



Project GloBAL

Global Bycatch Assessment of Long-Lived Species

Country Profile

BERMUDA



WIDECAST

Wider Caribbean Sea Turtle Conservation Network

BERMUDA (BM)



Fig. 1. Bermuda's Flag.



Fig. 2. Map of Bermuda¹.

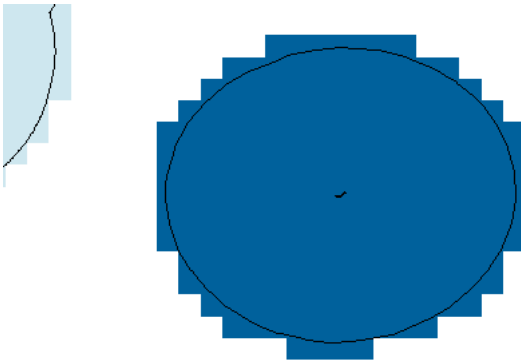


Fig. 3. Map of Bermuda's EEZ².

Geographic Coordinates: 32 20 N, 64 45 W¹

Terrestrial extent: 53.3 km²¹

Coastline: 103 km¹

EEZ area: 448,300 km²²

Shelf area: 936 km²²

Marine Fisheries Landings (production in tons):

Other countries operating in this EEZ: Unknown

Government agency for marine fisheries:

Government agency for the protection of marine environment:

¹ CIA World Factbook

² Sea Around Us Project website <http://www.seararoundus.org>

Population: 65,773 (July 2006 est.)¹

Description: English colonists who were shipwrecked on their way to Virginia settled Bermuda, an English and Portuguese speaking country, in 1609. Today, tourism is an important part of the island's economy, as is international business. Debate exists concerning independence from the United Kingdom. Bermuda is a group of islands in the North Atlantic Ocean, which are located about 700 miles east of South Carolina. Bermuda participates in Caricom (associate).

The Fisheries of Bermuda

Overview

The fisheries in Bermuda target mainly spiny lobster, grouper, snapper, tuna, and billfish (MacAlister, 2003). The fisheries are internally classified as artisanal but technologically advanced.

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

Spiny Lobsters (*Panulirus argus*):

In 1996, Bermuda reinstated a limited entry fishery for spiny lobsters (Appendix 1) (Trott et al., 2002). From 1996 to 2002, the total number of participants was between 16 and 27. The total number of offshore traps ranged from 270 to 330 and the number of inshore traps ranged from 126 to 220. The number of traps per fisher ranged from 12 to 19 offshore and 7 to 10 inshore. Traps can only be set for a four-month period during the winter (Dec. to March) in two designated areas.

In 1984, a recreational lobster diver program was established and from 1996 to 2002 the number of licenses issued ranged from 450 to 581. Recreational lobster divers are allowed to take two spiny lobsters per day during the open season. Landings for both commercial and recreational fishermen can be seen from 1996 to 2002 in Fig. 4. Catch per unit effort can be seen in Fig. 5 and 6.

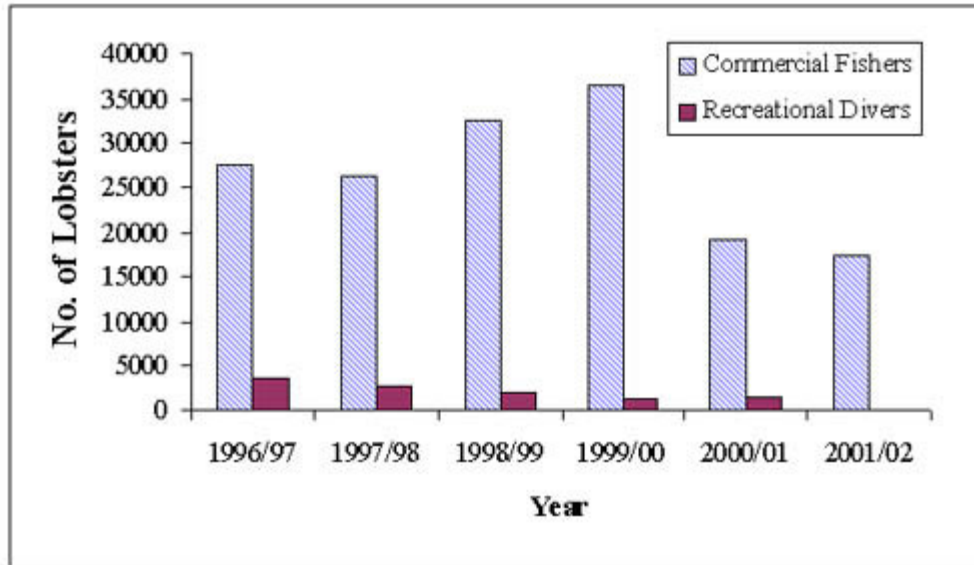


Fig 4. Number of lobsters captured by recreational and commercial fishermen from 1996 to 2002 (Trott et al., 2002).

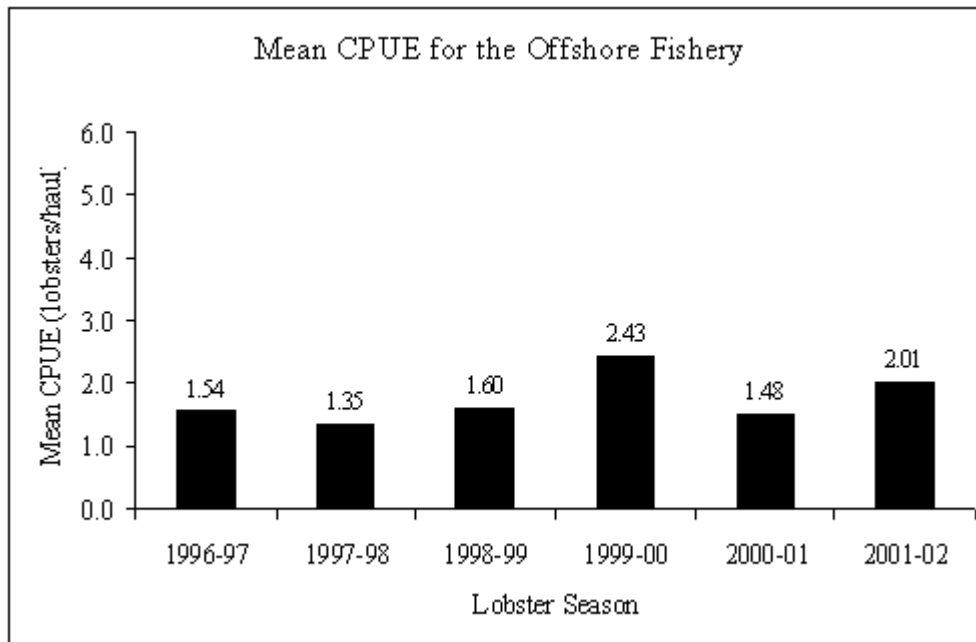


Fig. 5. Catch per unit effort for the offshore spiny lobster fishery in Bermuda (Trott et al., 2002).

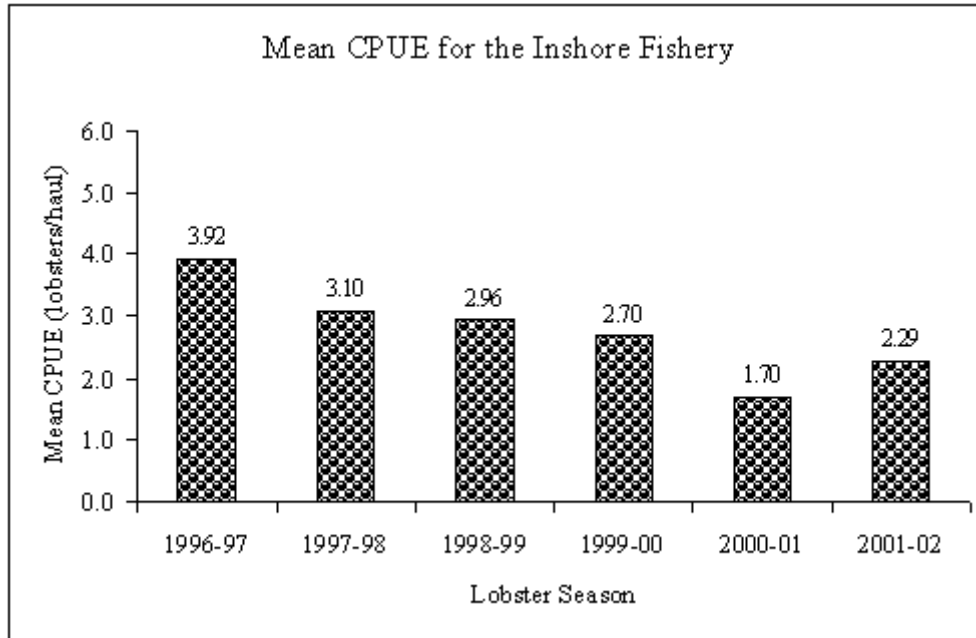


Fig. 6. Catch per unit effort for the inshore spiny lobster fishery in Bermuda (Trott et al., 2002).

Reef Fishery:

The reef fishery focuses on groupers, snappers, and jacks (Butler et al., 1993). However, the populations of large game fish have diminished and the reef fishery now catches mostly miscellaneous smaller fish.

Pelagic Fishery:

The pelagic fishery consists of tuna, wahoo, marlin, shark, mackerel, dolphin-fish, and barracuda (Butler et al., 1993). In the early 1990s, Taiwanese vessels were licensed to longline in Bermuda’s waters, but these vessels no longer fish in the region (Appendix 2) (MacAlister, 2003). During the mid 1990s, several Canadian and US vessels were also licensed to longline in the area. As of 2000, no foreign vessel licenses for longline vessels have been issued.

2. *What are the specific vessel and gear types used in each fishery?*

Reef fish are normally fished with hook and line (Robertson et al., 2005). The current level of line fishing for carnivorous reef fish is too low to supply the local market. Therefore, a large amount of reef fish is imported.

3. *Where and when are the specific gear types deployed for each of these fisheries (seasonality, trip duration, etc)?*

No information found.

4. What species of marine mammals, sea turtles, and sea birds occur and maybe at risk for capture or interaction with fisheries?

Marine Mammals:

According to MacAlister, 28 species of marine mammals can be found in Bermuda's waters (2003) (Appendix 3).

In the mid 1990s, one observer was placed on the US longline vessel. This observer reported no marine mammal bycatch (MacAlister, 2003). However, in May 1997, a sperm whale was found entangled in net with three buoys trailing behind about 130 nmi northwest of Bermuda (Anon., 2002).

Sea Turtles:

Four species of sea turtles can also be found in Bermuda's waters: green (*Chelonia mydas*), loggerhead (*Caretta caretta*), hawksbill (*Eretmochelys imbricate*), and leatherback (*Dermochelys coriacea*) (MacAlister, 2003). Other sources claim that only three species can be found in Bermuda because green turtles have been long extinct due to over-harvesting (Drews, 2004).

The observer on the US longline vessel in the mid 1990s reported no sea turtle bycatch (MacAlister, 2003). However, MacAlister argues that if longline fisheries return to Bermuda's 200-mile fishery zone, some bycatch of sea turtles may be expected.

Furthermore, one article claimed that the main threat to marine turtles in Bermuda's waters appears to be bycatch in marine fisheries (Anon., 2004). This includes both local fishers and those on international vessels that are operating on the high seas. No other information was provided.

Seabirds:

Seven species of seabirds exist in Bermuda: Cory's shearwater (*Calonectris diomedea*), Jamaica petrel (*Pterodroma caribbaea*), Audobon's shearwater (*Puffinus iherminieri*), Black-capped petrel (*Pterodroma hasitata*), Great shearwater (*Puffinus gravis*), Bermuda petrel (*Pterodroma cahow*), and Sooty shearwater (*Puffinus griseus*) (MacAlister, 2003).

The observer on the US longline vessel in the mid 1990s reported no seabird bycatch (MacAlister, 2003). However, MacAlister argues that if longline vessels return to Bermuda's waters then some bycatch of petrels and shearwaters should be expected.

5. What collection methods (observer programs, etc.) exist for gathering fishing effort and bycatch data for each fishery?

No information found.

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

The Bermuda Biological Station for Research runs a Marine Protected Area (MPA) project that collects fishing data within, among, and outside Bermuda's fisheries reserves (Anon., 2006). This project hopes to continue for years and decades because that length of time is necessary to determine whether the fisheries are recovering.

7. *What bycatch studies or bycatch mitigation projects exist for marine mammals, sea turtles or sea birds?*

No information found.

8. *Are there bycatch research and mitigation projects for other taxa, such as non-target fish or shark species?*

No information found.

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

For a list of all environment-related treaties and conventions to which Bermuda is a member, see Appendix 4.

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

Two marine reserves have been established in Bermuda: the North Shore Coral Reef Preserve and the South Shore Coral Reef Preserve (MacAlister, 2003).

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

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12. Are there other individuals in relevant government agencies or non-government organizations that may be able to assist us with information on bycatch?

No information found.

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

Literature Cited:

- Anon. (2002). "Blue whale: western North Atlantic stock." *Marine mammal stock assessment reports*. Appendix III. 196-279.
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- Robertson, D. R., Choat, J. H., Posada, J. M., Pitt, J., and J. L. Ackerman. (2005). "Ocean surgeonfish *Acanthurus bahianus*. II. Fishing effects on longevity, size and abundance." *Marine Ecology Progress Series*. 295: 245-56.
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2.3. Accessed: 19 September 2006.

<<http://www.fao.org/DOCREP/006/Y4931B/y4931b08.htm#bm08>>

Appendix 1. Fisheries and associated gear types. “I “ denotes industrial, “A” for artisanal fisheries and X undetermined.

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

Appendix 2. Fishing effort by gear.

Gear type →	Longline ³	Gillnet	Trawl
Artisanal / Industrial	Artisanal		
Target species	Carangids, Scombrids, Sharks		
Vessel type			
Vessel Classification / Category (country specific)			
Vessel length (m)			
Number of vessels			
Engine type			
Avg. Horsepower			
Gear Used (materials)			
How gear deployed (including demersal / pelagic, set / drift, mid-water / bottom)			
Crew Size			
Where gear deployed / area fished			
Fishing seasons (months)			
Avg. trip duration (hours /days)			
Total days fished per month / year			
Number of fishing trips per year			
Gear/vessel effort (gear & trip information)	Hook size/type: Number of hooks:	Net mesh size: Net length & width:	Net mesh size(s): 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			
Duration / Number of hours per set / soak / tow			
Total number of hours towed per trip			

³ MacAlister, 2003

Appendix 3

Marine mammal species in Bermuda (MacAlister, 2003).

Common Name	Scientific Name
Northern minke whale	<i>Balaenoptera acutorostrata</i>
Sei whale	<i>Balaenoptera borealis</i>
Bryde's whale	<i>Balaenoptera edeni</i>
Blue whale	<i>Balaenoptera musculus</i>
Fin whale	<i>Balaenoptera physalus</i>
Longbeaked common dolphin	<i>Delphinus capensis</i>
Shortbeaked common dolphin	<i>Delphinus delphis</i>
Pygmy killer whale	<i>Feresa attenuata</i>
Shortfinned pilot whale	<i>Globicephala macrorhynchus</i>
Risso's dolphin	<i>Grampus griseus</i>
Pygmy sperm whale	<i>Kogia breviceps</i>
Dwarf sperm whale	<i>Kogia simus</i>
Fraser's dolphin	<i>Lagenodelphis hosei</i>
Humpback whale	<i>Megaptera novaeanglia</i>
Blainville's beaked whale	<i>Mesoplodon densirostris</i>
Gervais' beaked whale	<i>Mesoplodon europaeus</i>
Killer whale	<i>Orcinus orca</i>
Melonheaded whale	<i>Peponocephala electra</i>
Sperm whale	<i>Physter macrocephalus</i>
False killer whale	<i>Pseudorca crassidens</i>
Pantropical spotted dolphin	<i>Stenella attenuata</i>
Clymene dolphin	<i>Stenella clymene</i>
Striped dolphin	<i>Stenella coeruleoalba</i>
Atlantic spotted dolphin	<i>Stenella frontalis</i>
Spinner dolphin	<i>Stenella longirostris</i>
Rough-toothed dolphin	<i>Steno bredanensis</i>
Bottlenose dolphin	<i>Tursiops truncatus</i>
Cuvier's beaked whale	<i>Ziphius cavirostris</i>

Marine Mammals that Possibility Exist in Bermuda's Waters ².

Scientific name	Common names
<i>Balaenoptera acutorostrata</i>	Dwarf minke whale
<i>Balaenoptera borealis</i>	Sei whale
<i>Balaenoptera brydei</i>	Brydes whale
<i>Balaenoptera musculus</i>	Blue whale
<i>Balaenoptera physalus</i>	Fin whale
<i>Delphinus capensis</i>	Long-beaked common dolphin
<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>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>Orcinus orca</i>	Killer whale
<i>Peponocephala electra</i>	Melon-headed whale
<i>Physeter macrocephalus</i>	Sperm whale
<i>Pseudorca crassidens</i>	False killer whale
<i>Stenella attenuata</i>	Pantropical spotted dolphin
<i>Stenella clymene</i>	Clymene dolphin
<i>Stenella coeruleoalba</i>	Striped dolphin
<i>Stenella frontalis</i>	Atlantic spotted dolphin
<i>Stenella longirostris</i>	Spinner dolphin
<i>Steno bredanensis</i>	Rough-toothed dolphin
<i>Tursiops truncatus</i>	Bottlenose dolphin
<i>Ziphius cavirostris</i>	Cuviers beaked whale

Appendix 4² Environment-related treaties and conventions to which Bermuda is a member.

Short Title	Long Title
Stradd. /Highly Migr. Fish St. Agr.	Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks
Cartagena de Indias	Convention for the Protection and Development of the Marine Environment of the Wider Caribbean Region
Meshes and Size Limit Cnvtn.	Convention for the Regulation of the Meshes of Fishing Nets and the Size Limits of Fish
CBD	Convention on Biological Diversity
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMS	Convention on the Conservation of Migratory Species of Wild Animals
Continental Shelf Convention	Convention on the Continental Shelf
IMO Convention	Convention on the International Maritime Organization
Territorial Sea Convention	Convention on the Territorial Sea and the Contiguous Zone
Fisheries Convention	Fisheries Convention
MARPOL 73/78	International Convention for the Prevention of Pollution from Ships
ICES	International Council for the Exploration of the Sea
IWC	International Whaling Commission