



# Fisheries Catch Data Collection

## Glover's Reef Marine Reserve

Report for the period August 2004 – December 2007

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## Acknowledgment

The results presented in this report are based on data gathered from fishers by Mr. Danny Wesby and Mr. Randolph Nunez. Sincerest thanks are extended to the 230 fishers from Sarteneja, Hopkins, Dangriga and Belize City who participated in the surveys. Thanks to Dr Samantha Strindberg (Wildlife Conservation Society) for assistance with data analyses and to Ms. Janet Gibson for her review of the report. Appreciation is also extended to the staff of the Wildlife Conservation Society Glover's Reef Research Station at Middle Caye, who have provided tremendous support throughout the data collection process. Funding for the study was provided generously by AVINA and the United States Agency for International Development (USAID).

## Summary

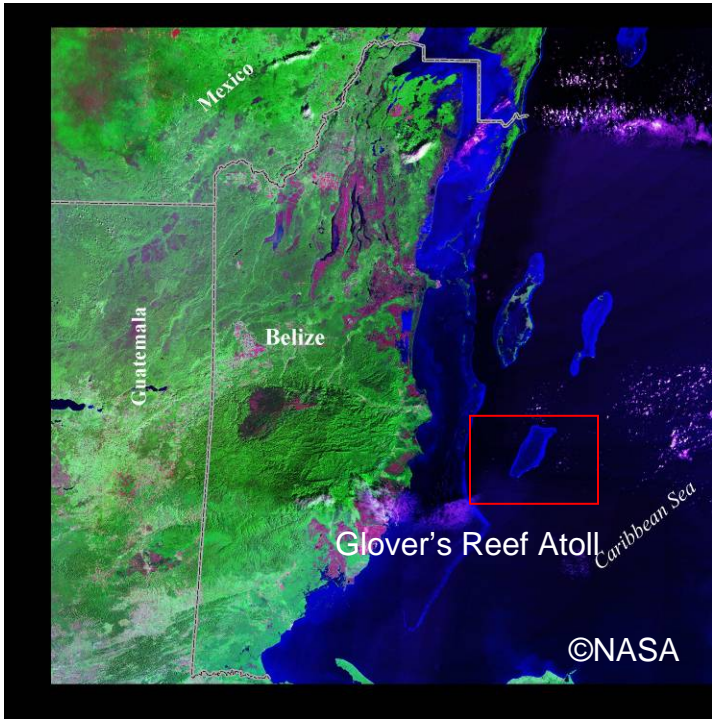
One of the main economic activities of the Glover's Reef Atoll is fishing. The Fisheries Catch Data Collection Program is a fishery-dependent monitoring program designed to determine trends in landings and fishing pressure at Glover's Reef Atoll. The data are used to provide baseline Catch per Unit Effort (CPUE) data in order to determine if there are any positive benefits (e.g. spillover effects) of the marine reserve's 'no take' zones on fisheries production.

Fishery-dependent monitoring involves sampling the catch from fishers and aims to determine the amount of fish harvested, size, and species composition of fish products harvested etc. in the General Use Zone.

The fisheries data collection program was developed by Sandra Grant, a consultant, hired by WCS and the Caribbean Regional Fisheries Mechanism (CRFM) Secretariat. The program was developed based on information gathered from a Glover's Reef Marine Reserve (GRMR) boat census in 2004 which looked at fishing patterns, gear use, landing patterns, number of boats and fishers utilizing the GRMR. The majority of fishers originate from Sarteneja, Dangriga, Hopkins with a small number of fishers from Belize City. The sampling program is divided into two sections: (1) Skiffs operated by fishers from Hopkins and Dangriga; and (2) Sailboats operated mainly by fishers from Sarteneja. Data collection from Hopkins and Dangriga fishers is based on landings data gathered in Hopkins and Dangriga. Data are collected at sea from the Sarteneja fishers.

This report presents data collected for the period August 2004 to December 2007. A total of 230 fishers participated in the surveys.

# Glover's Reef Marine Reserve

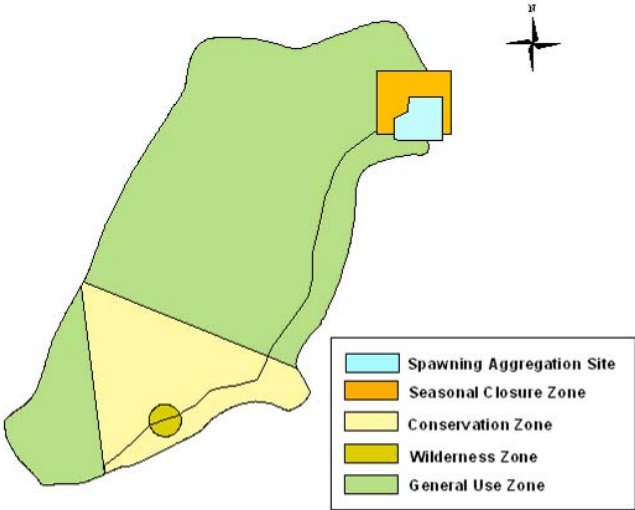


The Glover's Reef Atoll (16°44'N, 87°48'W) is about 32 km long and 12 km wide with an area of 35,876 ha. The atoll lies approximately 45 km east of the Belizean mainland and 25 km to the east of the Mesoamerican Barrier Reef. The depth ranges from 300 to 400 m to the north and west of the atoll, while the east side drops to over 1000 m.


There are three main channels that connect the ocean reef and lagoon habitats, with the latter containing approximately 850 patch reefs.

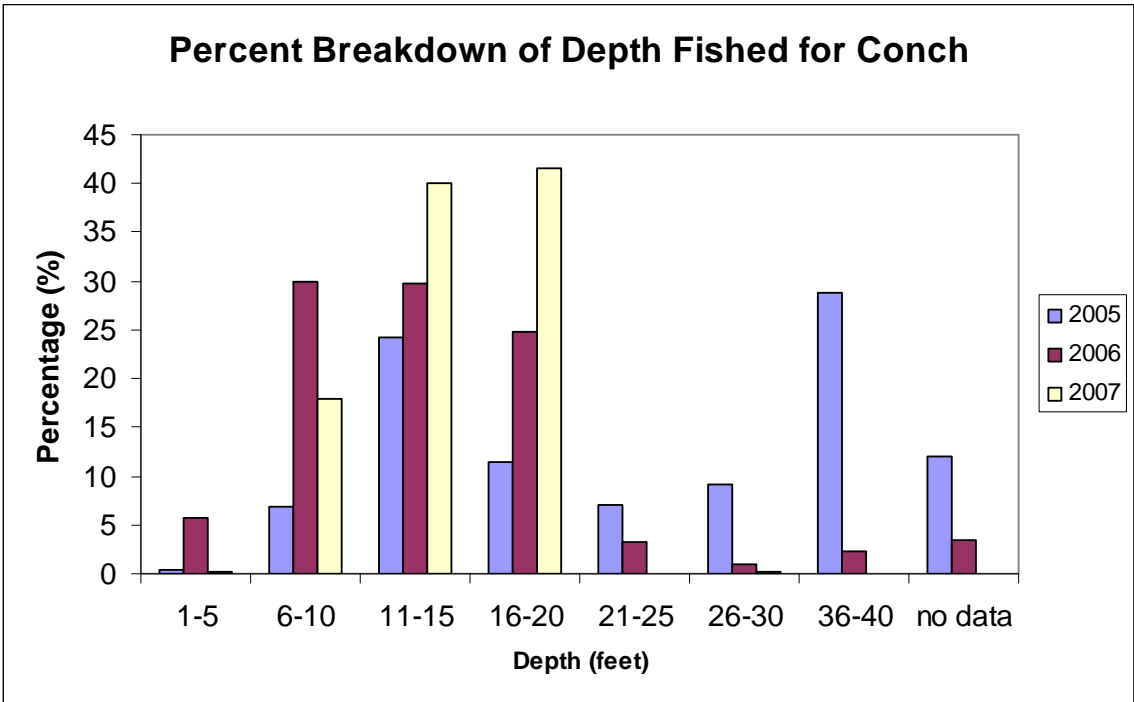
The entire Glover's Reef Atoll was established as a Marine Protected Area in 1993 (Statutory Instrument 38 of 1993 under the Fisheries Act Chapter 210) and is managed by the Belize Fisheries Department.

The Glover's Reef Marine Reserve includes five management zones: General Use Zone, Conservation Zone, Wilderness Zone, Seasonal Closure Zone and Spawning Aggregation Site.

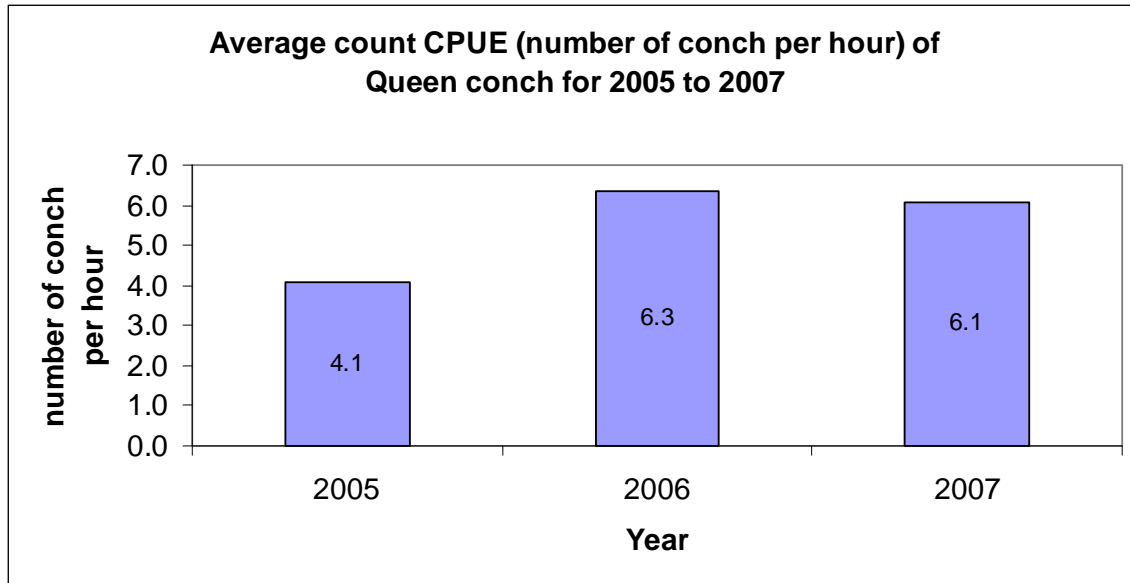


# CONCH

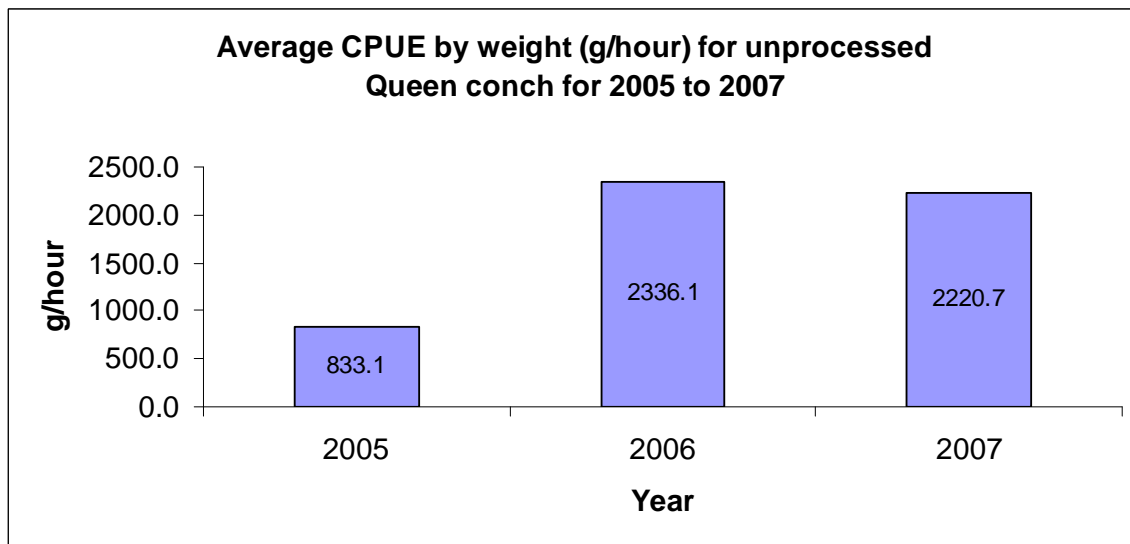
	<b>No. of Boats Surveyed 2004 to 2007</b>  <b>24</b>	<b>No. of Days Surveyed 2004 to 2007</b>  <b>202</b>
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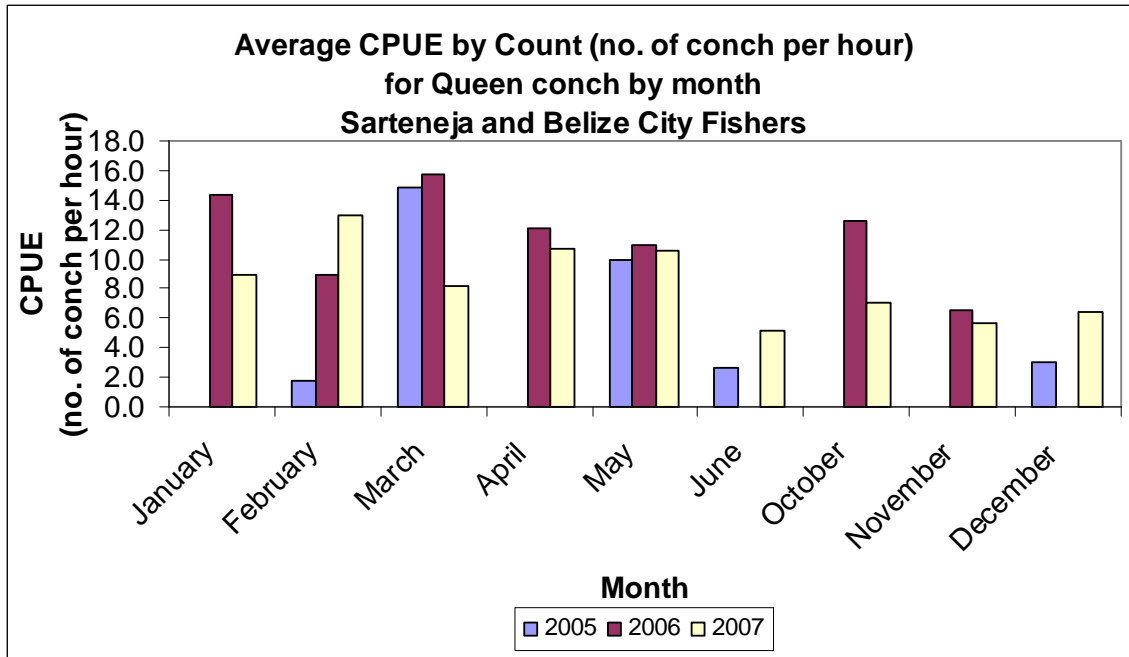
- In 2005, 81% of the conch were taken in depths between 10 to 40 ft., with the largest percentage (29%) taken between 36 to 40 ft.
- In 2006 and 2007, the largest percentage of conch (82%) was taken from shallower depths (between 6 to 20 ft) than in 2005.



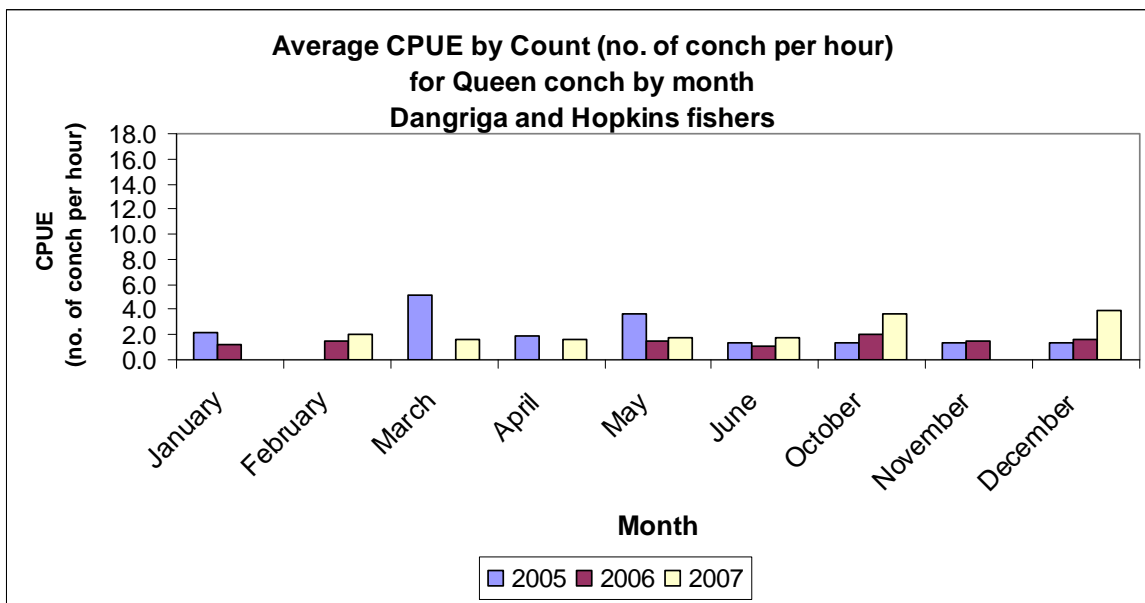
- The average catch per unit effort for Queen conch decreased from 6.3 conch/hour to 6.1 conch/hour.



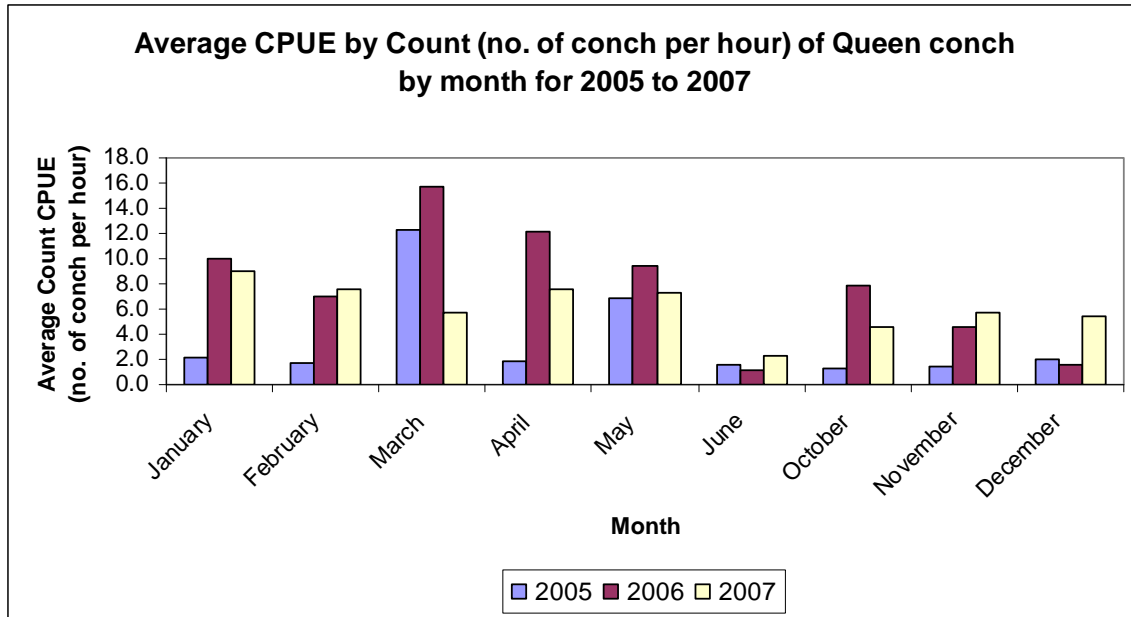
- The average catch per unit effort by weight for Queen conch decreased from 2336.1 g/hour in 2006 to 2220.7 g/hour in 2007.



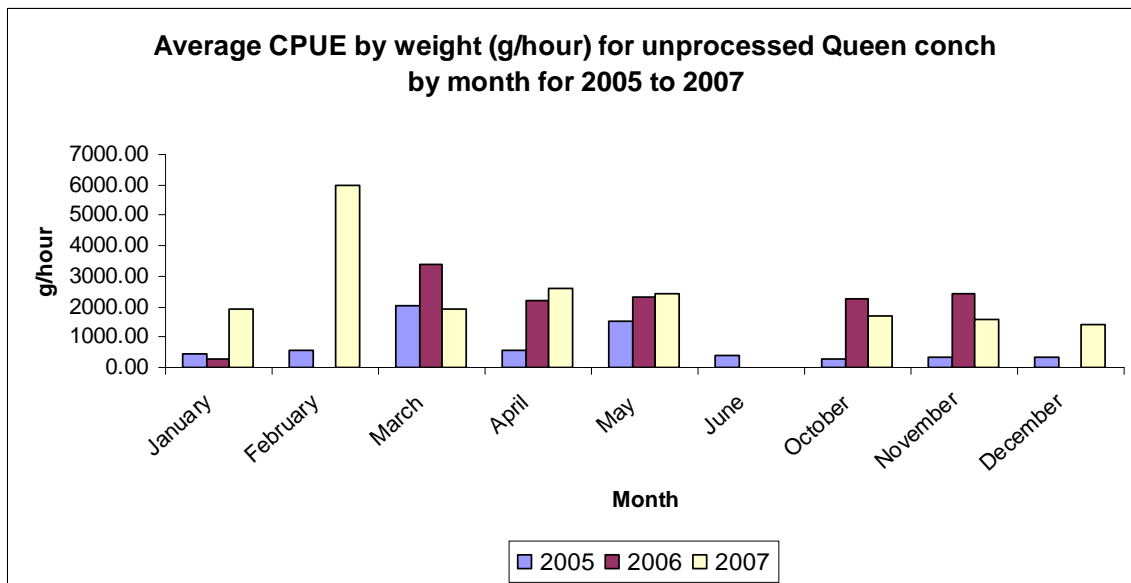
- For Sarteneja fishers, the highest average catch per unit effort occurred in March 2006 (15.7 conch per hour) at the end of the lobster season.



- For Dangriga and Hopkins fishers, the highest average catch per unit effort occurred in March 2005 (5.2 conch per hour).




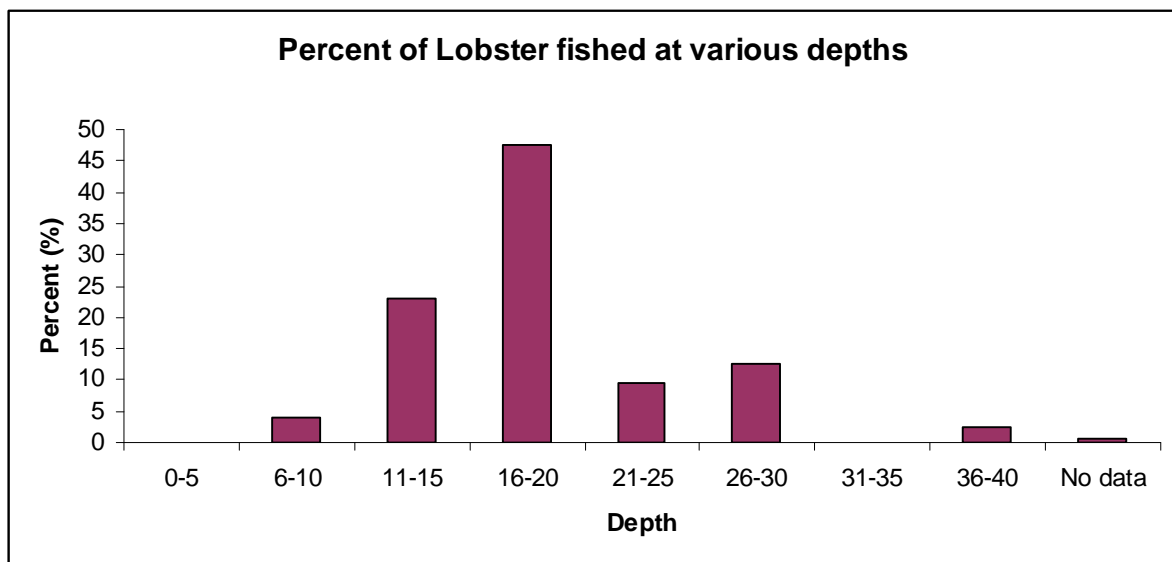
- The highest average catch per unit effort based on the number of Queen conch caught per hour was 15.7 in March 2006.
- The CPUE for all three years (2005 to 2007) was low in October, although it is the open season for conch.



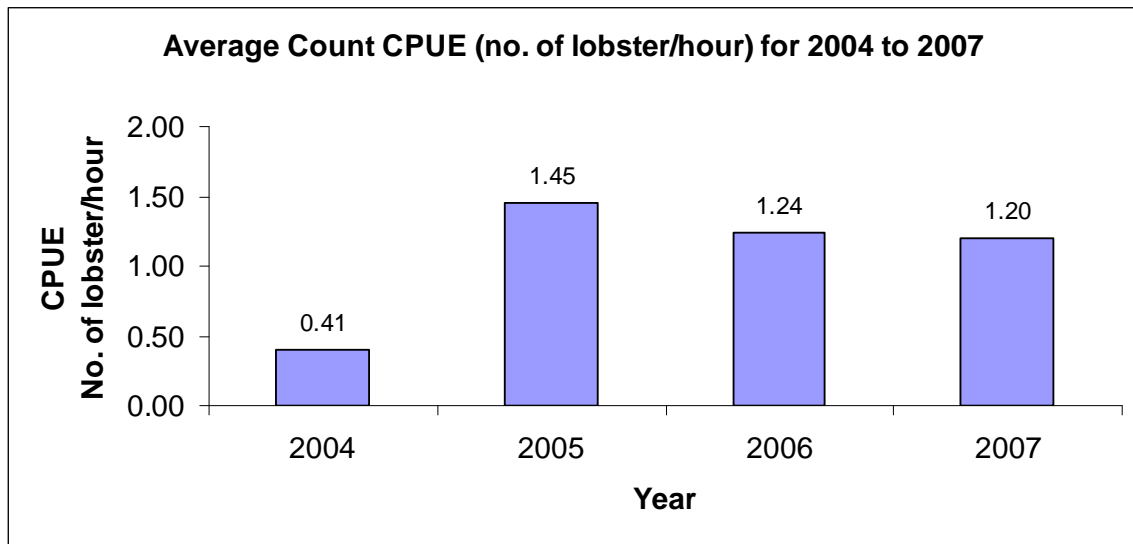
- The average catch per unit effort peaked in February 2007 (6007.8 g/hour).
- There were no significant changes in catch per unit effort from 2005 to 2007.

# LOBSTER

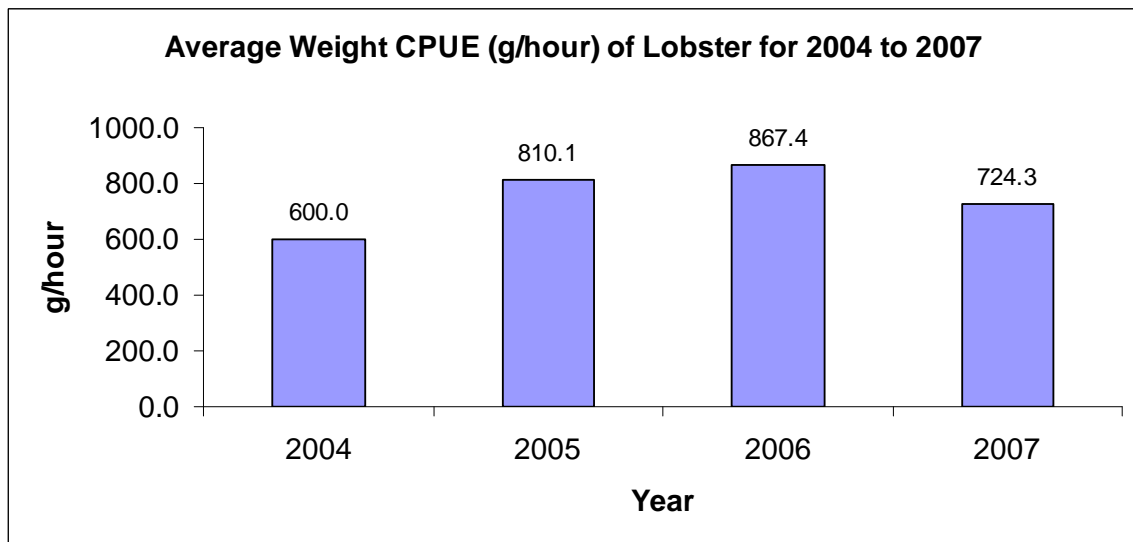
	<b>No. of Boats Surveyed 2004 to 2007</b>	<b>No. of Days Surveyed 2004 to 2007</b>
	<b>13</b>	<b>58</b>



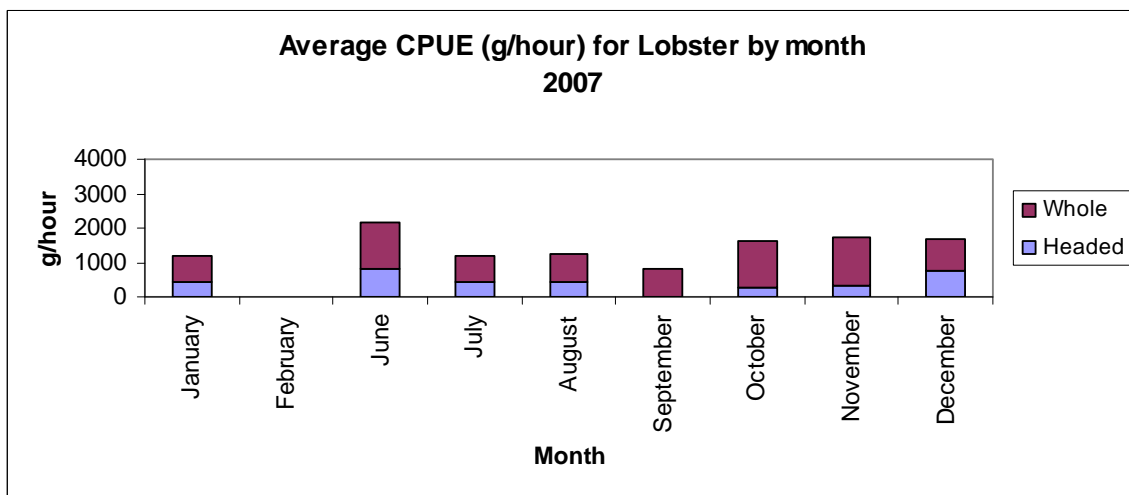
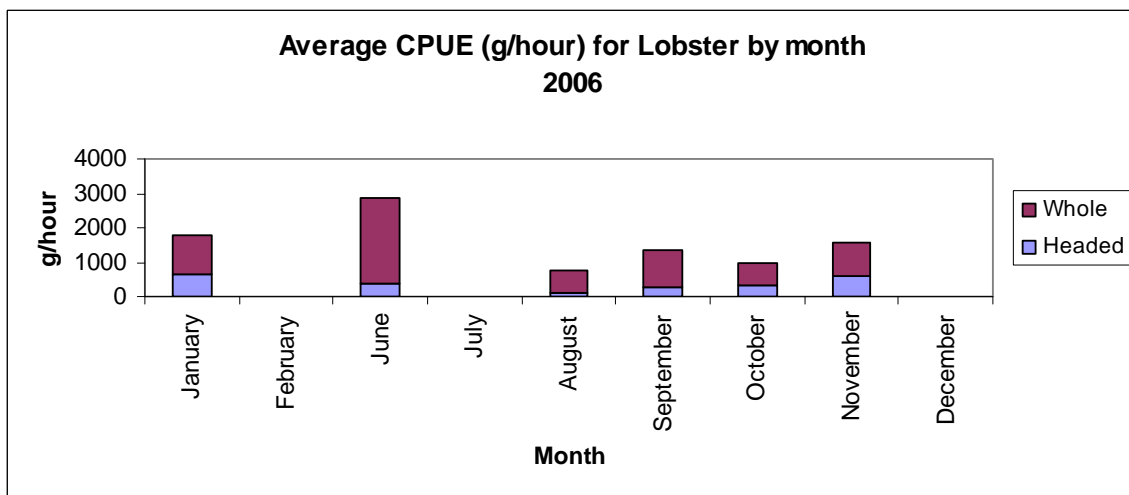
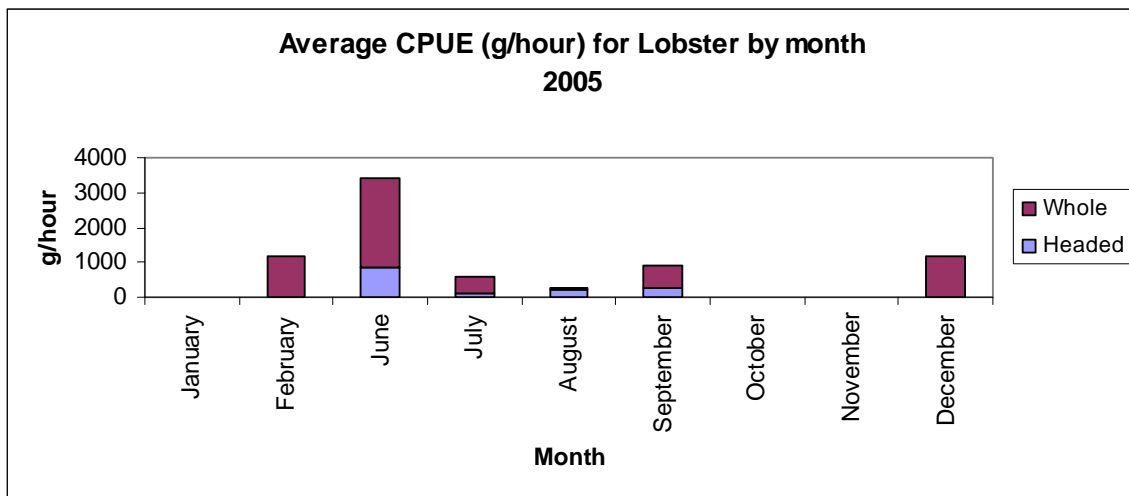
- The largest percentage of lobster (48%) was caught between 16 to 20 feet.



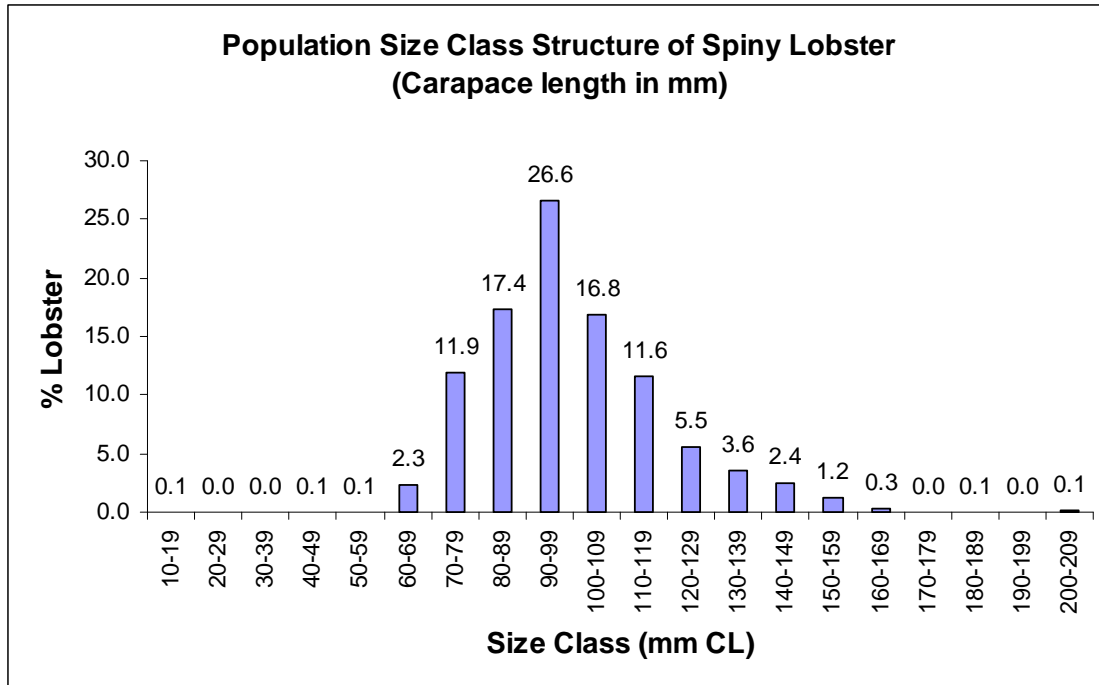
- The average catch per unit effort for lobster showed a small decrease from 2005 to 2007 with an average catch of 1.2 lobsters per hour in 2007.



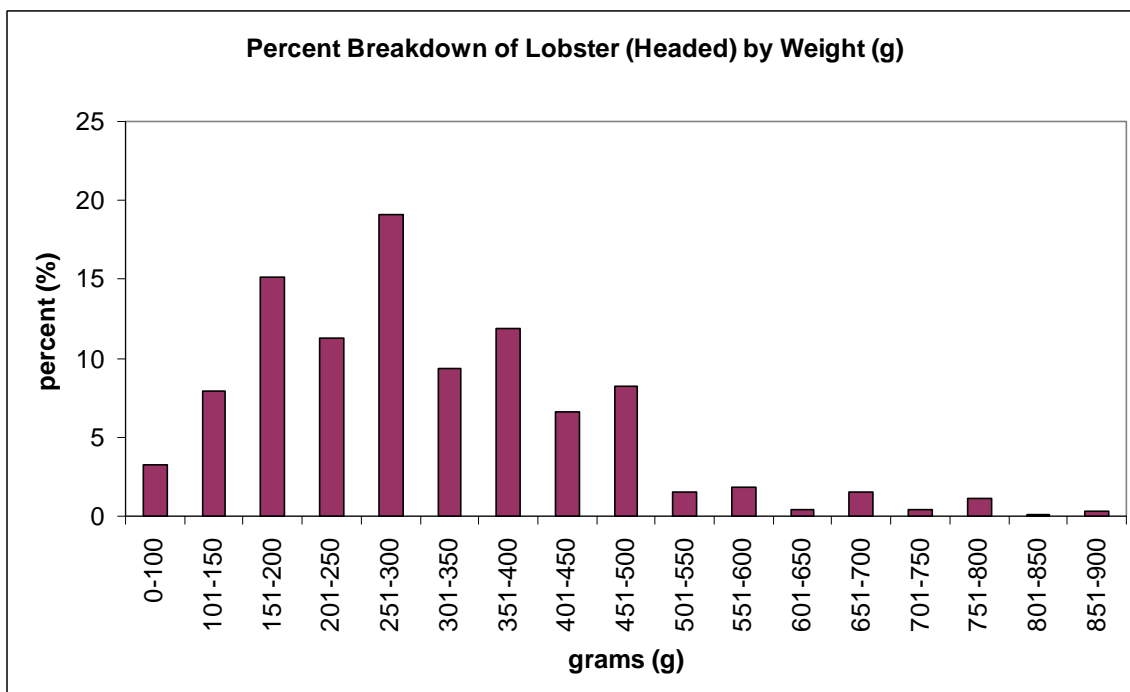
- The average catch per unit effort for lobster showed an increase from 2004 (600 g/hour) to 2006 (867.4 g/hour); however in 2007, there was a decrease to 724.3 g/hour.



- The highest catch per unit effort for lobster was in June (the opening of the lobster season) for all years sampled. \* In 2004, sampling was only done in August.




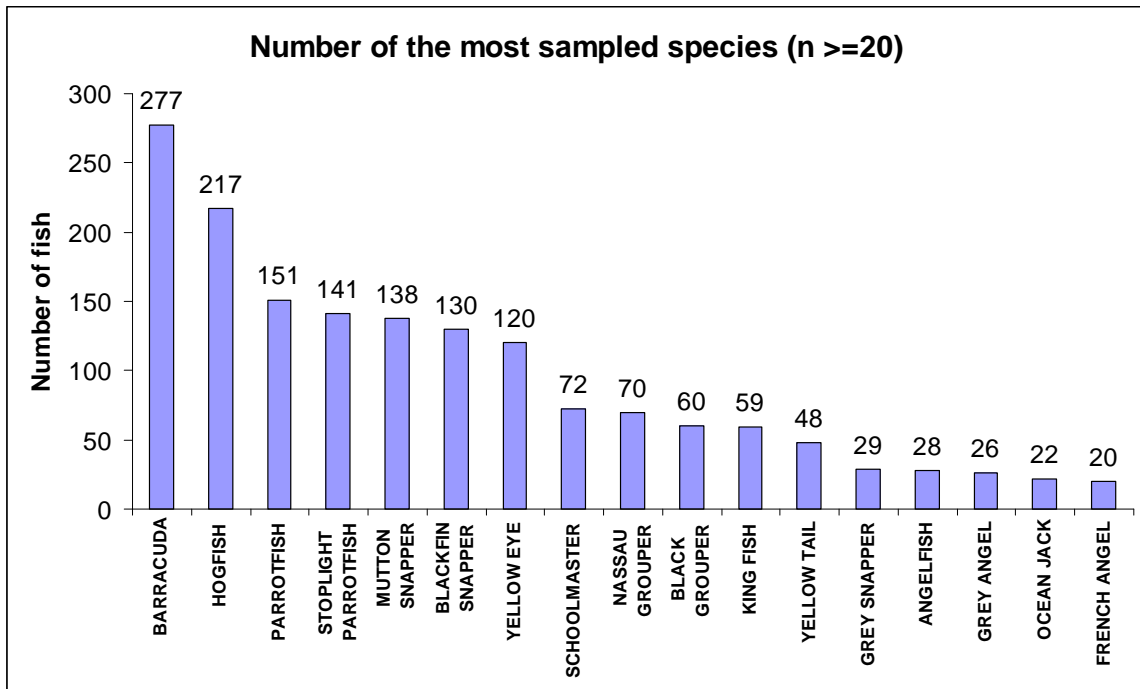
- A total of 91.2% of the lobster sampled (1,365 whole lobsters) were above the legal size limit of 76.2 mm or 3 inches carapace length.



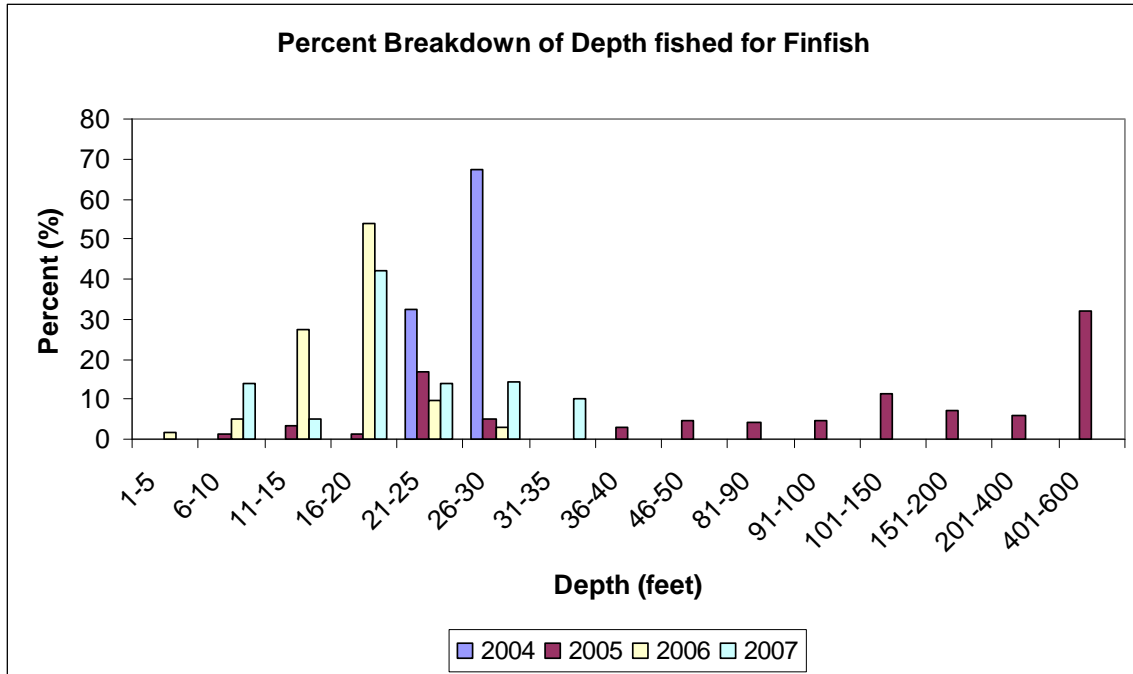
- 96.2 % of the lobsters sampled were above the legal minimum tail weight of 4 oz. or 113.4 grams.
- The majority of lobsters (62%) were taken above 251 g or 9 oz tail weight size class.

# FINFISH

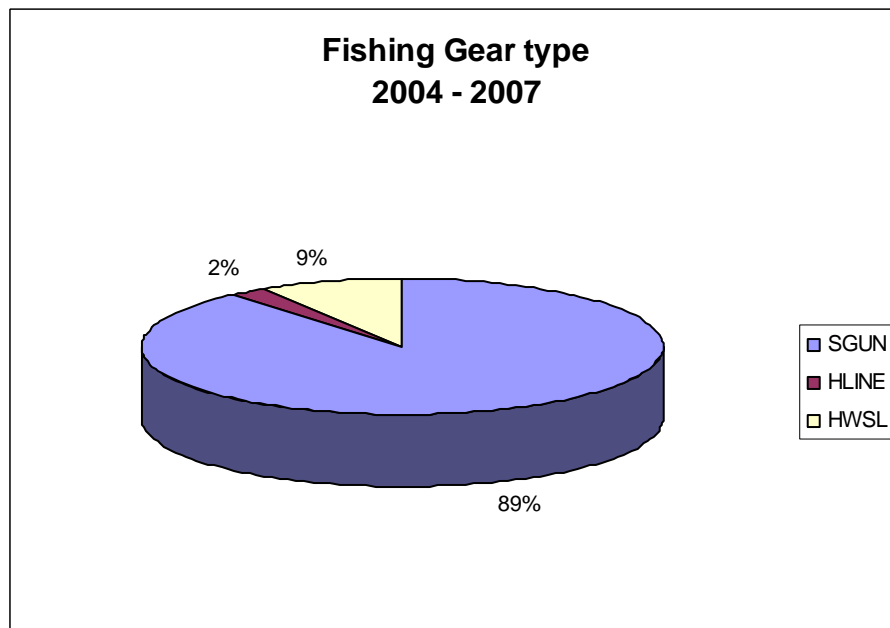
 <p>© R. Graham</p>	<p><b>No. of Boats Surveyed 2004 to 2007</b></p>	<p><b>No. of Days Surveyed 2004 to 2007</b></p>
	<p><b>20</b></p>	<p><b>109</b></p>



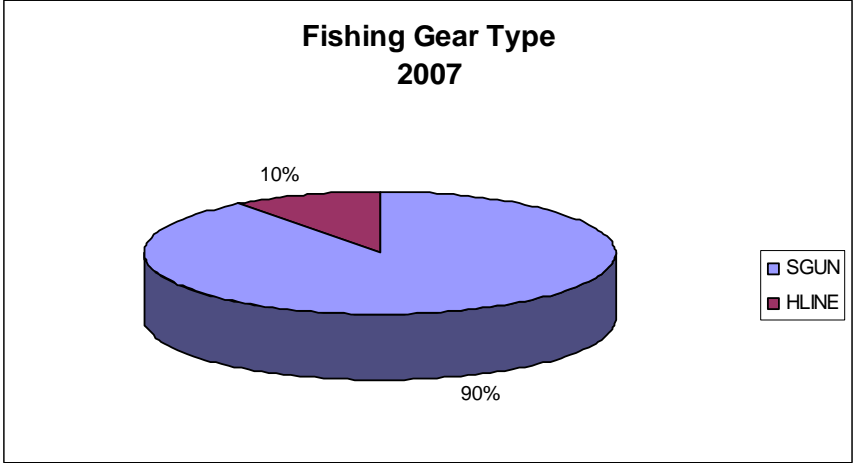
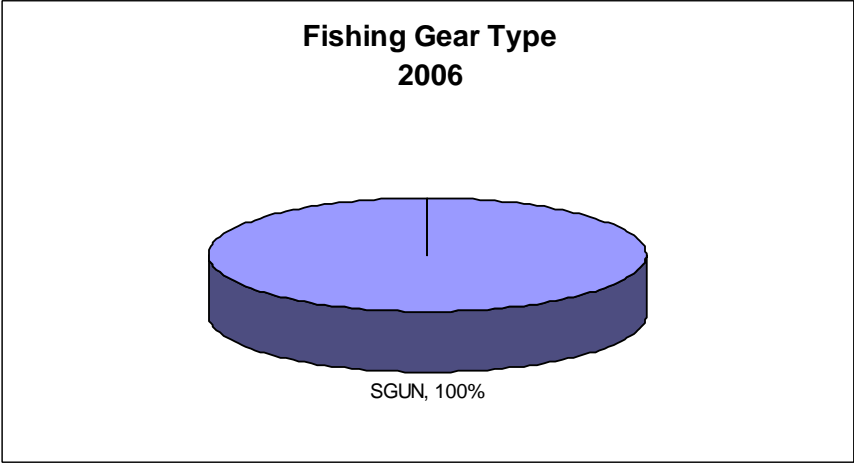
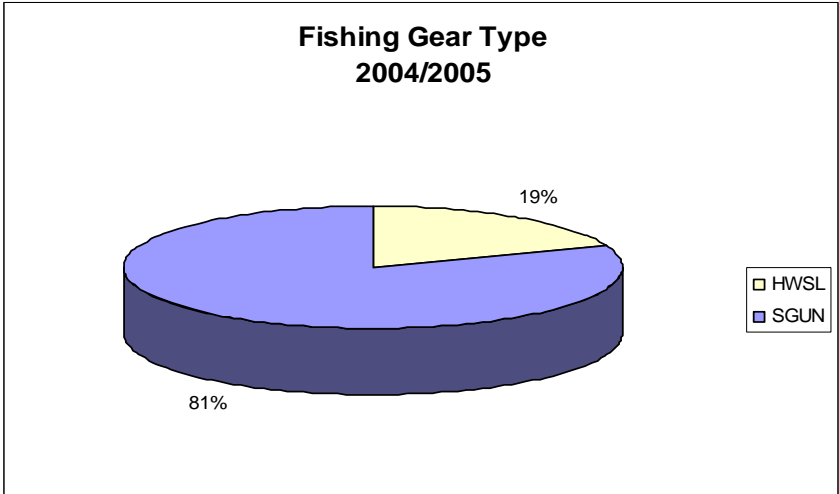
- A total of 57 species were recorded during 2004 to 2007.
- From 2004 to 2007, the Barracuda (277 fish), Hogfish (217 fish) and Parrotfish (non-Stoplight) (151 fish) were the most sampled species.
- When combined, the Parrotfish (non-Stoplight species) and the Stoplight Parrotfish (141 fish) were the most sampled fish with a total of 292 fish.



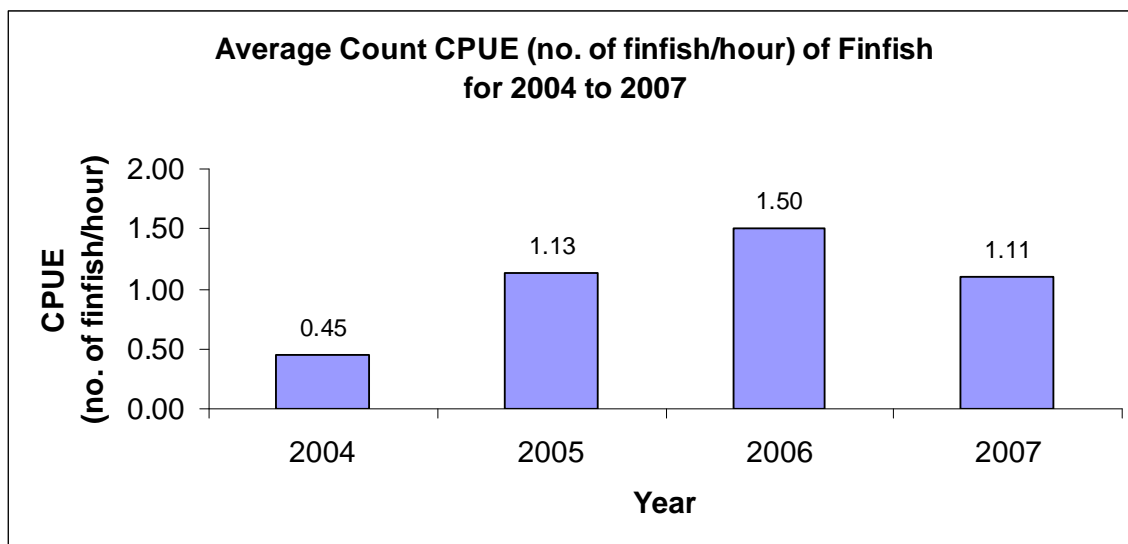
- Most fish were caught between depths of 6 - 30 feet. There are no significant changes in depth fished from 2004 to 2007.



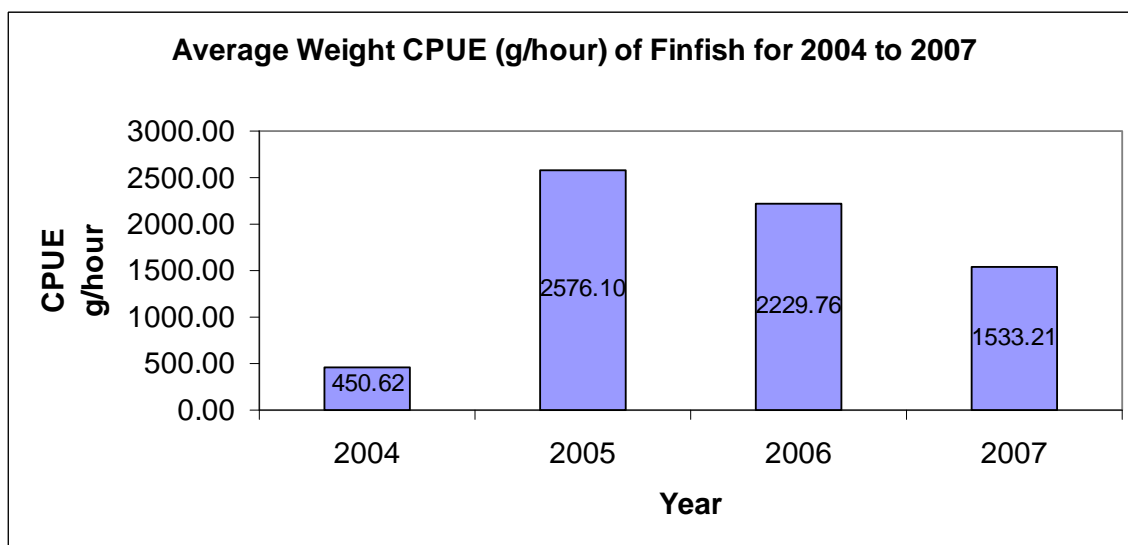
- From 2004 to 2007, the majority of the fish (89%) were caught using spear gun. \* Results are based on data from Sarteneja fishers only.



- Since 2005, none of the fish sampled were caught with Hawaiian Sling. Spear guns remains the most used fishing gear with 90% of the fish caught in 2007 using this method. \*Results based on data from Sarteneja fishers only.

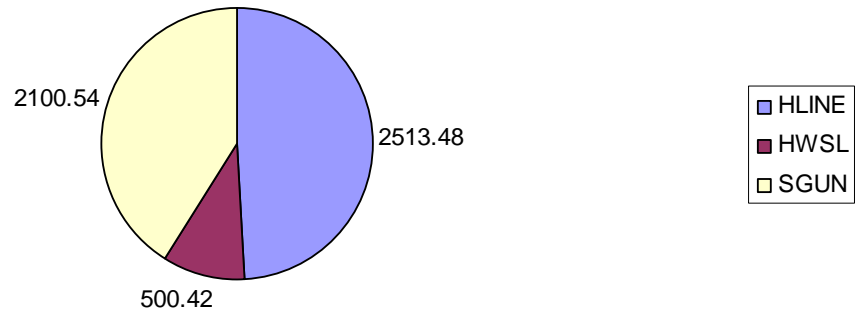


- The average catch per unit effort for finfish decreased in 2007 (1.1 fish per hour).



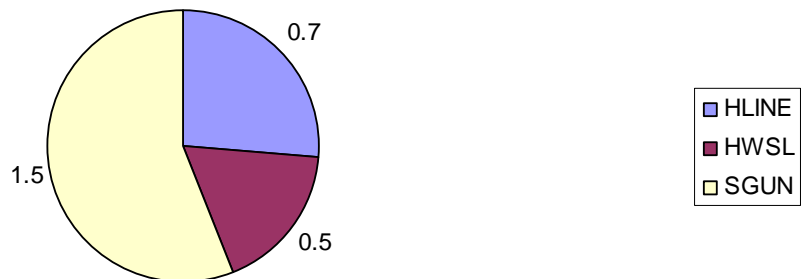
- The average catch per unit effort by weight for finfish also showed a decrease from 2576.1 g/hour in 2005 to 1533.21 g/hour in 2007.

**Average CPUE (g/hour) of finfish based on type of fishing gear**

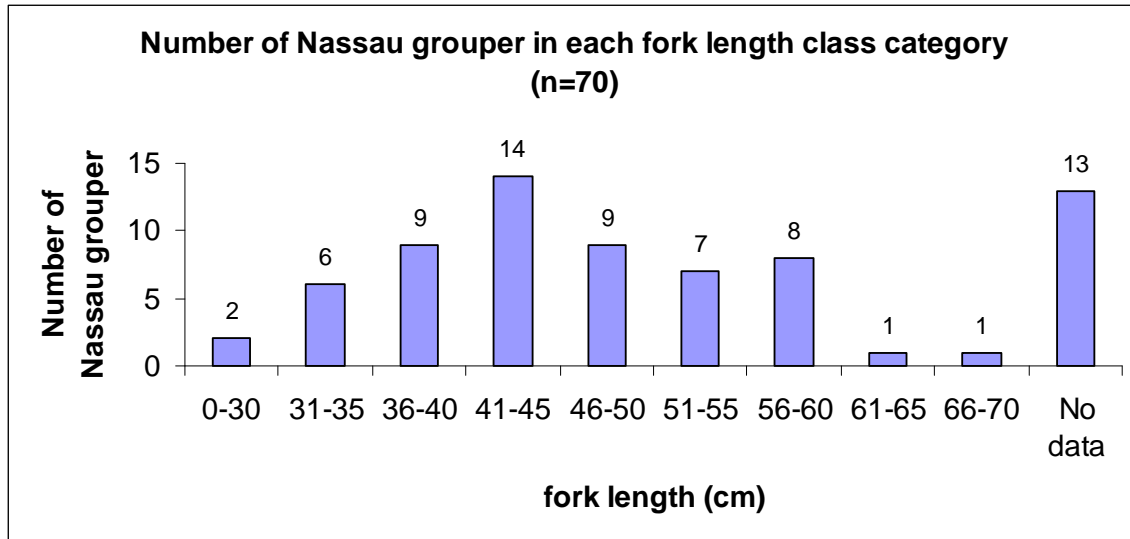


- The average catch per unit effort by weight of finfish was highest using hand lines (2513.48 g hour).

**Average Count CPUE (finfish/hour) based on fishing gear type**



- The average catch per unit effort by count of finfish was highest using spear guns (1.5 fish per hour).



- The size class distribution of Nassau grouper showed that only 57% of the Nassau groupers caught were above 40 cm (the estimated maturity size for the species).