

AN INTRODUCTION TO FISHING METHODS IN BELIZE



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Front page: Traditional fishing sail boat from northern Belize.

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Introduction

The purpose of this report is to provide a comprehensive and detailed description of the fishing methods used in Belize. It is important to understand the methods used by local fishing communities in order to appreciate the effects of fishing on the marine environment. Informal interviews were conducted in local fishing communities around Belize, with fishers and their family members in 2016. This report aims to provide information on local fishing techniques in Belize that can be used as a reference when discussing management strategies and alternative fishing practices.

Boats

Sailboat

Traditional wooden sailboats are primarily made in Sarteneja, a northern fishing community in Belize. Around eight fishers will go out to sea on one sailboat for eight to ten days at a time. One person is designated as the chef for the boat. For the most part, the fishers on sailboats are fishing for conch and lobster. Fishers will free dive for conch and lobster (and less frequently sea cucumber) and bring the product back to the sailboat where it is kept on ice during the journey. Fishing on sailboats is a year round practice, as lobster and conch season overlap (conch season is from October to mid-June and lobster season is from the end of June to mid-February). All of the fishers are required to have fisher folk licenses (a specific license for sea cucumber is needed) and sailboats need to be registered with the Belizean Port Authority.



Figure 1. Traditional sailboat from Sarteneja (left). Boat building in Sarteneja (right).

Dory

Dories are small (15-20ft), non-motorized, fishing boats that are usually found stacked on top of sailboats. They are lightweight (either fiberglass or wood) with a shallow-draft. In general, sailboats will carry about 8 dories at a time during lobster or conch season. There is one dory per fisher (excluding the chef) carried on the boat. The sailboat will anchor somewhere while each fisher will venture out in the individual dories and paddle away from the boat. Where the sailboat is moored is usually determined by ocean currents or the direction the vessel is headed. If the vessel is heading south, she will moor south of the drop off points and the dories will then meet at mid to late afternoon to clean their catch. The fishers who use the dories commonly free dive for lobster and conch, checking traps (lobster) or shades that have been set out previously. Dories do not require boat master licenses but the fishers on dories require fisher folk licenses.



Figure 2. Sailboats with dories and supplies stacked on their decks.

Dugout canoe

Dugout canoes are very similar to dories, however they are made out of wood while dories are most commonly made from fiberglass. Also, some dugout canoes will have an outboard motor, while dories are not motorized. Dugout canoes are used throughout Belize, although they are more prevalent in the South, in both ocean and freshwater. They are used to catch tilapia, shad, mojarra, and other fish species with hand lines and nets. They can also be used to catch conch and lobster. Like dories, they do not require registration or boat master licenses, but fishers require a fishing license.



Figure 3. Fisherman with dugout canoe.

Skiff (Panga)

Skiffs are motorized boats of varying sizes (generally 15ft-35ft) that are sometimes referred to as pangas in the north. Some skiffs have live wells in their boats, sections that fill with fresh ocean water to keep the fish alive for long periods of time. Other skiff fishers use coolers that they fill with ice before they leave to fish. Fishing on skiffs is usually limited to day trips; however trips can last up to four days if the fishers can find somewhere to camp at night. Skiffs are used throughout Belize, from the South to the North. Fishers in skiffs target conch, lobster and finfish. Fishing gear includes hand lines, gillnets, rod and reel, cast nets, lobster traps, set lines, tow lines, fly fishing, and fish pots. When fishers report piracy, they usually say armed men aboard skiffs are raiding fishing camps or robbing produce directly from the sailboat fishers or from the pangas transporting produce to market. Skiffs need to be registered with the Belizean Port Authority and the captain needs a boat master's license and a fishing license.



Figure 4. Skiffs lined up on the shore. Coolers can be seen on the boats, ready for fishing.

Gear

Nets

Cast net (sprat net)

The cast net is primarily used to catch baitfish off piers, in mangroves, or in flat shallow areas off the coast. Sometimes, the nets will be used to catch tilapia or chiwa (mojarra fish) in freshwater rivers or lagoons. They can also be used to catch shrimp. The nets range in size from 5 to 7 feet across. Mesh size varies depending on the target species. In general, mesh size is very small (less than the 3 inches required for gillnets), but there is no standard mesh size. The smallest mesh sizes are used to target baitfish while slightly larger mesh would be used for something like chiwa or tilapia. Cast nets are used throughout the year and there are no regulations on cast net use. The net is circular with weights around the circumference and a hand line coming from the center of the net. Fishers will often hold part of the net in their mouth and then throw the net open towards the intended target. As the lead line is extended out by the weights, the brail lines are pulled through the center to the bottom. Then, pulling up on the hand line closes the net around the fish, trapping them in the net.

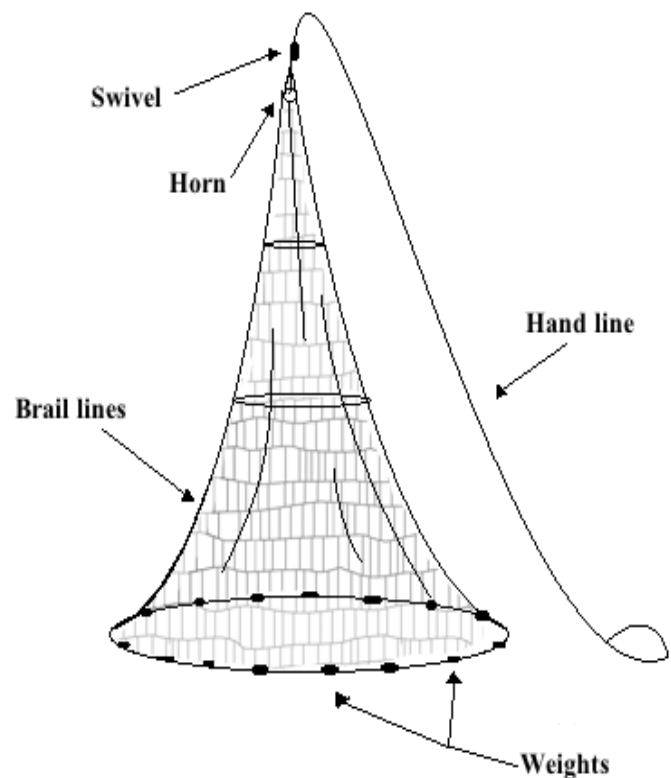


Figure 5. Fisherman holding cast net full of bait fish. Diagram of a cast net showing the basic elements of the structure.

Raati net (crawl net)

The raati net is used to catch blue crab (*Callinectes sapidus*) off of bridges or in shallow water. It is constructed around a metal frame, sometimes a bicycle wheel or a metal basket. Chicken skin or feet, cowhide, or other fleshy, tough meat is used as bait for the crabs. Blue crab is considered to be a lower class food and it is mostly fished for subsistence. However, it can sometimes be found for sale at fish markets. Raati nets are most commonly used in the South (Dangriga, Hopkins, etc.) during the months of May to August when the seas are a bit rougher. There are currently no restrictions on raati net use.

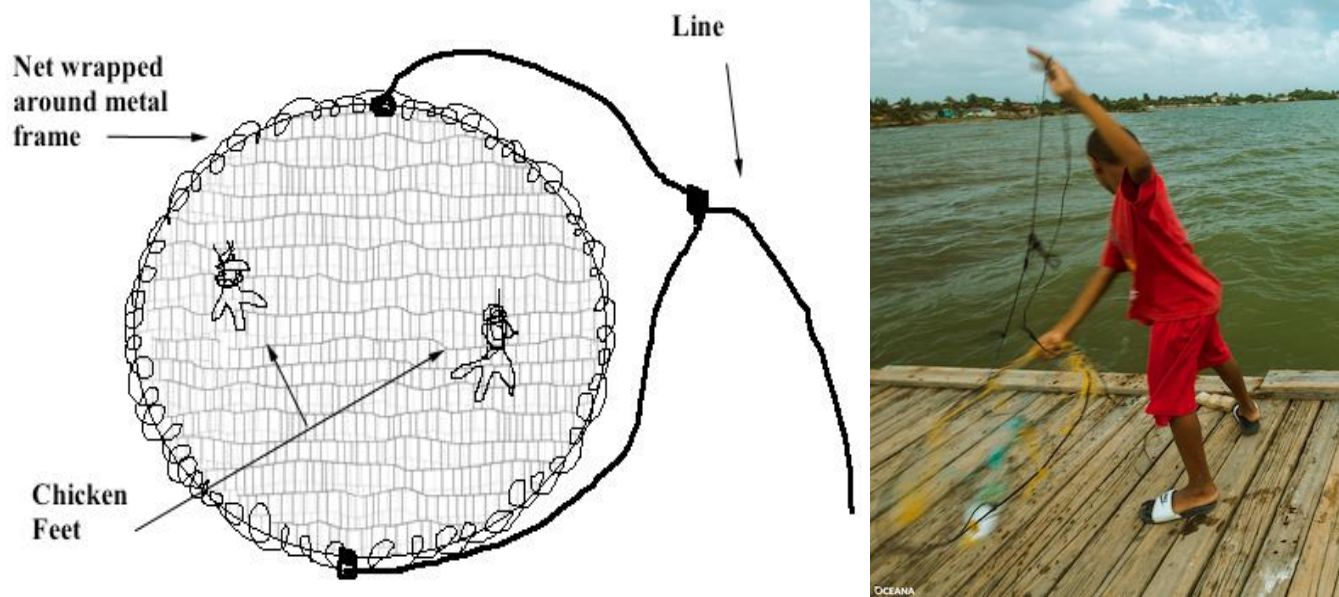


Figure 6. Diagram of raati net and young boy using a raati net off a bridge in Dangriga.

Gillnet

Gillnets are large fishing nets constructed from either natural or synthetic line. They are suspended vertically in the water column with floats on the top edge of the net and lead weights on the bottom. They cost between \$1000 and \$1500 Belize Dollars. A flag is sometimes attached to either end to locate the nets after they have been set. Fish will swim into the net and get caught by their gills. Fishers will set the nets overnight and then come back in the morning to remove the fish. Gillnets are primarily set by fishers in Sarteneja, Belize City, Hopkins, Dangriga, Punta Gorda, Riversdale, and San Pedro (Biery, 2013). The target fish for gillnets are snook, mackerel, snapper, grouper, barracuda, grunts and sharks. Gillnets are not selective however, and often have high rates of bycatch, including marine mammals, turtles, and protected game fish.

In Belize, gillnets must be registered with the Belize Fisheries Department and the gillnet license must be renewed every year. A license costs 25 Belize Dollars. No more than three gillnets 300 feet (100 meters) long (single or joined) are allowed per boat. Gillnets are not permitted to be set around the mouths of rivers. The legal mesh size for gillnets is 3 inches (Poseidon Aquatic Resources Management, 2013). Gillnets are not permitted in marine reserves.

Gillnets are often cited as being used illegally by both domestic and foreign fishers.

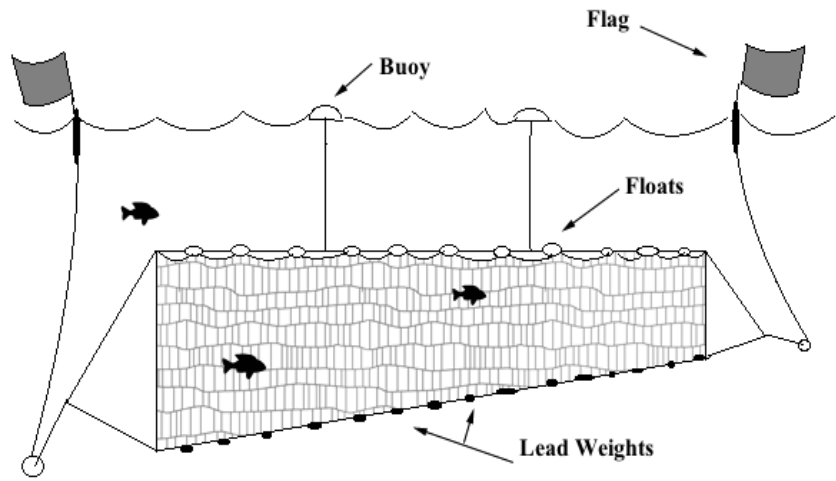


Figure 7. Gillnet in fishing boat and diagram of simple gillnet set up.

Beach seine

Seine nets are used primarily in the North and in Ambergris Caye. Seines can either be used in the shallows or from a boat. In shallow water, two fishers will hold one lead end each and slowly encircle schooling fish (shad, mojarra, or tilapia). Then, they will pull the weighted end up and over, trapping the fish in the pocket, or purse. This action is called “trampa de corona” in the North. From boats, each lead end will be attached a boat and one or two fishers will swim behind, pulling up the weighted bottom over the fish. The mesh size for inland seines is generally 1 ½ inches while boat seines are generally larger at around 3 inches. Net sizes range from 15 feet for near shore fishing and up to around 40 feet for fishing from boats. Beach seines cannot be used within half a mile of any city, township, village, settlement, or other inhabited locality in Belize, and they are not allowed outside the barrier reef within two miles of the Belize River, Haulover Creek or the Sibun River (Belize Fisheries Act, 2003).

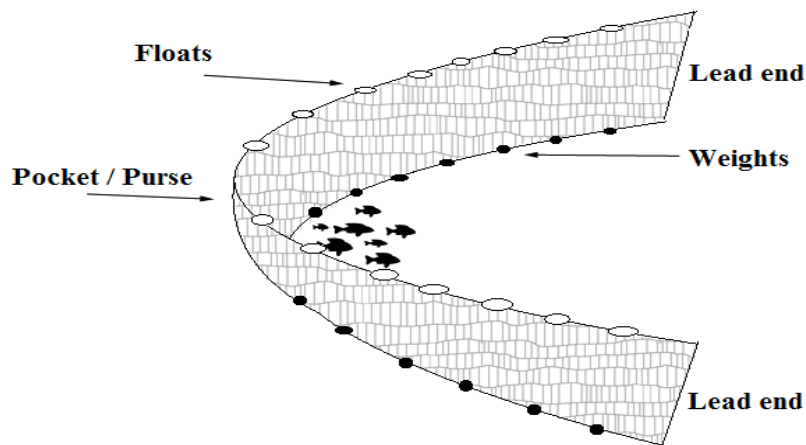


Figure 8. Diagram of beach seine.

Jamo

A jamo is known as a catch net or bully net in English and it is used to catch lobsters, often from shades (casitas), while free diving. Some fishers prefer to use a jamo because they can bring up their lobster catch alive, which helps them discard juvenile lobster more effectively than with a hook stick that might damage the juvenile before they release it. No permit is needed to use a jamo.

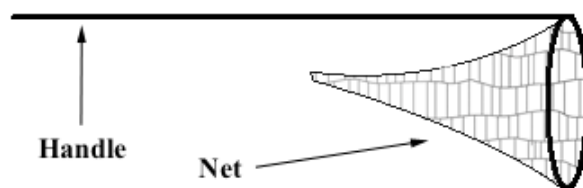


Figure 9. A simple representation of a jamo net used to catch lobster.

Snare

A snare is used to catch lobster, often from shades (casitas). The free diving fisher will wrap the snare around the tail or head of the lobster and pull to tighten the snare and pull the lobster out of the water. Just like the jamo, the snare will keep the lobster alive allowing for the fisher to discard it responsibly if it is a juvenile. There are no restrictions on snare use.

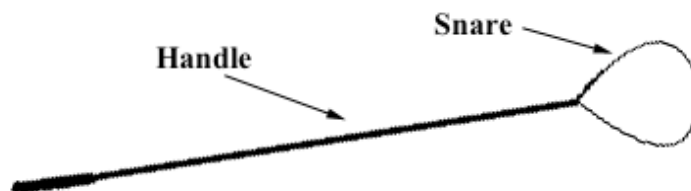


Figure 10. A simple drawing of a snare used to catch lobster.

Traps

Beach trap (fish trap)

In Belize, the traditional fishing traps, also known as beach traps, are mostly found in the north, outside of Sarteneja and Ambergris Caye. The traps are made from galvanized chicken wire strung along mangrove poles. The wire runs approximately 100 feet from the shore out to the circular trap. The traps are in very shallow water around 3 feet deep. As fish encounter the wall of chicken wire, they swim towards the trap where there are corralled until they can be harvested. Beach traps are harvested five days before and five days after the full moon, in the early hours of the morning (4 am). The fishers will place a net on one end of the circular trap and then pull it around to the other side, enclosing the fish within the net. They will then pull the net onto the boat and sort through the fish. The most commonly caught fish are shad, barracuda, and snapper, however there are sometimes tarpon and stingrays found in the traps that are released alive as bycatch. Beach traps require constant maintenance and fishers who own the traps will clean the traps of algae every two weeks and remove leaves every day. Each trap is made from approximately 550 mangrove posts and four rolls of quarter inch galvanized chicken wire. Fishing is seasonal with traps opened in mid-April and removed in mid-November (SACD, 2012).

Beach traps are not permitted in marine reserves except those that were already established in Bacalar Chico from 1996 or those in Corozal Bay Wildlife Sanctuary before 2012. Because of this, beach traps generally remain in families and pass from father to son. Beach traps must be registered with the Sarteneja Alliance for Conservation and Development in the Corozal Bay Wildlife Sanctuary (SACD, 2012). Fisheries regulations list that fish traps must be harvested every three days and juveniles released. If beach traps are not maintained, owners will lose their traps within two years. Fishers with beach traps are required to have fisher folk licenses.



Figure 11. Fisherman in beach trap in Sarteneja

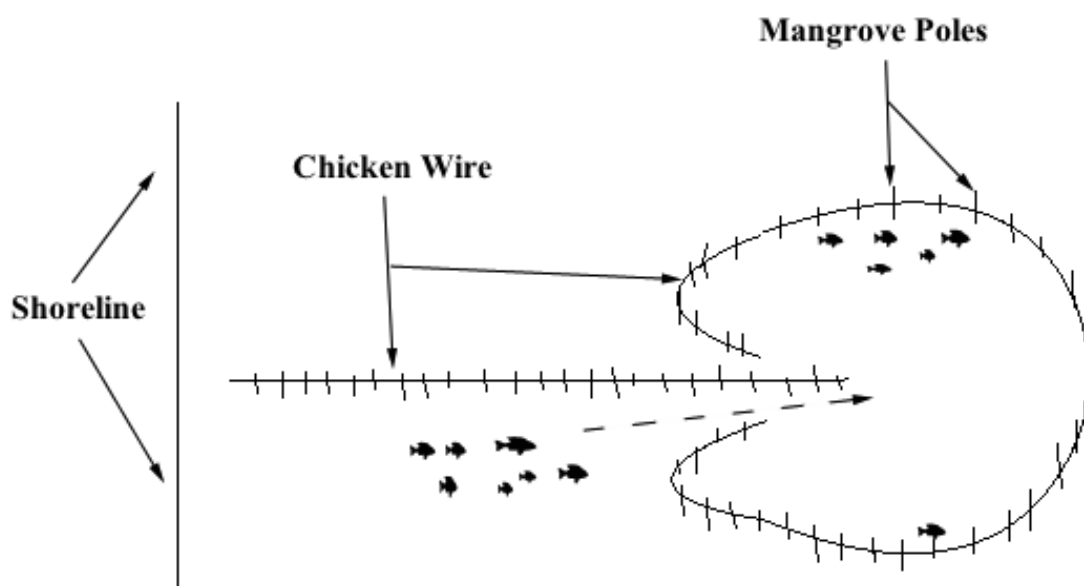


Figure 12. Diagram of fish trap from aerial perspective.

Lobster trap

Lobster traps are hand built traps that are used to lure lobster. Occasionally, fish will also be found in the traps, but they are not the target species. Fishers will put bait inside the traps (coconut, chicken, beef, or anything “stinky”) to attract lobster. The fishers will place the traps in sandy, shallow (approximately 30 feet at the deepest) areas and then return to harvest the lobster a few weeks later. They place a stick or a buoy close by to find the traps and when they are ready to collect them, one person will free dive to the traps and attach a line. Then, someone on the boat will pull the traps up and the lobster out. In some areas, no markings are used due to fears of poaching of traps (Huitric, 2005). Fishers on sailboats, dories and skiffs will use lobster traps. Trapezoidal lobster traps are mainly used in Belize City and in the Northern Cayes (Caye Caulker, San Pedro, etc.) while rectangular wire traps are used in the South in Monkey River and Placencia (Huitric, 2005).

Lobster traps are used during the designated lobster season (mid-June to mid-February of the following year). Lobster traps must be registered with the fisheries department and fishers must have a lobster fishing license. No lobster less than three inches (carapace length), with a tail weight less than 4.5 ounces, or found with eggs can be collected (Poseidon Aquatic Resources Management, 2013).



Figure 13. Lobster traps stacked on top of one another.

Lobster shade (casitas)

Lobster shades, or casitas, are similar to lobster traps in that they are built to lure lobsters. They are generally made of a sheet of zinc that creates shade under which lobsters will hide. The fishers will then free dive and use a hook stick, snare or net bag (jamo) to collect the lobster. Old tires or oil drums are also sometimes used as lobster shades. There is no standard size to a lobster shade and many objects can be used to attract lobsters to hide under. A lobster fishing license is needed if a fisher will be collecting lobster from a shade.

Fish pot

Fish pots are used in shallow areas, similar to lobster traps, where fishers can dive down to hook a line to them and retrieve them. However, they are typically much bigger than lobster traps because the larger the traps, the longer the fish will live inside them. They can be four feet by four feet and three feet high, but they vary in size. Fishers will often leave the traps for long periods and if they do not come back soon enough, many of the fish will die. Fish pots can be made of black mangroves, chicken wire, steel, or plastic mesh. The fisheries department has to approve the design of the fish trap and a proportion (unknown) of the trap must be biodegradable to prevent ghost fishing (R. Carcamo personal communication 6-30-16). The traps must be registered with the fisheries department and they cannot be deployed in areas that will affect the coral reef system or seagrass beds. The traps are baited with lobster, shrimp heads, coconuts or sometimes conch. The target fish are generally red snapper and hogfish, however whatever fish aggregate in the traps are usually harvested. Both juvenile fish and ornamental reef fish end up in the traps and interviewed fishers indicated that these non-target species are rarely thrown back into the water alive. Fish pots are mostly used in the south, especially in the Monkey River fishing communities.

Lines

Hand line

Hand line fishing or drop fishing consists of tying a hook to a line with a weight on the end, baiting the hook with sprat, shrimp, or small fish, and throwing the line in the water. The line is not attached to a reel, it is simply held in the hand. Sometimes the line is tied around a plastic or wooden spool. Fishers will use different sized hooks depending on the type of fish that is targeted. Multiple hooks can be tied to each line. Hand line fishers generally target snappers (yellow tail, red, schoolmaster), grouper, grunts, rockfish, jacks, or other finfish. Fishers will drive out to patch coral heads in their skiff (panga) and fish from 1 to 4 days at a time. Hand line fishing is also the method of fishing used at fish spawning aggregation sites. Some fishers will use a hand line attached to a winch to fish in deep slope areas. The fish caught by hand line is mostly for subsistence, however, it can also be sold locally and for export (Zeller *et al.*, 2011). Hand line fishing is common all along the coast of Belize. Hand line fishers are required to have a fishing license with the Belize Fisheries Department.



Figure 14. Fisherman using a hand line.

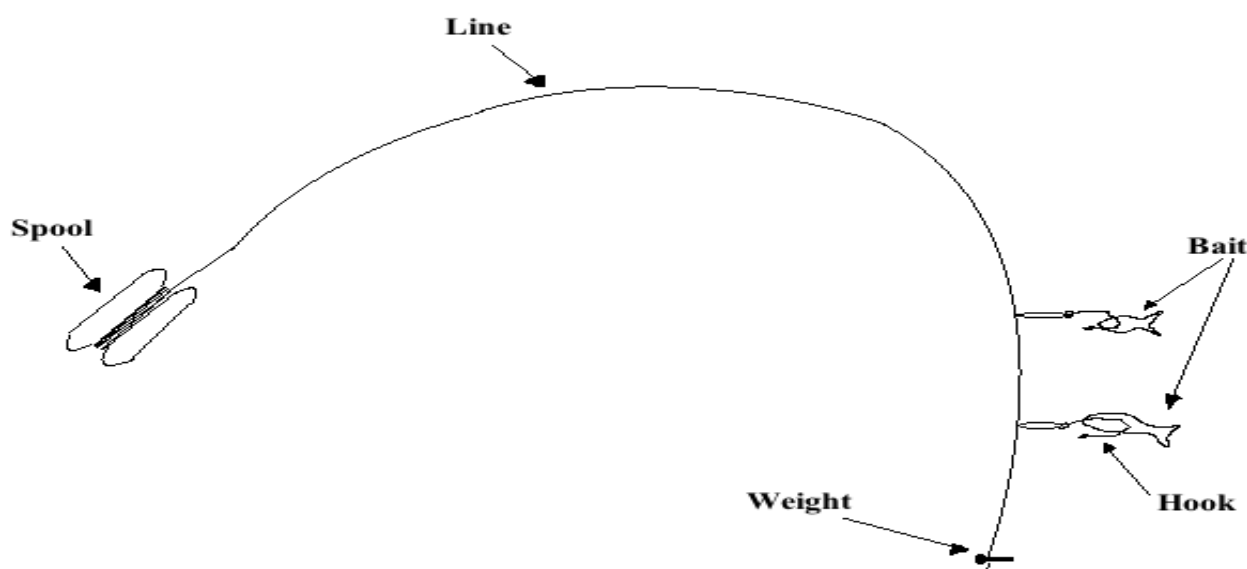


Figure 15. Simple diagram of elements of a hand line.

Set line

A set line is similar to a hand line, however, instead of holding the line in the hand, a fisher will tie it to a post in the water and come back for it later. Again, multiple hooks are used on the line. Snappers and groupers are usually the targeted fish for a set line. As with hand lines, the catch is most commonly for subsistence, however it may also be sold locally or to co-ops for export. A fishing license is needed for set line fishing.

Tow line

A tow line is also similar to a hand line, but tied to the boat and towed behind the boat while moving at around 1 to 2 knots. Tow lines are used to target coastal pelagic species like barracuda and Spanish mackerel. Again, catch is generally for personal consumption but can be sold locally or for export. Tow line fishing requires a fishing license.

Fly fishing

Fly fishing is a recreational fishing method in Belize. Fly fishers will target sport fish (tarpon, permit, and bonefish). It is not limited to sport fish, however, and fly fishers may also catch snook, billfish, marlin, and mahi mahi, which do not require release after capture. Fly fishing is an angling method that uses a rod, reel and specially weighted line with an artificial “fly” on its end. Fly fishing requires a fishing license.



Figure 16. Fly fisherman on his skiff.

Long line

Long line fishing is a commercial fishing method where hundreds (or thousands) of baited hooks are strung on a line and set out in the water. Each hooked line is called a snood. Long lines can be set out in open water and collected later or they can be attached to boat and dragged from the stern. The latter is more common because fishers report that leaving the lines in the water often results in loss of hooks as they become entangled and this becomes very expensive. In Belize, long line fishing is mostly used to target pelagic sharks. No specific license is needed for long line fishing other than a fishing license, however a permit is needed for shark fishing. There are often high rates of bycatch in the form of turtles, juvenile fish, or sea birds. Long lining is not permitted in marine reserves or replenishment zones (no take zones).

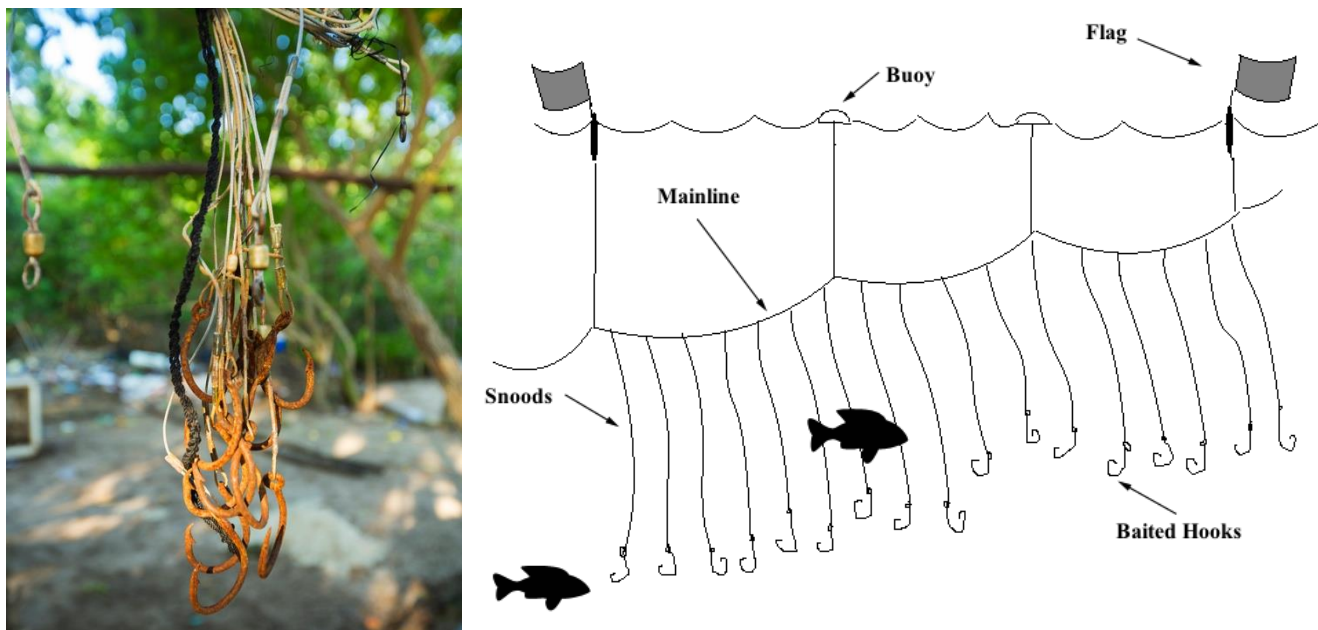


Figure 17. Long line fishing hooks hung up at a fishing camp (left). Simple diagram of pelagic long line fishing set up (right).

Rod and reel

Rod and reel fishing is mostly used by sport (recreational) fishers in Belize to catch tarpon, permit, bonefish, marlin, tuna, barracuda, wahoo, and mackerel. It is also called trolling and is mainly used in deep water. Protected game fish (tarpon, permit and bonefish) must be released after capture. A fishing license is required for rod and reel fishing.



Figure 18. Rod and reel on a sport fishing boat.

Electric reel

Electric reels are again mostly limited to recreational or commercial fishers and used in deep waters off of Belize. Target species are large pelagics such as mackerel, marlin, barracuda, wahoo, mahi mahi and protected game fish. A fishing license is required to use electric reels.

Spears

Sling (trident)

A sling (Hawaiian sling or trident) is a type of spear with rubber tubing that wraps around the wrist. It can vary in size but 5.5 feet is a standard length. It is traditionally three-pronged and it is used to catch lionfish and other finfish. The fisher will pull the spear back, stretching the rubber tubing around their wrist, and then release the spear to shoot toward the target fish. Fishers who use a sling or trident to catch lionfish are allowed to use SCUBA gear, however, these are the only conditions under which SCUBA gear can be used in fishing in Belize. The sling is not permitted for use in marine reserves.



Figure 19. SCUBA diver with trident spear, fishing for lionfish.

Hook stick

A hook stick is a traditional fishing tool used mainly for commercial and recreational lobster catch. It is a few feet (3-4) long with a barbless hook attached to one end. The fisher will free dive to where a lobster has been spotted (usually under natural coral ledges) and hook it under the belly to bring it back up to the boat. Some fishers prefer to use snares or jamo (net bags) to catch lobster as they do not kill the lobster. A hook stick can kill a lobster, which can be problematic if it is brought up and discovered to be smaller than the legal size limit (3 inches cape length). Hook sticks are used by fishers throughout Belize, but they are reportedly more common in the North and on Half Moon Caye, Turneffe Atoll, and Lighthouse Reef.



Figure 20. Hook stick modified with floats and used to pull fish in off a line. Hook sticks that are used to catch lobster do not have the floats on the end.

Spear gun

Spear guns are used to catch hogfish, barracuda, grouper, snapper and lionfish in Belize. Spear guns are rubber powered or pneumatic powered. In Belize, the most common spear guns are rubber powered. Rubber tubing is stretched on the spear to the trigger to load the gun. Then, as the tubing is released, the spear is propelled forward towards the targeted fish. Spear fishing is not permitted in marine reserves.



Figure 21. Fisher with a spear gun.

Other

Skin Diving (free diving)

Skin diving, or free diving, with a mask and fins is the method used to collect conch and sea cucumber in Belize. Fishers will collect these target species by hand and bring them back to their boats (sailboat, skiff, dory, or dugout canoe). A fishing license is needed to catch conch and a special permit is required to catch sea cucumber. Lobster fishers will also skin dive to catch lobster from underneath lobster shades (casitas) or ledges where lobster congregate. Spear fishers will also skin dive to catch finfish.



Figure 22. Skin diver with three-pronged sling.

References

- Belize Fisheries Act. Chapter 210. Revised Edition 2003 ([pdf](#))
- Biery, L. (2013) The status of gillnet fisheries in Belize waters. *Oceana* ([pdf](#))
- Huitric, M. (2005) Lobster and Conch Fisheries of Belize: a History of Sequential Exploitation. *Ecology and Society* 10 (1): 21 ([pdf](#))
- Poseidon Aquatic Resources Management. (2013). Support to Update the Fisheries Regulations in Belize. Final Technical Report. ([pdf](#))
- Sarteneja Association for Conservation and Development (2013). Planning for a Sustainable Fishery. ([pdf](#))
- Zeller, D., Graham, R., Harper, S., 2011. Reconstruction of total marine fisheries catches for Belize, 1950-2008. In: Palomares, M.L.D., Pauly, D. (eds.), *Too Precious to Drill: the Marine Biodiversity of Belize*, pp. 142-151. Fisheries Centre Research Reports 19(6). Fisheries Centre, University of British Columbia [ISSN 1198-6727]. ([pdf](#))