BELIZE

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INTRODUCTION

Belize is a small country with a total land mass of 22,966 km^2, an Exclusive Economic Zone (EEZ) of 3,351 km^2, and one of the region's lowest population densities (17.64 people per km^2). It possesses 250 km of coastline and is protected by a large network of managed marine protected areas (MPAs). Belize faces the Caribbean, is surrounded by the much larger countries of Mexico to the north and Guatemala to the west and south, and is part of both the Caribbean Common Community (CARICOM) and the Central American Integration System (SICA).

Belize is composed of a patchwork of marine and coastal habitats that provide diverse habitats for sharks, rays, and chimaeras throughout all life-history stages. Belize is best known for hosting the world's second longest coral barrier reef (250 km in length) and three coral fringed offshore atolls. The continental shelf encompasses 10,491 km^2, with mangrove cover of approximately 900 km^2 and 2,290 km^2 of seagrass meadows. Deep waters (>250 m depth) comprise 71% of the marine EEZ.

There is a strong history of fishing from both colonial days and beyond independence (1981), and export of finfish and invertebrates (conch and lobster); however, there is a limited contemporary culture of eating or fishing sharks or rays.

Tourism is a key industry where sharks and rays play an important role. Belize contains one of the longest provisioned aggregation sites for these species in the Caribbean in the northern sector of its barrier reef.

Belizean marine resources are, however, subject to strong transboundary fishing pressures.

FISHERIES

Fleets

Belize's national fisheries are small-scale mixed subsistence and small-scale commercial, characterised by small vessels ranging from 5–8 m in size. Trawlers were banned in 2010 (SI 2011). At least 3,400 fishers are registered (Belize Fisheries Department, 2022). There were 43 licensed shark fishers in 2021–2022, down from 78 in 2017.

In 2020, there were 48 registered active flagged high seas vessels. Of these active vessels, 45% were registered under the International Commission for the Conservation of Atlantic Tunas (ICCAT) with 34% fishing in high seas, 17% in EEZ waters, and 4% in other areas. Reports to the Food and Agriculture Organization of the United Nations (FAO), from 1985–2022, provide Belize-flagged capture data from the Atlantic high seas of 14,300 metric tonnes (mt) in 2013, 5.2 mt in the Indian Ocean in 2003, and 10.5 mt in 2011 in the Pacific Ocean (FAO, 2023).

Gear

Gear used in national shark fisheries are characterised by a mix of nets (silk nets, drifting and anchored and bottom, and hanging longlines), traps (wire, natural palmetto), and heart traps used to capture demersal and benthic dwelling species. The majority of targeted shark fisheries were based on the use of mono filament gillnets until November 2020 when these nets were banned in marine waters throughout the country (SI 158 of 2020). Longlines are now used with both bottom and hanging sets, but is prohibited within a 2 nautical mile (nm) radius from the three offshore atolls per legislation enacted in September 2021 prohibiting shark captures at these sites (Government of Belize, 2020).

Of the high seas vessels, 27% were midwater trawlers, 25% were longliners, 23% were purse seiners, and 25% used various other fishing gears in 2020.

PRODUCTION

Overall landings

Sharks are not traditionally targeted following boom and bust shark fisheries from the 1960s–1980s (Graham, 2007). Rays are likewise not targeted in Belize, though they are occasionally used for bait when captured incidentally. Chimaeras are not targeted either. Shark landings in-country are dispersed, while incidentally caught rays are primarily landed in the south of the country. Landings are seasonal in nature to meet the demands of the Lenten season in neighbouring Guatemala where shark and ray products are exported primarily between December and April. A proportion of catches are landed outside of the country in neighbouring Guatemala, Honduras, and Mexico. An estimated 800 mt of sharks were captured in Southern Belize by 92 fishers (Graham, 2007), processed in remote locations in Belize and transported to Guatemala for sale. Official shark landings were recorded by local cooperatives in Belize City until 2001 (Zeller et al., 2011). Disaggregated landings were reported from one key landing site, highlighting most captures of sharpnose sharks (*Rhizoprionodon* spp.), Great Hammerhead (*Sphyrna mokarran*), and Atlantic Nurse Shark (*Ginglymostoma cirratum*; Zeller et al., 2011). Reconstructed total shark catches from 1950–2008 were approximately 50,000 mt, representing 14% of all fisheries landings by weight (Zeller et al., 2011). Total landings of sharks reported by the Belize Fisheries Department was ~58.9 mt for the 2017–2018 shark fishing season (Quinlan et al., 2021), and peaked at 144.5 mt in 2019 before decreasing to 15.4 mt in 2021 due to after effects the COVID-19 pandemic, which caused a notable interruption of transboundary trade (Belize Fisheries Department, 2022).

Species-specific

Through 2008, Caribbean Sharpnose Shark (*Rhizoprionodon porosus*), Great Hammerhead, Scalloped Hammerhead (*Sphyrna lewini*), Atlantic Nurse Shark, and Bull Shark (*Carcharhinus leucas*) made up nearly 90% of catches, with Blacktip Shark (*Carcharhinus limbatus*), Bonnethead Shark (*S. tiburo*), and Lemon Shark (*Negaprion brevirostris*) making up the remaining 10% (Zeller et al., 2011). Disaggregated landings were reported from December 2017–2018, representing 1,378 landed sharks from 13 fishing group representatives (Quinlan et al., 2021). Caribbean Reef Shark (*C. perezi*) were the most prevalent species (n=465, 34%), followed by Blacktip Shark (n=370, 27%), sharpnose sharks (n=225, 16%), and Bonnethead Shark (n=115, 8%). Scalloped Hammerhead (n=26, 1.9%) and Great Hammerhead (n=51, 3.7%) were also landed. It is unknown what proportion of the total landings these numbers represented, though the authors considered the species composition to be representative of the overall fishery. Length-frequency analysis indicated that Caribbean Reef Shark and Blacktip Shark were primarily landed as juveniles, while the small coastal sharks (sharpnose sharks and Bonnethead Shark) were primarily mature (Quinlan et al., 2021). Comparison of data through 2010 to those collected through 2020 indicated a shift in catch composition, with Caribbean Reef Shark making a larger contribution in recent years, while large hammerhead sharks were much lower in number. Also noted in more recent landings were several deepwater species, including Night Shark (*C. signatus*), Atlantic Sixgill Shark (*Hexanchus vitulus*), and smoothhounds (*Mustelus* spp.). In 2022, fishers reported that prices for fins were valued at too low a price to warrant export, but salted, dried meat was valued at USD 2.00 (Belize Fisheries Department, 2022). Dried fins were historically sold for up to USD 110/kg, and wet, salted fillet for USD 2.8/kg (Graham, 2007). Large-bodied sharks are targeted due to the value of the exported meat.

TRADE

Processing

Shark landings have historically been dispersed and remote throughout Belize with six small island landing sites identified by the Belize Fisheries Department. Sharks are landed whole and processed on site with removal of fins; filleting of meat; and discarding of skin, entrails, and heads (bar the liver which is occasionally rendered for oil for local medicinal consumption), if the fishing camp is set up for this processing. Fins are placed in the sun to dry and meat is salted or brined in 189 litre barrels for ease of transport to Guatemala, the primary destination of shark products from Belize.

Domestic

Sharks are wholly utilised when captured, with meat filleted, salted and brined, and then sold in Mexico, Guatemala, and Honduras or, less frequently, eaten and sold fresh locally. Livers are rendered for their oil and sold locally. Skin is discarded, and jaws are occasionally processed for sale as curios locally or in neighbouring countries. Rays are not locally consumed but may be used for bait when captured.

Export

The majority of targeted shark fisheries products are exported to Guatemala through an aggregating fishery with an export permit valued at USD 25. In 2022, there were two export permits provided for shark products. From 2016–2021, 88% (345,956 kg dried salted meat) of total reported landings (398,677 kg dried salted meat) were exported at a value of USD 2 per 450 g, with 100% of reported landings being exported in 2020–2021.

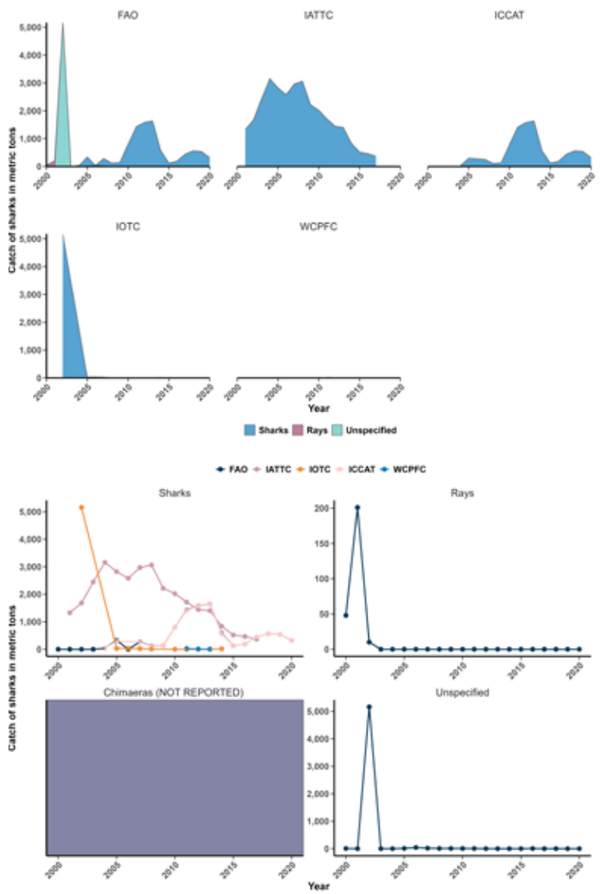
CULTURAL SIGNIFICANCE

Sawfish rostra are occasionally encountered painted and unpainted hanging in homes. These are mainly prized as family heirlooms with general recognition that no sawfish have been recorded even before the 2000s. Shark liver oil rendered locally is historically considered important for medicinal use against colds and flu, to maintain body health and function. As shark captures and incidental catch fisheries have declined due to greater protective legislation and public awareness of their importance to economy and ecosystem, and outreach on the impact of methyl mercury consumption, populations are expected to increase in coming years.

RESEARCH

Shark research is divided into fisheries dependent and independent work. The Belize Government's Fisheries department conducts the fisheries landings monitoring in specific sites and non-profits such as MarAlliance and Florida International University (FIU) conduct long term fisheries independent monitoring, as well as research on spatial ecology, diet, fisheries landings, and investigation into the effectiveness of legislative policies on shark and ray populations. Genetics studies have historically

Belize's total catch of shark, ray, chimaera, and unspecified species reported to the Food and Agriculture Organization of the United Nations (FAO), Inter-American Tropical Tuna Commission (IATTC), International Commission for the Conservation of Atlantic Tunas (ICCAT), Indian Ocean Tuna Commission (IOTC), and Western and Central Pacific Fisheries Commission (WCPFC), from 2000–2020 in metric tonnes (mt) | Source: FAO (2022), IATTC (2022), ICCAT (2022), IOTC (2022), and WCPFC (2022)



Small-scale fishers at Caye Caulker, Belize | Greg Ribaroff | Unsplash

been conducted by MarAlliance, Wildlife Conservation Society (WCS), and FIU.

MANAGEMENT

Governance framework

Management of sharks and rays falls primarily under the purview of the Belize Fisheries Department, under the Ministry of the Blue Economy and Civil Aviation, which also enforces legislation along with the Coast Guard and the Belize Defence Force. The Capture Fisheries Unit collects shark landings data, and fishers must submit logbooks upon renewal of their shark fishing license. Shark fishers are also required to submit anal fins for landed sharks for identification and size estimation of catches. There are no reporting requirements for rays, and landing of all ray species is prohibited (Government of Belize, 2020). Non-governmental organisations (NGOs) are responsible for seven of the country's 14 MPAs through the statute of co-management with the government, where responsibility for enforcement is delegated to NGO-based fisheries officers. Ultimate authority in the judicial process rests with the Government following the arrest of those committing infractions. Conservation of sharks and rays in relation to international conventions, such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), rests with the CITES authority led by the Forestry Department. Belize is not a party to the Convention on the Conservation of Migratory Species of Wild Animals (CMS).

Belize-flagged vessels on the high seas are managed by the High Seas Fisheries Unit (HSFU), under the Ministry of Finance. The HSFU oversees observer coverage and ensures vessels abide by regional treaties, and coordinates and manages fisheries monitoring, control, and surveillance. A National Plan of Action for Sharks was completed in 2015 (Belize High Seas Fisheries Unit, 2015).

To support decision-making, Belize founded a multisectorial National Shark Working Group in 2005 that integrates authorities, NGOs, academia, the fisheries and private sectors that reviews and proposes policies and measures related to sharks and rays.

Policy

Belize possesses a broad set of protective regulations for sharks and rays throughout its territorial waters.

The closed season for shark fishing (excludes rays) is 1st May to 31st October of each year, aligning with seasonal demand for shark meat in the region. In 2003, Belize protected Whale Shark (*Rhincodon typus*) and one of its key foraging sites in the Western Caribbean (Graham, 2007), and Atlantic Nurse Shark was afforded national protected in 2011 due to their importance to the tourism economy. In November 2020, a gillnet ban was enacted within marine waters, though enforcement has lagged. A prohibition on all ray fisheries was also enacted in 2020 as a proactive measure as there was no historical national fishery for rays (Government of Belize, 2020). Use of shark fishing gear (longlines) was banned within a two-mile (~3.2 km) radius of offshore atolls in 2020, with hook size greater than 12/0 to be used (Government of Belize, 2020). Fishing for sharks using drifting or unanchored longlines was also prohibited.

Regional Regulation OSP-05-11, agreed between Central American countries in November 2011 to be implemented in 2012, of which Belize is a party to, outlines:

- Objective: Ban on shark finning and requirement for sharks to be landed with fins naturally attached.
- Key points: Regulation OSP-05-11, was adopted via SICA's Fisheries and Aquaculture Sector Organization of the Central American Isthmus (OSPESCA). It binds Belize, Costa Rica, Dominican Republic, El Salvador, Guatemala, Honduras, Nicaragua and Panama to landing sharks with fins naturally attached.

Enforcement and monitoring

Enforcement is conducted by three institutions: the Belize Coast Guard, The Fisheries Department, and MPA rangers. Most enforcement takes place within the boundaries of 14 MPAs with limited enforcement in interstitial areas. Enforcement within MPAs varies due to lack of funding for fuel and staff time, with much transboundary and illegal fishing activity taking place at night.

Outreach and awareness of sharks and rays has primarily been conducted by the NGO MarAlliance but increasingly by a host of other NGOs who target younger age groups (4–12).

Belize Fisheries Department has conducted shark landings monitoring in two key sites (i.e., Robinson Caye, Rocky Point) since the 2000s, but has not implemented this for rays as of 2024.

Community Involvement

Commercial and recreational fishers, tourism guides, and other participants from coastal communities throughout Belize are involved in shark and ray monitoring through the fisheries independent shark monitoring conducted by MarAlliance since 2004.

Following the gillnet ban enacted in November 2020, many fishers and communities supporting the ban conduct patrols and enforce the removal and disposal of illegal gears.

Infractions of laws protecting Atlantic Nurse Sharks or highlighting landings of threatened species are commonly shared on social media, which is now generating support for sharks.

Gaps

Gaps persist in information on the impact of provisioning on shark aggregations such as in Hol Chan Marine Reserve.

Further, government communication on shark policies and closed seasons should be improved to have a more far-reaching effect and linked to the tourism sector and benefits derived from Belize's growing shark encounter tourism.

RECOMMENDATIONS

Policy

- Improve transparency in shark and ray fisheries, fishers, permitting and catches with annual reports produced by authorities with support from the National Shark Working Group.

Science/knowledge/research

- Continue assessment of transboundary trade, targeted and incidental catch shark fisheries.
- Assess shark and ray population recovery following the net ban.

Management/governance/conservation

- Increase enforcement of protected areas and policies.

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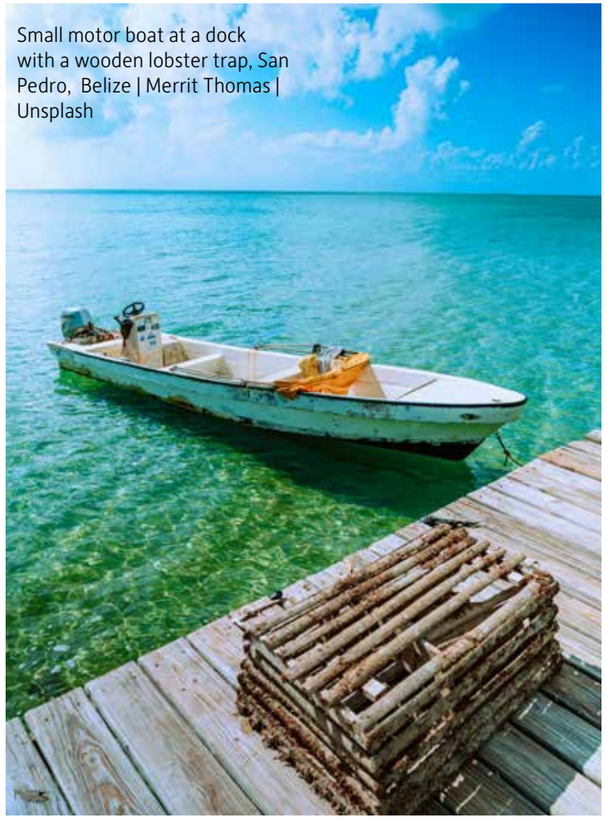
Atlantic Nurse Shark *Ginglymostoma cirratum* at Hol Chan Marine Reserve in San Pedro, Belize | Rachel T. Graham



Small motor boat at a dock with a wooden lobster trap, San Pedro, Belize | Merrit Thomas | Unsplash