bead bracelet. In preliminary research, the Wildlife Justice Commission has also observed giant clam shell products advertised openly for sale on various e-commerce platforms, including Alibaba, 1688, JD.com, and Baidu. However, further research would be required to complete meaningful analysis of these advertisements.

Given the way that social media applications operate and the functions they provide such as WeChat ‘Moments’, which allows users to showcase illegal commodities covertly, they are more likely to host activity of a criminal nature than other types of e-commerce platforms.

Enhanced law enforcement efforts in China monitoring criminality on WeChat are having an influential effect on the wildlife trade “business” and contributing to traders altering their means of communication. Analysis of the Chinese court judgement database reveals a steady growth in the number of criminals being convicted for wildlife crimes in China since 2014, due to investigations conducted on or through WeChat. Furthermore, the Wildlife Justice Commission’s own investigations found that during 2020, several high-level wildlife brokers in Vietnam stated their deliberate avoidance of discussing wildlife “business” on WeChat, instead preferring to use WhatsApp, an American messaging application which is banned in mainland China. Another technique used by traders is to only send voice messages when communicating on WeChat, thereby minimising the risk of crime being detected via keyword searches.
China’s elephant ivory trade ban and the use of substitute materials

Domestic trade in elephant ivory ceased in China at the end of 2017 when a national ban came into force. Prior to this, in early 2006, traditional Chinese ivory carving skills were listed as an “intangible national heritage”. A handful of factories and carving masters from Beijing and Guangzhou appear on the list of specialised carvers, representing two distinguishable styles, northern and southern. In 2016 when the complete ban on ivory trade was announced, the State Council notice specifically encouraged the transformation of ivory carving skills “to initiate the rescue of such intangible national and provincial heritage” and “to direct using replacement materials to develop other ivory carving and bone carving skills.”

By promoting the use of alternative materials in the carving industry and enabling a continuing market for these products, the directive is in effect raising the potential risk of increased trade and demand for ivory substitutes. In this context, the May 2021 seizure of 1,300 kg of raw shells from the processing factory in Qionghai City, Hainan province, the eight cases of giant clam shell seizures converging with elephant ivory and other ivory-like products, and the unconfirmed destination of the vast giant clam shell stockpiles in the Philippines, are all the more concerning.

Furthermore, the active promotion of markets for “replacement” ivory materials could also perpetuate demand for elephant ivory as the “ultimate” ivory product. Where demand continues to exist, it will likely lead to the market being driven underground. Although China’s strict law enforcement approach to elephant ivory may go some way towards dampening demand, the sustained trade of substitute materials will likely pose an ongoing threat to elephants in the long-term.

An example of the potential impact of this directive can be seen with mammoth ivory trade in China. In 2017, as the elephant ivory trade ban was being phased in, mammoth ivory stopped being considered an exclusive collector’s product and appeared to become an authentic substitute for elephant ivory. Mammoth ivory is currently legal to trade in China with a permit, and it went from being sold only in specialty shops, to carvers and vendors switching to it to mass produce smaller jewellery and chopsticks. By becoming a legal substitute for illegal elephant ivory, the trade in mammoth ivory was touted as an effective solution to reduce the number of poaching incidents and demand for elephant ivory. However, conservationists and campaigners have argued that the mammoth ivory trade is a way to sustain a criminal industry and could instead provide a loophole for mislabelling and laundering elephant ivory.

In August 2020, the Wildlife Justice Commission conducted some initial research into the availability of mammoth ivory and other alternative types of ivory products on Chinese e-commerce platforms. During undercover engagements with 23 sellers offering mammoth ivory products online, most sellers suggested it was too risky to trade in elephant ivory because authorities were taking “strict actions” against traders and buyers. Four sellers were identified who were willing and/or able to offer elephant ivory for sale, although further investigation would be needed to verify their actual ability to access elephant ivory products.

The research also found other types of ivory for sale on e-commerce platforms including walrus ivory (not protected) and narwhal ivory (protected species). Narwhal ivory was observed to be much higher in value than mammoth ivory for comparatively similar products. Very little is known about the supply chain of many of these alternative ivory materials, but they should be monitored closely given the potential risks of their increased use as a replacement for ivory in the carving industry in China.

Japan as a potential location of concern

Japan is known to be one of the largest importers of fishery products in the world and has previously been recognised as a major importer of giant clams for meat and shells. In one recent media article in the Philippines, a Palawan official identified Japan along with China as a potential destination for the giant clam shell stockpiles, saying that “a boat will come from China or Japan to load the fossilised giant clams”.

Two of the smuggling cases in China are also of particular interest as they indicate that Japan was the source of processed clam shell products. The first case involved the smuggling of hundreds of carved wildlife products by plane from Osaka, Japan to Beijing, China in January 2019. Beijing Customs seized 497 giant clam shell products, 214 elephant ivory products, and 107 red coral products from the subject’s luggage. The subject had bought the products to sell in his two antique stores in Beijing as well as via WeChat. During raids on his shops, a further 226 ivory products and 131 red coral products were seized. The subject was sentenced in December 2019 to eight years imprisonment and fined RMB 80,000 (USD 12,348) for both offences of smuggling and illegally selling wildlife products.

In the second case, between August and September 2019, two Chinese subjects purchased carved elephant ivory, clam shell, hawksbill turtle shell, and red coral products in Japan through a third Chinese subject. The third subject coordinated the shipment of the products to Shanghai via an international logistics company and facilitated customs clearance and onwards shipment within China through four other individuals. In total, more than 14 kg of elephant ivory products were seized from the homes of the two subjects along with 62 g of clam shell products, 34.5 g of red coral products, and 3 g of turtle shell products. The two subjects were convicted in July 2020 and sentenced to six years imprisonment and RMB 250,000 fine (USD 38,590) and one year imprisonment and RMB 190,000 fine (USD 29,328) respectively.

Although the two cases above involved relatively small quantities of products, they indicate that the clam shell carving industry continues to be active in Japan. It is not known why the traders in these cases preferred to source their wildlife products from Japan, but one hypothesis is that they may have deemed it to be a lower risk option than purchasing locally in China.

No giant clam species are included in Japan’s Red List of protected species, and only CITES Appendix I species are subject to Japan’s Act on Conservation of Endangered Species of Wild Fauna and Flora. It further appears that giant clams may only be protected locally within the Okinawa Prefecture. Japan is also known to have a large domestic ivory market and ivory carving industry, for which it introduced stricter regulations in June 2018 in an effort to address international concerns that regulatory loopholes were contributing to illegal domestic ivory trade and the illegal export of significant quantities of raw and worked ivory to China. It is notable that both of these cases in China occurred after Japan’s strengthened regulations came into effect, with products smuggled out of Japan undetected. The existence of an active clam shell carving industry and market in Japan, alongside an active ivory market, could make it an attractive location for traders to source their products. Very little is known of the current extent of the giant clam shell industry in Japan, the source of the shells (whether from wild stocks or from mariculture), or to what level the industry is regulated or controlled, but these factors identify it as a potential location of concern that should be further investigated.

Image 19: Antique Japanese carving of ivory okimono figure with a clam shell. Credit: Bonhams.

Impact of COVID-19

The Wildlife Justice Commission identified record volumes of elephant ivory moving from Africa to Asia until 2019, but since 2020, the COVID-19 crisis has significantly curtailed ivory smuggling possibilities. Although ivory stockpiling was already starting to occur in Southeast Asia in 2019 due to China’s increased law enforcement efforts; travel restrictions, transportation difficulties and increased border security during the pandemic have exacerbated the situation, and increased ivory stockpiling is known to have occurred in Vietnam, Lao PDR, and Cambodia. The Wildlife Justice Commission’s investigations also indicate there are fewer elephant ivory carvings available in the underground retail market in China and a reluctance of Chinese traders to sell these products because authorities were taking “strict actions” against traders and buyers. These changes in the ivory market may lead to other more accessible materials being sourced as a substitute for ivory in the carving industry, such as giant clam shells.

Meanwhile, the stockpiling of giant clam shells in the Philippines does not appear to be occurring as result of transportation challenges to move the contraband to its intended destination, but rather is part of the collection and supply chain strategy. However, there are some indications that the economic fallout from the pandemic may be contributing to the apparent increase in development of these stockpiles. The largest stockpile seized so far – 120,000 tonnes of shells in October 2019 – occurred before the COVID-19 pandemic began and would likely have taken several years to build. More recently, Philippine authorities say they have been receiving regular tip-offs of the illegal trade since October 2020, which could suggest an increasing use of the stockpiling strategy during the pandemic, possibly due to negative economic effects and this trade offering an opportunity to make money. One report mentioned that smugglers are luring fishermen who were badly hit by the pandemic into a “get-rich-quick” scheme, taking advantage of their local fishing knowledge and lack of understanding of the consequences of this trade.

Furthermore, amid the pandemic, the local price of giant clams in Palawan is reported to have doubled to PHP 2,000/kg (USD 40/kg), offering a greater economic incentive to fishermen to participate in shell collection schemes. The increased incentives could correlate with the number of seizures in the Philippines, which have increased in average volume and frequency during the pandemic. To demonstrate in Figure 6, in 2019, discounting the super seizure in October, there were three other seizures which averaged 4,333 kg each. In 2020, there were also three seizures, but the average volume increased significantly to 56,666 kg. In 2021, there were six seizures reported up to July, with an average volume of 76,077 kg each.

In response to the pandemic, in 2020 China introduced two new bans relating to wildlife trade and consumption, although neither of these are relevant to the trade of giant clams. Firstly, on 26 January 2020 China introduced a nationwide ban on any type of wildlife trade, including all types of business operations such as markets, restaurants, and e-commerce platforms. The ban prohibits businesses from offering wildlife regardless of the species’ protection levels, although it appears to exclude products made thereof, such as carved ornamental items. No end date to this ban has been decided or announced.

Secondly, on 24 February 2020 the Standing Committee of the National People’s Congress of China announced a nationwide “complete ban on wildlife consumption”, which immediately prohibited the trade of terrestrial wildlife for consumption as food. However, this ban does not apply to non-terrestrial wildlife species such as marine species, or to other types of use such as carved ornamental items, and therefore it has no impact on the trade of giant clams.

![Image 21: Intricate carvings maintaining the original clam shell shape, observed in Tamaran, August 2016. Credit: Mei Lin Neo.](image)

Figure 6: Seizures and average volumes of seized giant clams in the Philippines, discounting the super seizure in October 2019 (January 2019 - July 2021).
Current intelligence gaps

The research has identified several key intelligence gaps that should be further investigated to understand the criminal dynamics driving the giant clam shell supply chain, its potential nexus with organised crime groups, and the extent of the risk posed by the potential use of the shells as a substitute for ivory in the carving industry in China.

The known and suspected extraction modalities, including the involvement of commercial fishing fleets from China, the organisation of local networks in the Philippines, and the vast quantities of the shell stockpiles, suggests a considerable level of criminal organisation and perhaps an element of corruption could be playing a role in the trade.

Regarding the stockpiling of shells in the Philippines, China is frequently mentioned in media reports as the obvious consumer market for the products, while some also mention Japan; however, no smuggling routes have been uncovered nor any Chinese or Japanese nationals identified as part of the operations. Apart from the economic incentives for local Philippine fishermen, there is almost no information on the criminal drivers and enabling factors behind the stockpiling phenomenon.

From the information collected, it is not possible to assess the volumes of giant clam shells entering China: the movement of the raw contraband along the smuggling chain remains almost completely undetected. Questions remain unanswered about points of entry of the raw contraband into China, methods used to prevent the detection of smuggling operations, current consolidation and processing locations, and the real extent of the illegal retail market. The small volume of crafts evidenced in the retail market could potentially point to a speculative investment strategy around the raw shells.

Conclusion

The sharp rise and significant volume of giant clam shell seizures in the Philippines during the past three years is a concerning trend, particularly given the potential involvement of organised crime and the current lack of insight into this trade type. As a lesser-known marine species, giant clams may be overlooked compared to charismatic species affected by crime such as elephants and rhinos, but it is important that law enforcement authorities in implicated countries turn their attention to the potential criminal factors that could be at play.

As such, this report identifies the following key issues for consideration by law enforcement authorities in China, the Philippines, and Japan:

1. More research is required to address the intelligence gaps and fully assess the level of threat in the giant clam shell trade and its relationship to organised crime.

Other than the harvesting methods involving Chinese fishing fleets in the South China Sea and the collection and stockpiling of shells by local networks in the Philippines, insufficient information is currently available to describe other elements of the supply chain. Many questions remain unanswered about the smuggling routes, modus operandi, current consolidation and processing locations, and other factors. While a carving industry and consumer market for giant clam shells exists in China and Japan, no evidence has been found linking the stocks in the Philippines with either country as a destination, or with Chinese or Japanese nationals as facilitators of the trade.

Physical and online markets in China provide potential entry points for further investigation.

Raw giant clam shells are believed to enter China predominantly through Hainan province, which has been the epicentre of the shell carving industry for decades, but few detected seizures or other law enforcement actions have been publicly reported in the province. The giant clam seizure data reveals that physical retail...
markets are active in various provinces including Guangdong, Hainan, Zhejiang, and Fujian, as well as online markets on social media and e-commerce platforms, providing potential entry points for further investigation. Engaging with the trading networks could provide intelligence on the origin and size of the stocks available in the country, their point of entry to mainland China, the role of corruption in illegal harvesting and trade, and glean a greater understanding of the extent of this market and its clandestine value.

Intelligence analysis and special investigative techniques should be utilised to develop the intelligence picture on the potential role of organised crime.

The giant clam shell seizures in the Philippines and China provide an important starting point for further investigation into the criminal networks and dynamics of the trade. Intelligence analysis and special investigative techniques such as undercover operations, electronic surveillance, and communications interception will be necessary to dig deeper into the supply chain, understand the composition of the criminal networks, and identify and target those subjects who play a pivotal role in the trade. These techniques will also be useful to verify the apparent presence of crime convergence.

It is important to assess the extent of the risk posed by the possible use of giant clam shells as a substitute for ivory and the ongoing threat this sustained trade may pose to elephant ivory in the long term.

The potential use of giant clam shells as a substitute material for elephant ivory could be underpinning the recent stockpile development and will be a key possibility to monitor. Organised criminal networks are resourceful and where demand and the opportunity for profit exists, a supply chain is often formed to feed it. Concern also remains that a sustained trade in ivory substitute materials could have the unintentional effect of perpetuating demand for elephant ivory as the premium ivory product, and consequently continue to pose a threat to elephant populations in the wild.