

Shark Fisheries of Trinidad and Tobago: A National Plan of Action

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ABSTRACT

Sharks are valued fisheries resources in Trinidad and Tobago ranking fourth in the total estimated landings of the artisanal fishery. They are caught primarily as bycatch of the artisanal gill-net fishery but are landed as by catch of almost all other fisheries such as the artisanal pelagic, and demersal hook and line fisheries for mackerels and snappers, respectively; the beach seine fishery for mackerels and the demersal trawl fishery for penaeid shrimps. There is in addition a small-directed fishery targeting largely the Brazilian sharpnose, *Rhizoprionodon lalandii*. This species is one of the five most important species comprising the artisanal landings, which averages about 800 metric tons per year. Sharks are also an important component of the landings of the small, offshore, semi-industrial pelagic longline fleet for tunas and swordfish. In response to national concerns for the sustainability of shark fisheries, Trinidad and Tobago is developing its National Plan of Action for Sharks under the Food and Agriculture Organization's International Plan of Action (IPOA) for sharks. This poster presents some of the elements of the plan and associated assessment report, namely description of the fishery, brief status of the knowledge of the main species, catch and effort data and the major issues for management as required under the IPOA.

KEY WORDS: Trinidad and Tobago, sharks, National Plan of Action

Piscifactoría de Tiburón de Trinidad y Tobago: Un Plan Nacional de Acción

Los tiburones son recursos de piscifactoría valorados en Trinidad y Tobago la clasificación de cuarto el en general estimó aterrizajes del piscifactoría artesanal. Ellos son agarrados principalmente cuando por - agarran del piscifactoría artesanal neto de papada, pero son conseguidos cuando por agarran de casi todos otros piscifactoría como el gancho artesanal pelágico y profundo y piscifactoría de línea para caballas y castañuelas respectivamente; el piscifactoría de jábega de playa para caballas y el piscifactoría de red de arrastre profundo para camarones peneid. Hay además un piscifactoría pequeño-dirigido que apunta en gran parte el Brasileño sharpnose, *Rhizoprion-*

nodon lalandii. Esta especie es una de las cinco especies más importantes que comprenden los aterrizajes artesanal, que hace un promedio de aproximadamente 800 mt. por año. Los tiburones son también un componente importante de los aterrizajes de la flota pequeña, en el exterior, semiindustrial pelágica longline para atunes y pez espada. En respuesta a preocupaciones nacionales por la sostenibilidad de piscifactoría de tiburón, Trinidad y Tobago desarrollan su Plan Nacional de la Acción para Tiburones bajo el Alimento y el Plan Internacional de la Organización de Agricultura de la Acción (IPOA) para tiburones. Este cartel presenta algunos elementos del plan e informe de evaluación asociado, a saber la descripción del piscifactoría, el breve estado del conocimiento de las especies principales, agarrar y datos de esfuerzo y las cuestiones principales para la dirección como requerido bajo el IPOA.

PALABRAS CLAVES: Trinidad y Tobago, tiburones, Plan Nacional de Acción

INTRODUCTION

Consistent with widespread global trends concerned with the management and sustainable use of shark resources, several countries are proceeding with the analysis of shark fisheries and the development and implementation of National Plans of Action as required under the International Plan of Action (IPOA) for shark conservation and Management (FAO Website). The IPOA Sharks is the outcome of a global response to promote sustainable use of shark resources. Sharks and their relatives exhibit life history characteristics which render them particularly vulnerable to unrestrained exploitation. In addition, there has been a general outcry for the tremendous waste of shark resources through the practice of 'finning', that is removing the fins of captured sharks and discarding the rest of the animal, often alive. In 2000, FAO elaborated precise guidelines for the development and implementation of shark plans and assessment reports at the national regional and international levels (FAO 2000).

Adherence to the requirements of the IPOA Sharks, as well as preparation and implementation of a NPOA, are both voluntary. However, the IPOA Sharks recommends that states adopt a NPOA if their vessels conduct directed fisheries for sharks or regularly catch sharks in non-directed fisheries. Stevens et al. (2000) notes that by-catch makes up about half of the annual global catch of sharks and rays.

Trinidad and Tobago, located on the continental shelf of northeastern South America about eight miles east of Venezuela, is one of the few Caribbean island states where sharks are extensively utilized. Estimated landings of shark rank fourth in volume and value of the species landed by the artisanal fleet. There is also some export of large pelagic sharks and shark fins. As in most parts of the world, the fishery is principally a by-catch fishery with a very limited, seasonal directed component (Shing 1993). The fishery is being analysed and the biological data collected over the period 1985-1986 and 1987, and later are being reviewed in the context of a NPOA.

FISHERY DESCRIPTION

The principal inshore artisanal fishery that catches sharks is the gill net fishery for carite *Scomberomorus brasiliensis* and kingfish *S. cavalla*. This fishery contributes about 60% of the estimated shark landings (Henry and Martin, 1992). Sharks are also caught incidentally by the beach seine fishery, the hook and line (trolling live bait (a la vive) and banking) fishery; the demersal longline or palangue fishery, and the semi-industrial pelagic longline fishery. Of the species of sharks identified from the waters of Trinidad and Tobago about 15 generally comprise the catch.

The artisanal vessels involved in the fishery are either wooden, fiberglass, or fiberglass coated wooden boats between 6.71m. and 9.14m. in length called pirogues. These vessels are equipped with one or two outboard engines, commonly 45 to 75 hp. All operations are manual (Henry and Martin 1992). The semi-industrial vessels are fully equipped for spending up to seven days at sea. Gear used is pelagic longlines.

DATA COLLECTION

Catch and effort data for sharks have been collected since 1962 as part of the onshore data collection system. With this system, data are collected at 31% of the fish landing sites for 20 random days in the month. Data are subsequently raised to account for non-enumerated days and sites. Data collected includes landings and trip details for each vessel. Trends in the landings and standardized effort for some years are examined. These data do not include the offshore semi-industrial fleet. Attempts to record sharks by species is achieving limited success.

Biological data on sharks were collected over the period 1985 - 1986 and later from 1987 - 1989 with some follow up activities intermittently from 1999 - 2000. Samples were obtained largely through a fishery independent survey, which sought to mimic the activities of the inshore artisanal, gillnet vessel on the north and east coasts where sharks were found to be most prevalent in the landings. However, while the typical artisanal gillnet vessels use gillnets of about 4½ in. mesh size, the nets used in the survey were at least 6 inch mesh and deployed specifically for sharks. The species composition of the catch was noted and biological data collected on all species caught. These included sex, total length, weight and stomach contents; for females the width of the shell gland, reproductive state, presence of eggs or pups in the uterus, sex (where possible), and size of pups. For males data collected were clasper length and reproductive state. Some of these data are summarized here for five species.

CATCH AND EFFORT DATA

Between 1962 and 2002 landings averaged about 800 tons. Figure 1 shows estimated landings for this period. Landings peaked in the late 1970s, declined dramatically in these mid-1990s with an increasing trend in 2000s. The variations in landings may be typical of a by catch fishery. It is to be noted however that the peaks in the late 1900s early 2000s are lower than

peaks in previous years. CPUE data were standardized for some years between 1972 and 1992 and is shown in Figure 2. The CPUE peaked in the late 1970s declined in the mid-1980s with further increases. However, as with the landings the later peak is at a lower level.

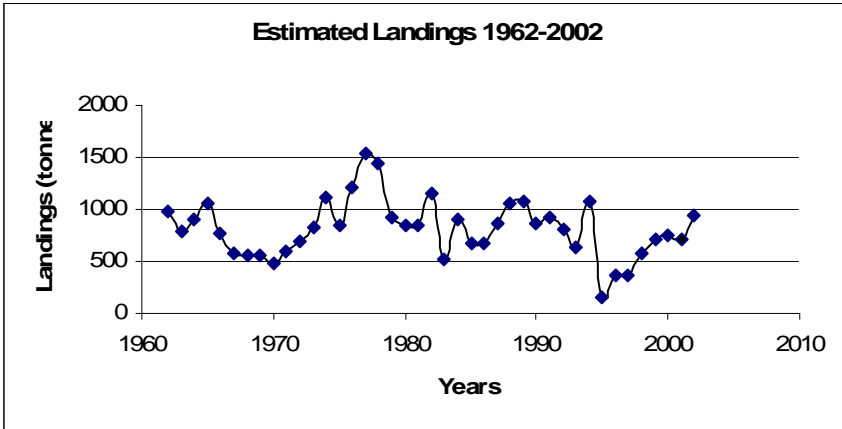


Figure 1. Estimated landings of sharks 1962 - 2002

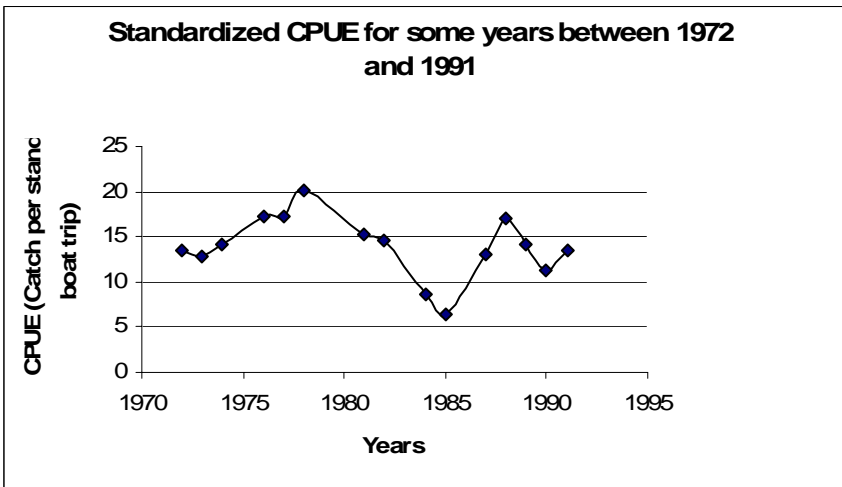


Figure 2. Standardized CPUE (catch per standard boat trip) (Henry and Martin 1992)

SPECIES COMPOSITION OF THE CATCH

Data from the fishery independent survey collected with respect to the fishing grounds on the north and east are presented in Figure 3. It shows that 15 species were most common in the catch. *Carcharhinus porosus* was most abundant followed by *Sphyrna tudes* and *Rhizoprionodon lalandii*.

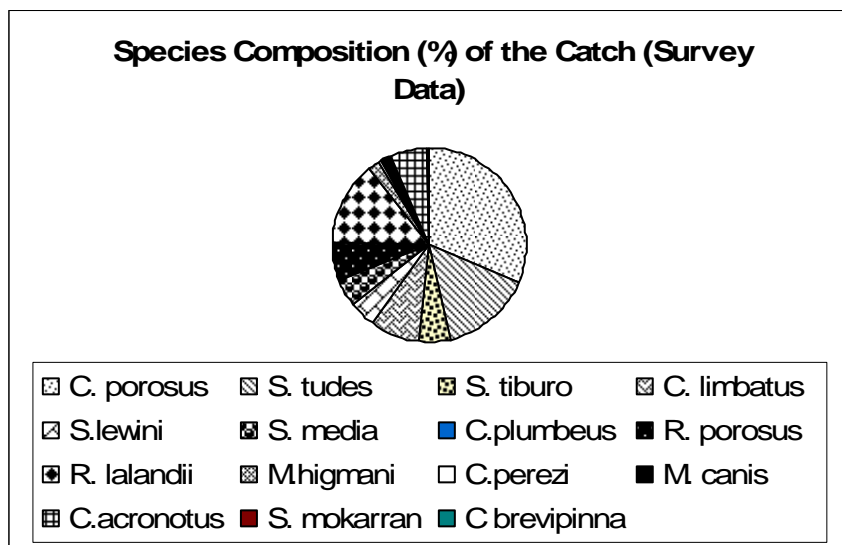


Figure 3: Percentage species composition of the catch (fishery independent survey data)

SUMMARY: BIOLOGICAL DATA AND FISHERY NOTES

Biological Data

Table 1 summarises the biological data based on data collected during fishery surveys (in bold) and data from the literature in italics for comparison. It provides a snapshot of the life history characteristics of the main exploited species. Largely it demonstrates that these species like other chondrichthyans have extended gestation periods, whether they are small or large sharks, produce a limited number of large progeny and are mature at relatively large sizes.

Table 1: Biological data on five species of sharks (*Data in bold is largest specimen in the catch, °data is bold is the smallest female with eggs or pups in the uteri or smallest male with a calcified clasper; pup length in bold in the largest pups observed, Data in italics from Compagno 1984).

Species	Gestation Period	Litter Size	°Age/Size (cm) at Maturity	*Max. Length (cm)	Max. Age	Size at Birth
<i>Carcharhinus porosus</i>	9-10 months	2-7	♂ ♂ 75-78 ♀ ♀ 84	150	9yrs	31-40cm
<i>C. limbatus</i>	10-12mths	1-10 (4 common)	4yrs ♂ ♂ 135-180 ♀ ♀ 120-190	255	12yrs	38-72
		4-6	♂ ♂ 106 ♀ ♀ 140	♂ ♂ 167 ♀ ♀ 200		48cm
	7-9 mths.	6-9		150.		30cm.
	7-9 mths	6-10	♀ ♀ 765	♂ ♂ 152 ♀ ♀ 118		29 -30
<i>Rhizoprionodon porosus</i>	10-11	2-6	♂ ♂ 60 ♀ ♀ 80	110		31-39cm.
		2-8	♂ ♂ 64 ♀ ♀ 65	♂ ♂ 97 ♀ ♀ 105		34cm
	7mths	1-4cm	40-50cm	64cm		33-34
		2-4	♀ ♀ 56cm	♀ ♀ 71cm		32cm

Fishery Notes

Carcharhinus porosus — The smalltail shark was found to be quite common in the landings as well as in the survey catch. The catch comprised both neonates and immature sharks. Neonates were taken in nets set between 10 to 16 fathoms off the north and east coasts about three to five miles offshore. On the north coast particularly in the months of March to May pregnant females of this species comprised a substantial part of the catch of this shark from the

inshore artisanal fishery for mackerels. A preliminary assessment done in 1992 (Walker 1992) with respect to this species concluded that it was not yet at the stage of maximum exploitation. Complimentary assessments done on the target species *Scomberomorus brasiliensis* concluded that this species was at the level of maximum exploitation and management measures were prescribed which included an increase in mesh size and increasing use of lines instead of gillnets.

C. limbatus — The blacktip shark is a favoured species. The inshore artisanal catch of blacktips comprise both neonates and adults depending on the fishing location (distance from shore). Beach seine catches have been observed to land both neonates and older, immature males and females but at different times suggesting that pups may stay in nearshore waters as they develop. The semi-industrial longline fishery also catches mature blacktips.

Sphyrna tudes — The smalleye also known as a golden hammerhead or buttershark has declined in numbers in the landings of the inshore artisanal fishery. This was also evident from a review of the data collected during the fishery survey.

Rhizoprionodon lalandii — The Brazillian sharpnose like the blacktip is also a favoured species given cultural predilection for small sharks. This shark is the focus of a small directed fishery on the north coast of Trinidad. Unfortunately, based on observations of individuals most of the catch comprise females carrying pups. A public awareness programme is focused on restricting the development of this fishery.

R. porosus — The Caribbean sharpnose shark has been observed from the catches of most fishing gears in the artisanal fishery. Generally an inshore species, catches are usually of adult/mature males and females.

ISSUES FOR FISHERY MANAGEMENT

The location, landings and biological and fisheries notes present a number of issues for fishery management:

- i) Multispecies nature of the fishery,
- ii) Apparent patchy distribution of species,
- iii) Landings generally bycatch of more lucrative fisheries,
- iv) Inability of field data collectors to reliably record landings by species,
- v) Different life history stages of the same species caught by different fisheries,
- vi) Different life history stages of the same species caught by the same fishery,
- vii) Females carrying pups found on same fishing ground as target species of some fisheries,
- viii) Lack of stock assessments for important coastal species,
- ix) Need for collaboration with neighbouring states (transboundary

- issues),
- x) Shark finning,
 - xi) Systematic recording of shark catches from all sources,
 - xii) Framework for identification of threatened species,
 - xiii) Inappropriate legal framework,
 - xiv) Public education awareness,
 - xv) Human resource capability for systematic monitoring of sharks,
 - xvi) Post harvest practices that contribute to waste of sharks caught,
 - xvii) Ecosystem impacts as a consequence of shark fishing (directed fishery),
 - xviii) Further research on shark fisheries biology, age and growth, diet composition and volume of diets contributed by prey species, and
 - xix) Systematic collection of trade data on sharks.

CONCLUSION

Much remains to be done to complete the assessment report for sharks. The issues identified so far remain to be reviewed and finalized. The continuing challenge is the multi-species, bycatch nature of the fishery. However, the management measures that have been proposed and in some cases implemented with regard to the gillnet fishery, includes gear modifications and promotion of more selective gears. These will have implications for the associated bycatch of sharks.

Further studies on these species will require regional collaboration at least with neighbouring states to ensure compatibility with regard to management approaches.

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