



Project GloBAL

Global Bycatch Assessment of Long-Lived Species

Country Profile

GUYANA

DRAFT



WIDECAST

Wider Caribbean Sea Turtle Conservation Network

Guyana (GY)



Figure 1, National Flag of Guyana

Geographic Coordinates: 5 00 N, 59 00 W¹

Terrestrial extent (km²): 214,970²

Coastline(km):

EEZ Extent (km²): 137,765²

Shelf (km²): 50,578²

**Other countries operating:
within this EEZ:**

Venezuela, Trinidad &
Tobago, Suriname

Total Landings: 59,106 mt

Population (July 2006): 767, 245²

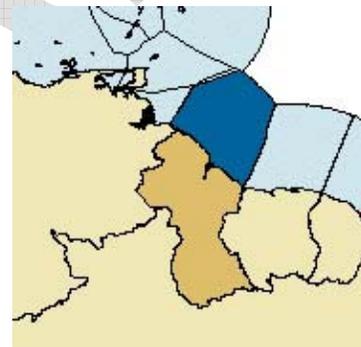


Figure 2. COUNTRY MAP

EEZ ■ Country ■ Disputed ■ FAO area
Other EEZ ■ Other countries ■ High seas Not included

Description:

Guyana is the third smallest country in South America and is sited between Venezuela and Suriname in the northeastern corner of the continent (**Figure 2**). Although the largest English-speaking country in the Caribbean, Guyana is relatively sparsely populated Independent from Great Britain since 1966, Guyana is a (voting) member of the Commonwealth, CARICOM, FAO (WECAFC), and the OAS. The major languages are English, Amerindian languages, Creole, Hindi, Urdu

¹ SAUP

² Worldfact Book CIA 2006

Figure 3. Map of Guyana's EEZ

The Fisheries of Guyana

Overview

The fisheries of Guyana are largely inshore and artisanal. There is not an intense high seas fishery effort off the Guianas and “most of Guyana's fishing effort occurs in relatively shallow waters of the continental shelf, within 60 km from the shore. The marine resources exploited within the EEZ are mainly the demersal fishery resources and, to a much more limited extent, the pelagic fish resources over the continental shelf and toward the continental slope” *Government of Guyana (1997)*. In 2002, 86% of the total finfish landed was from the artisanal fishery (FAO 2005). FAO (2005) noted that fisheries contributed GY\$ 157,000,000³ to the GDP in 2004. There are about 4600 artisanal fishermen (Government of Guyana, 2006). The industrial fisheries in Guyana are the trawl fisheries capturing shrimp resources of the continental shelf. Commercial exploitation of 4 species penaeid shrimp began in the 1950's under foreign ownership (FAO, 2005). Currently there are approximately 127 commercial trawlers active (Government of Guyana, 2006). Guyana briefly experimented with finfish-targeting trawlers, but there are no trawlers licensed specifically for finfish today/ The inshore artisanal fleet numbers approximately 1,300 artisanal fishing boats (Laurent et al., 1999; Weidner et al, 2001; FAO, 2005). There are no currently foreign registered or licensed trawlers (FAO 2005).

1. What fisheries exist in this territory and what are the target species?

Marine capture fisheries in Guyana are directed at exploiting its shrimp resources (FAO 2005). The most valuable fishery is the penaeid fishery targeting 4 species of *Penaeus* (*P. brasiliensis*, *P. notalis*, *P. schmitti* and *P. subtilis*). Seabob and whitebelly shrimp (*Xiphopenaeus kroyeri* and *Nematopalaemon schmitti* respectively) comprise the other major components of the shrimp fishery (Table 1). The industrial fishery is dominated by the seabob (*Xiphopenaeus kroyeri*) fishery, which began in 1984. As foreign fleets were replaced by local entities, the foreign-owned vessels that targeted penaeids were reconfigured primarily for *X. kroyeri*, which now surpasses penaeid fishery in total landings (FAO 2005).

The groundfish complex captures deep-slope species (Lutjanids like *L. purpureus*, *L. synagris*), weakfish; *Macrodon ancylodon* (locally called “bangamary”), *Micropogonias* and *Cynoscion spp.*) and sea catfish (*Arius spp.*). Groundfish are caught in commercial operations as bycatch or targeted fisheries by artisanal fishers. There is a partially-directed shark fishery that captures both demersal and pelagic inshore species (e.g. *Carcharinus limbatus*) in gillnets, seines and artisanal longlines (FAO, 1999; M. Kalamandeen, pers. com)

There is no legal sea turtle fishery, since a moratorium was enacted in 1957. TED use in the shrimp industry was introduced in 1994.

³ 1US\$ = G\$199.79

2. What are the specific gear types for these fisheries?

The industrial shrimp fisheries (*Penaeus* and *Xiphopenaeus*) utilize Gulf of Mexico standard steel-hulled vessels with twin otter trawl nets, 10-16 m long. In the period that foreign fleets were involved in the shrimp fisheries, Shepherd et al (1999) reported some country-specific differences in vessels and fishing techniques.

Currently, there are 31 trawlers fishing for penaeid shrimp and 96 vessels for seabob/finfish, under-filling the 45 and 102 ceilings respectively. The penaeid and seabob/finfish fleets both use nylon or polyethylene jib trawl nets with 4 – 5cm stretched mesh in the wings and 2.5 – 3.5 cm stretched mesh in the cod-end (Shepherd et al., 1999) Tow times average 4-6 hours for Penaeid shrimp and 2-4 for *X. kroyeri* (Table 2). The penaeid shrimp trawls are equipped with tickler chains which stir up the bottom substrate and cause the shrimp to jump into the nets. The seabob/finfish trawls are fitted with drop chain around the mouth opening of the nets. They tow two 14 to 16 m nets per trawl (Shepherd et al., 2000). Smaller trawlers were used to target finfish. These finfish trawlers used strewn trawl nets with 10.16 cm mesh size (Shepherd et al., 2000). There are currently no trawlers targeting only finfish (e.g. *M. ancylodon*, *M. furnieri*, *Arius* species).

The artisanal fishing fleet has approximately 1129, vessels (Government of Guyana, 2006), lower than the 2005 estimate of 1331. Fishing craft are wooden and range in size from 6-18 m. Propulsion methods include sail, outboard or inboard motor). Artisanal vessel registration is incomplete and not all registered vessels are licensed to fish (M. Kalamandeen pers. com). They engage in multi-species, multi-gear fisheries including Chinese seines (fyke nets) and gillnets, various seines and hook and line fishery (cadell lines, handlines. Larger boats are equipped with ice boxes and engage in fishing trips extending up to 18 days (FAO 2005)

Multifilament gillnets (drift and bottom set) are the most widely used gear (FAO 2005), deployed by over 60% of the artisanal fleet). Over 750 boats set drift gillnets to target snook (*Centropomus*), weakfish (*Cynoscion* spp., sea catfish (*Arius* spp⁴), sharks (*Carcharhinus* and *Rhizoprionodon* spp) (Lurent et al.) Bottom set gillnets use braided nylon with stretched smaller mesh sizes 9 – 10 cm (or 17.5 to 20 cm)

Chinese seines fishing takes place at or around the mouths of rivers, and target whitebelly shrimp, *N. Schmitti*, *X. kroyeri*, *M. ancylodon* and *Nebris microps* are also caught, along with the shrimp. Chinese seine vessels use funnel shaped fyke nets with mesh size of 8 cm (3.15 inches) at the mouth and 1 cm (0.39 inches) at the tail end (Shepherd et al., 2000). The 1994 Frame survey estimated 253 vessels deployed these seines, but the Department of fisheries (DOF) 1996 estimate is 354. The 2006 Draft FMP estimate for this fishery is 285 vessels. Pin seine fishing was reported as practiced by 46 vessels, 5% of the artisanal fleet (1994 Frame Survey), but the estimated number of vessels in 2006 was 17.

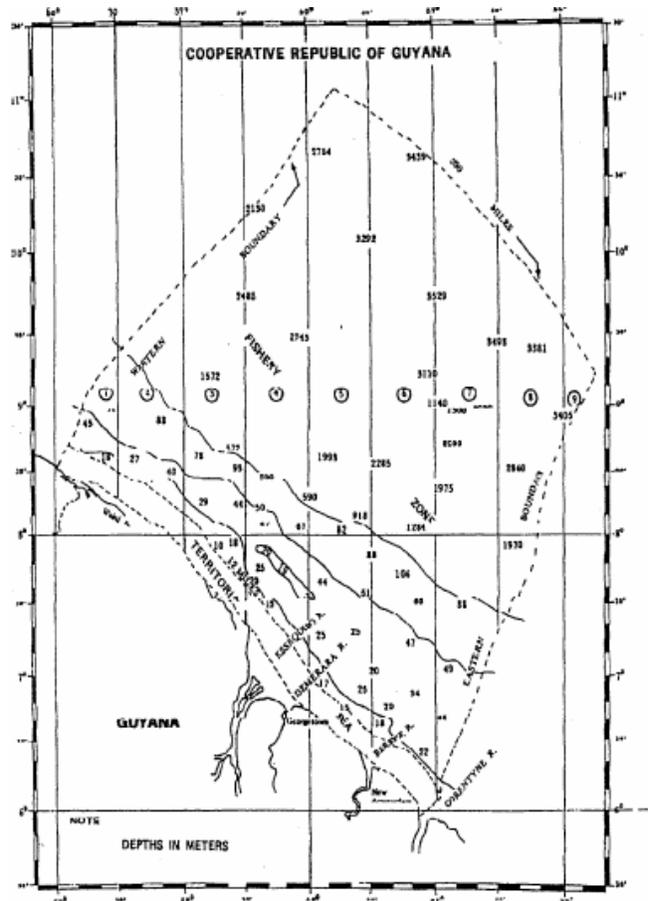
The cadell or demersal longline fishery targets sea catfish (*Arius parkieri*, *A. proops*) and several species of sharks. The deep-slope fishery targets Lutjanids (*Lutjanus* spp.) and Serranids (*Epinephalus* spp) using multiple gear types- primarily handlines and fish pots (traps). Vessels in this semi-industrial fishery are 18 m long, and fish at depths from 120m deep to the edge of continental shelf. The number of vessels using handlines declined to 11 in 1996, as fishers switched to gillnet fisheries.. Today 75 handliners operate in Guyanese waters. The 55

⁴ *Arius* species including *A. parkeri*, *A. phrygiatus*, *A. proops*

Guyanese-owned vessels now deploy traps and pots while the Venezuelan vessels continue to use hook and line gear.

3. Where and when are the different gear and fisheries deployed for each of these fisheries (Seasonality, trip duration, etc)?

The penaeid fishery typically operate 40-145 km offshore in waters 18-91 meters in depth, usually beyond the 34 m isobath (Shepherd et al., 1999; FAO, 2005). The seabob/ finfish



trawlers operate in shallower waters, 10-20 m deep. Trawlers tend to operate in muddy, sand or gravel bottomed area and fish in the following manner: statistical Fishery Zones 1-6 in January,

Figure 4. Guyana Fisheries Statistical Zones (from Shepherd et al., 1999)

with a gradual movement to the east to zones 4-8 by April (**Figure 4**). They return to Fishery Zones 1-7 in May and remain until the September, when they switch to Zones 2-6. In December, the prominent zones covered are Zones 3-8.

The most productive period for fishing is between March and October, coinciding with the greatest abundance of seabob, whitebelly shrimp and the nectobenthic fish. Coastal pelagic (*Scomberomorus* spp.) are most abundant between May and September. Penaeid shrimp vessels spend an average of 30 days at sea. The seabob trawlers spend 5 – 9 days at sea, but an average

trip lasts 7 days. A typical seabob vessel makes 2 - 3 trips per month, and an average of 30 trips per annum.

Drift gillnets (also called drift seines) are deployed in coastal waters 31- 39 km from shore in waters 18-36 m deep.

The Chinese seine vessels operate with the tide and as such they make 1 or 2 trips per day, with each trip lasting between 6 - 12 hours (**Appendix II**). Circle seines are used in the Corentyne River

4. What species of marine mammals, sea turtles and seabirds occur and/or are caught as bycatch and/or may be at risk for capture or interaction with fisheries?

Marine Mammals

Appendix II lists marine mammals whose distributions overlap with Guyana's EEZ. No information exists on the bycatch of marine mammals in Guyanese waters. However the IWC's Scientific Committee's (SC) draft report on small cetaceans of the wider Caribbean (IWC/SC 2006) cites information from French Guiana and Venezuela. Bottlenose dolphins are incidentally captured in both gillnet and trawl fisheries in those countries. Tucuxi, the grey dolphin, *Sotalia fluviatilis* is known to suffer incidental capture in gillnets and seines throughout its range which includes the Guianas. A review of French Guiana strandings data showed that all stranded animals were *Sotalia*. In one case, six out of eight animals had net marks. (IWC/ SC, 2006) The SC review notes that each year dozens of animals are found stranded with net marks in Brazil, French Guiana and Venezuela and recommends special attention to *Sotalia* and other small vulnerable coastal populations. Bouillet (2002) examined the threats to Tucuxi in French Guiana.

Sea Turtles

Five of the six sea turtle species of sea turtles found in the Wider Caribbean occur in Guyanese waters, with nesting populations for four; (*D. coriacea*), *L. olivacea*, *E. imbricata* and *C. mydas*).

Information on the interaction between sea turtles and trawl fisheries on the Guianas shelf has been available since the 1970s (Pritchard 1973, 1991). Although leatherbacks and olive ridleys occur in the highest densities in the Guianas shelf, and show a corresponding frequency in shrimp trawls, juvenile greens and loggerheads are also taken as bycatch (Tambiah, 1994; Reichart et al. 1999, Weidner, 2001). Tambiah (1994) estimated that trawl nets caught 1300 turtles annually, with mortality rates of 60%. Sea turtle bycatch rates for neighboring French Guyana are given in Moguedet et al. (1994). Based on the reports (Tambiah, 1994; Reichert et al., 1999; Shepherd and Ehrhardt, 2000; FAO, 2005) our estimate of an overall sea turtle bycatch rates for trawl fisheries are between 0.003- 0.009- turtles/ trawl hr.

Tambiah (1994) also reports, without references that gillnet fisheries in Guyana and Suriname are an even bigger threat than trawl fisheries, incidentally capturing 21, 600 sea turtles a year. Conflicting information in Tambiah (1994) creates some difficulties in pinpointing the seasonal overlap between fisheries and sea turtles undertaking reproduction-related movements. However, the report documents the highest incidences of olive ridley bycatch as occurring during the period prior to the nesting "arribadas" in Suriname (January to March) coinciding with peak period for shrimp fisheries (February to May)

While none of the Guianas use high seas fishing gear, there is potential for the Venezuelan longline and drift net fisheries in the EEZs of the Guianas to cause incidental capture of sea turtles.

Sea birds

No information exists on the bycatch of sea birds.

5. *What collection methods exist for gathering fishing effort and bycatch data?*

The Fisheries Division has data of monthly shrimp landings data on from 1981 and the number of days fishing per trip is available from 1990-1996. Fishing effort (days fished) is number of trips by trip length (30-day average) (Shepherd and Ehrhardt, 2000). The Government through the Ministry of Fisheries, Crops and Livestock has implemented an observer program. Guyana's Marine Turtle Conservation Society is undertaking a sea turtle bycatch assessment project in collaboration with WWF Suriname (M. Kalamandeen pers. com)

6. *Are there databases or datasets (including geospatial databases) on fisheries, fishing effort or bycatch of marine mammals, sea turtles or sea birds?*

Guyana has accumulated several decades of catch and effort data but there are no maintained databases for this information. Coastal zone geodata maybe available through the geospatial unit of the Environmental Protection Agency

7. *What bycatch studies or bycatch mitigation projects for marine mammals sea turtles, and sea birds, if any have been undertaken or are ongoing in the area?*

Project title: [Sea turtle Bycatch in Guyana's artisanal Fishery](#)
 Institution: [WWF Suriname/ GMTCS](#)
 Objectives: [Bycatch of sea turtles \(species?\) in the Guyana](#)
 Dates: [_ to August, 2006](#)
 Contact: **Michelle Kalamandeen**

8. *Are there bycatch research/ mitigation/ management projects for other taxa?*

Finfish bycatch from trawl fisheries managed through regulations mandatory 15% retention of bycatch landings. TED use in trawlers has been mandatory since 1994

9. *What policy/regulatory framework exists to guide fisheries or bycatch management?*

National Fisheries legislation

The Fisheries Act of 2002 replaced the 1957 statute. There is a mandatory TED requirement through out the Guianas (except French Guyana). However the dimensions of the escape hatch do not allow leatherbacks to escape.

International Framework

A 200 nm EEZ was established by the EEZ (Designation of Area) Order 1991 as provided for by the Maritime Boundaries Act of 1977. The *CIA World Factbook* states "all of the area west of the Essequibo river claimed by Venezuela preventing any discussion of a maritime boundary;

Guyana has expressed its intention to join Barbados in asserting claims before UNCLOS that Trinidad and Tobago's maritime boundary with Venezuela extends into their waters; Suriname claims a triangle of land between the New and Kutari/Koetari rivers in a historic dispute over the headwaters of the Courantyne; Guyana seeks arbitration under provisions of the UN Convention on the Law of the Sea (UNCLOS) to resolve the long-standing dispute with Suriname over the axis of the territorial sea boundary in potentially oil-rich waters” There is an agreement with Barbados (December 2003 agreement). Previous fishing access agreements are listed in Table 1.

Table 1. Fishing access agreements

Country fishing	Access period * assumed date	Reference(s)	Fished taxa
Barbados	1978 - 1980	Anon (unknown year)	some
Barbados	1978 - 1978	Weidner and Hall (1993)	all
Barbados	1989 - 1991	Anon (1989)	all
Barbados	1989 - 1989	Weidner and Hall (1993)	all
Cuba	1974 - 1981	Weidner and Hall (1993)	some
Cuba	1978 - 1979	Anon (unknown year)	some
Former USSR	1977 - 1980	Weidner and Hall (1993)	all
Germany	1979 - 1981	Anon (unknown year)	some
Germany	1979 - 1981	Anon (unknown year)	some
Jamaica	1983 - 1985	Anon (1983)	all
Jamaica	1984 - 1986	Bonfil et al. (1998)	all
Japan	1979 - 1982	Weidner and Hall (1993)	all
Suriname	1979 - 1981	Anon (unknown year)	some

- International instruments and agreements.

Table 2 provides a listing of key agreements and indication of Guyana’s status under these

Table 2: Key international Agreements

Agreement short form	Agreement long form	Status
CARICOM	Caribbean Community	Member
CBD	Convention on Biological Diversity	Ratified
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora	Ratified

UNCLOS	United Nations Convention on the Law of the Sea	Ratified
WECAFC	Western Central Atlantic Fishery Commission	Member
FAO Code of Conduct		
Stradd. /Highly Migr. Fish St. Agr.	Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks	Non-party
London Dumping Convention	Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter	Non-party
Cartagena Convention	Convention for the Protection and Development of the Marine Environment the Wider Caribbean Region	Non-party
IWC	International Whaling Commission	
SPAW Protocol		Non-party

10. Have research and management needs priorities or constraints been identified or recommended? (include gear/ technological developments or prohibitions that might impact)

FAO (2005) lists concerns pertinent to our reviews and include IUU fishing in the distant portions of the shelf and Guyanese EEZ and the prohibition of gear that destroy habitat and catch immature fish.

The Guiana Shield Sea Turtle Conservation Regional Strategy Action Plan: Fishery Sector Report (Laurent et al., 1999) recommended

- deriving regional estimates for incidental capture and mortality from fisheries
- assessing the population-level impacts of sea turtle bycatch, especially on nesting females
- identify hotspots for sea turtle bycatch
- instigating TED use in French Guiana
- modification of TEDs to accommodate leatherback sea turtles.
- identify possible mitigation measures

Turtle Excluder Devices have been mandatory since 1994. However the escape opening of current TEDs does not permit leatherbacks to escape. Tambiah (1994) noted that if TED used resulted in a decrease in finfish bycatch, then fishing effort might shift to gillnet fisheries which cause significantly higher levels of bycatch than trawl fisheries.

Penaeid / Seabob fishing areas are demarcated by the 36m isobath, with penaeid fishing restricted to deeper waters). The increasing proximity to inshore waters by trawling fleets has engendered conflicts with the artisanal fleet and will have some impact on the interactions with sea turtles and possibly marine mammals. Research i

11. Are other individuals in relevant government agencies or non-governmental organizations that may be able to assist us with information on fisheries?

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12. Are other individuals in relevant government agencies or non-governmental organizations that may be able to assist us with information on bycatch of sea turtles, sea birds and marine mammals?

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13. What documents (journal articles, grey literature Agency reports) describe fisheries and bycatch in this area?

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Appendix I. Guyana fisheries and associated gear types. “I” denotes industrial, “A” for artisanal fisheries and “X” unspec

Fishery by Target	Longline		Gillnets /entangling nets		Trawls		Seine nets			Traps		Falling gear	Hook & line		Hand Harvest (free dive, scuba, or wire loop)
	Pelagic	Demersal	Drift	Anchored	Mid-Water	Bottom	Boat/circle	Beach	Purse	Pots	Fyke nets	Cast nets	Troll	Hand or pole line	
<u>Ocean Pelagics</u>															
<u>Coastal Pelagics</u>			A												
<u>Coastal demersals</u>		A	A	A		I					A				
<u>Demersal shelf / deep slope spp.</u>											A			I	
<u>Shallow-shelf reef fish</u>															
<u>Sharks</u>		A	A	A				A							
<u>Crustacea (shrimp)</u>						I					A				
<u>Crustacea (lobster, crab)</u>											A				
<u>Cephalopods (squid)</u>															
<u>Sea Turtles</u>															
<u>Marine Mammals</u>															

Appendix II. Description of fisheries and fishing effort in Guyana

	Gear type	Longline	Drift Gillnets (polyethylene)	Drift Gillnets (nylon)	Trawls	
					Traps ("fish pots")	Seabob trawls
Fleet Characteristics	Artisanal / Industrial	Artisanal	Artisanal	Artisanal	Industrial	Industrial
	Target species	Sea catfish (Ariidae) and sharks	<i>Cynoscion</i> spp; Snook (<i>Centropomus</i> spp.); sea catfish (<i>Arius</i> spp); sharks (Charcharinids); Small scombrids (e.g. <i>Scomberomorus brasiliensis</i>)	<i>Macrodon ancylodon</i> (banga mary), (<i>Cynoscion</i>) spp.; butterfish (<i>Nebris microps</i>)	Penaid shrimp (<i>Penaeus</i> species)	<i>X. Kroyeri</i> ,
	Vessel type	Flat bottomed dories	V- bottomed "decked" and "undecked vessels,	V- bottom	Industrial Florida type trawlers	Industrial Florida type trawlers
	Vessel Classification/ Category (country specific)					
	Vessel length (m)	7-9	15-18	8- 10	19-21	19-21
	Number of vessels	79 (<i>Shepherd et al 1999</i>) 55 (<i>Government of Guyana, 2006</i>)	547 (<i>Shepherd et al 1999</i>) 368 (<i>Laurent et al 1999</i>) 406 (<i>Government of Guyana, 2006</i>)	242 (<i>Shepherd et al 1999</i>) ; 442 (<i>Laurent et al.1999</i>) ; 342 (<i>Government of Guyana 2006</i>)	31	96
	Engine type	Sail, paddle or outboard engine (25 hp)	Diesel powered inboard and outboard Yamaha outboard and Lister, Perkins or General Marine engines(<i>CRFM, 2005</i>)	outboard	Inboard caterpillar diesel engines or Cummings engines	Inboard caterpillar diesel engines or Cummings engines
	Avg Horsepower		Smaller vessels have 48 - 55 hp; larger vessels 210 hp	25-48 hp	365-425	365-425
	Gear Used (materials)	Cadell line (horizontal line with a series of approx. 800 dangling lines set with baited hooks 2m outward	Multifilament polyethylene with over 900 kg of netting. Stretched mesh sized ranging from 12.5 to 20.3 cm. Nets are 2-4 km long and 5-8 m in height	Multifilament braided nylon nets with stretched mesh size 9,4- 11.43 cm. Nets are 0.3- 1 km long. With over 500 kg netting	Twin otter trawler with 2 jib trawls 4 to 5 cm stretched mesh (wings) and 2.5 cod end	Twin otter trawler with 2 jib trawls 4 to 5 cm stretched mesh (wings) and 2.5 cod end
How gear deployed (including demersal/pelagic, set/drift, mid-water/bottom)	Demersal set (night time), with lines anchored at each end. Each vessel has 4-5 wooden trays each with 2-6 main lines	Typically held on the bottom, while drifting freely at one end and adjusted for water depth and target fish	set or anchored at the boat or drifting in contact with entire water column	Bottom—trawled during the night	Bottom-trawled during the day	
Effort	Crew Size	2-4	4-6	4-6		
	Where gear deployed/ area fished	Coastal areas within 92 km of the shore at depths 9- 20 m	31-39 km offshore in waters 18-36 m deep.	31-39 km offshore in waters 18-25 m deep	Continental shelf; 40- 145 km offshore in waters 19-90 m deep	Near shore (15 -30m) in waters < 34 m deep
	Fishing seasons (months)		March to October for groundfish; May to October for scombrids	March to October for groundfish; May to October for the Scombrid fish		
	Avg. trip duration (hours/days)	12 hours	10-12 days for larger vessels; 5-6 days for smaller ones	1- 3days	30 days	7 days
	Total days fished per month/ year				Between 160-256 / yr	2-3 trips per month
	Number of fishing trips per year				8	30
	Gear/vessel effort (gear & trip	Hook size/type:	Net mesh size (stretched)	Net mesh size: 7.5	Net mesh size(s): 4-5	Net mesh

Gear type	Longline	Drift Gillnets (polyethylene)	Drift Gillnets (nylon)	Trawls	
				Traps ("fish pots")	Seabob trawls
information)	Mustard 6,7,8, Number of hooks: 32,000 -50,000	12.5-20.3 cm Net length & width: 2-4 km in length and 5-8 m in height Soak time: 5-6 hrs	cm Net length & width: 0.3-1 km Soak time: 5-6 hrs	cm (wings), 2.5 cm (cod end) Foot rope length & diameter: Head rope length Horizontal opening width (m): Tow (trawl) or haul (seine) speed:	size(s): 4-5 cm (wings), 2.5 cm (cod end) Foot rope length & diameter: Head rope length Horizontal opening width (m): Tow (trawl) or haul (seine) speed:
Number of sets/hauls/soaks/tows per day and per trip	1, sometimes 2 sets /day	2 times daily	2 times daily	3-4 hauls/day	4 hauls /day
Duration/ Number of hours per set/soak/tow	Soak duration is 6-12 hours			4-6 hrs/haul	3-3.5 hrs/haul
= Total effort (list metric(s))	= 32,000-50,000 hooks per vessel * 79 vessels= 2,528,000-3,950,000 2006 estimate: 32,000-50,000 *55 =1,760,000-2,750,000			160 - 256 fishing days * 3-4 hauls per day * 4-6 hrs /haul *31 vessels = 59, 520-190, 464 trawl hours per annum	210 fishing days * 4 hauls/day* (3- 3.5) hrs /haul *96 vessels =241,920-282,240 trawl hours per annum

Appendix III: Marine Mammal species in the EEZ of Guyana (*Sea Around Us, 2006*)

<i>Balaenoptera borealis</i>	Sei whale
<i>Balaenoptera brydei</i>	Brydes whale
<i>Balaenoptera musculus</i>	Blue whale
<i>Delphinus delphis</i>	Short beaked common dolphin
<i>Eubalaena glacialis</i>	North Atlantic right whale
<i>Feresa attenuata</i>	Pygmy killer whale
<i>Globicephala macrorhynchus</i>	Short-finned pilot whale
<i>Grampus griseus</i>	Rissos dolphin
<i>Halichoerus grypus</i>	Gray seal
<i>Kogia breviceps</i>	Pygmy sperm whale
<i>Kogia simus</i>	Dwarf sperm whale
<i>Lagenodelphis hosei</i>	Frasers dolphin
<i>Megaptera novaeangliae</i>	Humpback whale
<i>Mesoplodon densirostris</i>	Blainvilles beaked whale
<i>Mesoplodon europaeus</i>	Gervais beaked whale
<i>Mesoplodon mirus</i>	Trues beaked whale
<i>Peponocephala electra</i>	Melon-headed whale
<i>Physeter macrocephalus</i>	Sperm whale
<i>Pseudorca crassidens</i>	False killer whale
<i>Sotalia fluviatilis</i>	Tucuxi
<i>Stenella attenuata</i>	Pantropical spotted dolphin
<i>Stenella clymene</i>	Clymene dolphin
<i>Stenella coeruleoalba</i>	Striped dolphin