



Impacts of Bottom Trawling

on Fisheries, Tourism, and the Marine Environment

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Belize bottom trawl. J.Stockbridge

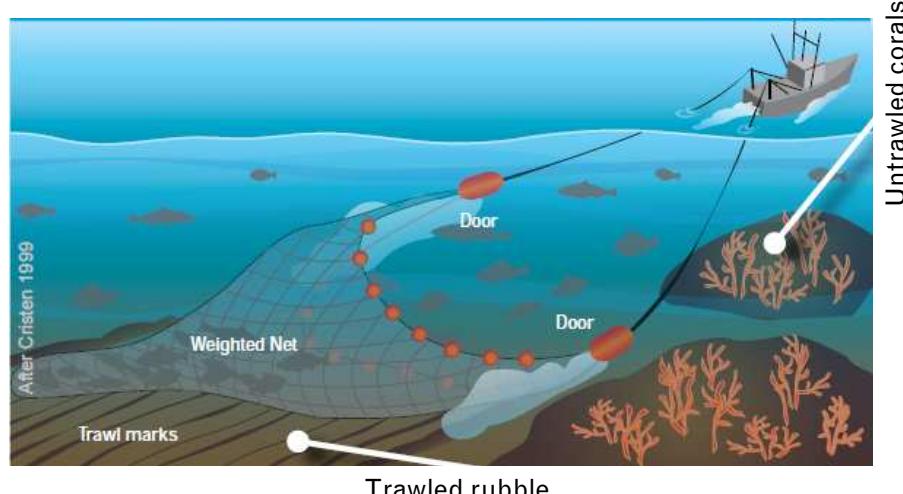
Impacts of Bottom Trawling

Bottom trawl nets are used to catch shrimp and fish living on the seafloor from shallow coastal waters to extreme depths of 6,000 feet (2km) (Morgan & Chuenpagdee 2003). In addition to the shrimp, many other animals are captured and later discarded, including undersized fish (Kelleher 2005, Clucas 1997). Shrimp trawling is one of the most indiscriminate kinds of fishing because the small mesh used to retain the shrimp allows few other animals to escape (Kelleher 2005).

Bottom trawling uses heavily weighted nets that are dragged across the ocean floor. Metal

"doors" that can weigh more than several hundred pounds are used to hold open the net, which can be as large as 40 feet tall and 200 feet wide (Morgan & Chuenpagdee 2003, Stiles et al. 2007). In some regions, additional weights and hard rubber wheels are added to the front of the net.

When the weighted nets and trawl doors are dragged along the seafloor, everything in their path is disturbed or destroyed, including seagrasses, coral reefs or rock gardens where fish hide from predators (Roberts et al. 2005).





Fish dumped by trawlers in Belize attract pelicans. P.Lobel

Fish Thrown Away

Bottom trawling is one of the most destructive ways to catch fish, and is responsible for up to half of all discarded fish and marine life worldwide (Kelleher 2005). Valuable fish, turtles, seabirds, marine mammals and other animals are all captured and discarded by bottom trawls, and many do not survive (Morgan & Chuenpagdee 2003). In a side-by-side comparison, bottom trawling for spot prawns threw away nine times as much bycatch as more selective fishing gear (Reilly et al. 2002).



Unwanted fish caught in bottom trawl. R. Visser, Greenpeace

In the Gulf of Mexico, scientists estimate that for every pound of shrimp caught, between four and ten pounds of marine resources are thrown away (Harrington et al. 2005, Nance and Scott-Denton 1997, Alverson et al. 1994). Shrimp trawling in the Caribbean and Central America also has high discard rates, with shrimp trawls in Panama discarding more than 80% of their catch (Teutscher 1999 in Kelleher 2005). Even small-scale fisheries catch high percentages of unwanted fish and marine resources when using bottom trawls, including Brazil as well as Trinidad and Tobago (Kelleher 2005). In 2007, shrimp trawlers in Belize landed only 19 metric tons of shrimp (FAO) and likely discarded about 76 to 190 metric tons of other marine life. The fish thrown away by bottom trawlers in Belize are probably a third of total spiny lobster landings for the same year.



Fly fishing in the cayes. M. Paz, Green Reef, Marine Photobank

Impact on Fisheries

Shrimp trawls compete directly with traditional cast nets, a less wasteful and more fuel-efficient gear which catches higher quality shrimp (Ramos et al. 1997).

Fish that are “unwanted” and discarded by the bottom trawler are often juveniles of valuable species caught by other fishermen. Caribbean bottom trawls commonly catch juvenile grouper and snapper (Clucas 1997) and Gulf of Mexico shrimp trawls catch significant numbers of red snapper, porgy, and mackerel (Harrington et al. 2005). In Belize, scientists working near bottom trawlers see slicks of snappers and other dead fish in their wake (P. Lobel, symposium presentation).

Bottom trawling often leads to overfishing because the gear is not selective and discards a lot of dead fish. Overfishing by bottom trawls is a direct threat to local fishing communities and to tourism from sport fishing.



Young snapper discarded by trawler in Belize. P. Lobel



Lobster fisherman. J. Stockbridge

Impact on Fisheries (continued)

Local fishermen catch fewer fish for the same effort when competing with bottom trawls (Whitmarsh 2003, Ssentongo 1988). In Indonesia, local fishermen's catches declined 40% after bottom trawling expanded (JALA). Bottom trawls also conflict with the operation of other kinds of fishing gear, leading to disputes with

lobster and crab fishermen in the US. Industrial trawlers operated by foreign fleets drag through the gear of local fishermen in Guinea, destroying wooden canoes, other gear, and causing personal injuries (Lowrey 2004, EJF 2007, JALA).

Dead fish discarded by a bottom trawler. NOAA





Spanish trawler fishing illegally at night. Oceana, J.Cuetos

Illegal fishing and the Deep Sea

Inherently destructive fishing gear is especially dangerous when used for illegal fishing, because a small number of illegal fishermen can cause a lot more damage than they would if using more selective gear. For this reason, banning destructive gear is an important step against illegal fishing, especially when resources for enforcement are limited. Destructive gears are also particularly risky in offshore waters, where law enforcement is more difficult and deep sea fish are more easily overexploited.

Belize's deep sea resources remain unknown and are likely to include similarly vulnerable species (W.Heyman, *pers.comm.*). Many deep sea fish are exceptionally slow-growing, late-maturing, and do not tolerate heavy fishing pressure (Roberts et al. 2005). One of the quickest-ever boom-and-bust fisheries targeted a deep sea fish, the orange roughy, which doesn't mature until 20 or 30 years old and lives for more than 125 years ((Froese & Pauly 2004, Koslow et al. 2000).



Spotted eagle ray.Oceana, H.Kaddachi

Impact on Tourism

Ocean-based tourism involving snorkeling, diving, and sport fishing is one of Belize's most important economic activities, and is directly threatened by discards of the marine wildlife people most want to see. Bottom trawling not only affects valuable fish species, but also threatens sea turtles, sharks and rays, seagrasses and coral reefs (Morgan & Chuenpagdee 2003). Tourists are

willing to pay more for a dive trip during which they are likely to see marine wildlife; including approximately \$30 more to see a sea turtle, \$35 to see a shark or \$55 to see a healthy coral reef (Oceana 2008). Several endangered and threatened species in the US are in decline primarily because they are caught incidentally in destructive fishing gear, including the smalltooth sawfish.

Diver with horse-eye jacks. Oceana, H. Kaddachi





Sea turtle caught by destructive fishing gear. NOAA

Impact on Tourism (continued)

Corals, seagrasses and other seafloor habitats are especially vulnerable to disturbance by bottom trawling, and can be extremely slow to recover (NRC 2002). Bottom trawling flattens any upright structure on the seafloor (NRC 2002, Koslow et al. 2000), destroying coral reefs and other places where juvenile fish hide. Hard-bottom areas away from the reef

are also likely to be vulnerable to bottom trawling, though the impacts may not be as long-lasting as with deep sea corals. Recent mapping of southern Belize waters where bottom trawling takes place revealed a series of small rock outcroppings, which may provide refuges for groupers as they move from the mangroves to the reef (P.Lobel, *pers.comm.*).

Untrawled Coral



Trawled Coral



Florida's Oculina Banks. G.Gilmore, Dynamac / L.Horn, NURC, UNCW

Bans on Bottom Trawling

Bottom trawling has been banned in many different locations worldwide:

Indonesia

The government of Indonesia banned bottom trawling to increase catches and income for local fishermen and to end conflicts with industrial trawlers. (JALA)

Florida, Georgia, North Carolina, and South Carolina (US)

The South Atlantic Fishery Management Council banned bottom trawling in 23,000 square miles of rare deep-sea corals from North Carolina to Florida. This ban followed the destruction of more than 90% of a nearby bank of Oculina corals by trawling.

California, Oregon, Washington, Alaska (US)

The Pacific and North Pacific Fishery Management Councils banned bottom trawling in more than 840,000 square miles of seafloor in the Pacific, Bering Sea, and the Arctic. The state of California banned bottom trawling for spot prawns to reduce discards and increase prawn catches for fishermen using more selective gear.

Hawaii and Pacific Islands (US)

The Western Pacific Fishery Management council banned bottom trawling in 1.5 million square miles around Hawaii and other Pacific islands in US waters. Bottom trawling is also banned in more than 330,000 square miles of the Pacific islands from Samoa to the Mariana Trench which are protected as a National Monument.

Azores, Madeira, and Canary Islands

Bottom trawling is banned in more than 500,000 square miles of Atlantic waters surrounding the Canary Islands, Madeira, and the Azores.

New Zealand

The New Zealand government banned bottom trawling in large areas of seamounts and hydrothermal vents.

Mediterranean (Europe and North Africa)

The General Fisheries Commission for the Mediterranean banned bottom trawling in approximately 630,000 square miles of deep sea waters.



Children play in a fishing canoe. M. Paz, Green Reef, Marine Photobank

Bottom Trawling in Belize

From Punta Gorda to Placencia, from Sarteneja to San Pedro, responsible fishing is critical to maintaining healthy fisheries, reefs, and villages.

Fishing is one of the most important employers and sources of protein for coastal communities in Belize. Yet bottom trawls and other kinds of unselective fishing gear cause harm to other fisheries and to the marine environment by catching juvenile fish, damaging the seafloor, and leading to overfishing.

Bottom trawl nets can also harm coral reefs, sharks, and sea turtles that attract valuable tourism to Belize. The majority of international tourists come to Belize in order to participate in an ocean-related activity such as snorkeling, diving, or sport fishing charters, bringing hundreds of millions of Belize dollars each year to the economy (Richardson 2007).

Destructive fishing gears ruin future development opportunities for Belize by undermining both fisheries and tourism, which depend on a healthy marine environment.

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