FERNANDO DE NORONHA'S SHARK PROJECT, BRAZIL: PARTICIPATIVE FISHERIES MONITORING

FINAL REPORT

PROJECT NO: 050307

PROJETO TUBARÕES
FERNANDO DE NORONHA

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July 2008

Conservation Leadership Programme

Project summary

Fernando de Noronha Archipelago is an important shark nursery in the equatorial Atlantic that was commercially exploited from 1992 to 1997. As a consequence of their low reproductive potential, populations of sharks may take decades to recover pre-exploitation levels. Despite the closure of the shark fishery, these animals are still captured by local fishermen and the fishing pressure is unknown. In this sense, the aim of this project was to train local agents and implement a participative fisheries monitoring programme in the archipelago. The activities conducted with the fishermen and others members of community included workshops on marine conservation and fisheries, coastal management, and practial trainings on catch record. The mean monthly production of the commercial fisheries during the project activities was 5.24 tons, the lowest amount recorded to date. The catch was higher between October and December 2007. The lower mean catch, 2.96 tons/month, was detected from April to June 2008 and may be attributed to a decrease in the fishing effort, as 50% of the fishermen left the archipelago to engage in the lobster fishing season in the northeastern coast of Brazil. The first-rated fish species represented almost two thirds of the mean production, and sharks comprised only 2.68% of this amount. The mean monthly production of the recreational fisheries was 192 kg. Higher catches were recorded during months of vacation, January, December and July, when an increase in the number of students fishing is evident. Fishes of the family Carangidae represented 73% of the recreational production, with sharks comprising only 0.51% of the total catch. As observed, the local fisheries were very dependent on a few pelagic fish species, which have a great migratory cycle and may frequent the archipelago surroundings by a brief period of the year. As some of the local shark species are protected by law, the monitoring agents have witnessed fishermen landing captured sharks in pieces and hidden inside bags that are not weighted at the processing plant. So the shark catch is probably higher than the amount recorded, and field observations indicate a moderate degree of fishing pressure on neonate sharks during the birth season and occasional capture of pregnant females, what still may affect the recruitment of local populations. Therefore, further educational activities directed to the fishermen and students, and the continuation of the fisheries monitoring as a permanent practice are recommended.

Project Background

Fernando de Noronha Archipelago, 345 km off northeastern Brazil, is an important nursery for the Reef, Nurse and Lemon sharks in the western equatorial Atlantic (Garla, 2004; Garla et al., 2006a, b; Garla et al., 2008). The populations of these species in the archipelago have already declined as a result of a local directed longline fishery between 1992 to 1997. Despite the relaxation in fishing pressure upon the adult sharks since 1997, there continues to be significant fishing mortality of juvenile Reef and Lemon sharks during the birth season between December to March, when up to 12 individuals can be captured in quick succession along the shoreline.

This fact is trivial to the local fishermen, who are unaware that this number may represent the biennial production of two-three adult females of these species (Compagno, 1984). As the current fishing mortality in the archipelago is unknown, it is not possible to evaluate the actual impact of the fisheries on the local shark populations. As they represent a significant fraction of apex predators around the archipelago, local conservation of these sharks is important because they likely play an important role in the overall trophic dynamics of this insular ecosystem.

Furthermore, the visible presence of living individuals of such conspicuous and charismatic elements of the reef ecosystem enhances the reputation of the archipelago as one of Brazil's finest dive tourism locations and helps attract visitors, indirectly contributing to the local economy, based on the ecotourism (Maida & Ferreira, 1997; www.noronha.com.br; www.noronha.pe.gov.br).

In this sense, the aim of this project was to capacitate the fishermen for to implement a participative fisheries monitoring in Fernando de Noronha Archipelago and to incorporate the local community as the main agent of the shark management program.

Methods

The current fishing fleet of the local fisheries consists of 40 small motorized boats (6-10 m) (Figure 1). Fifth professional fishermen are linked to the fishermen's association (ANPESCA), and 80 recreational fishermen are registered by the local office of the national environment agency (IBAMA). The main gear employed by both categories is hand line with live bait, and the fleet rarely ventures beyond 5 nautical miles off the insular shelf because boats generally lack electronic navigation equipment. Recreational fisheries occur onboard and along some beaches, reefs and rock shorelines (MMA/IBAMA, 2005). All investigations focusing the fisheries production of the archipelago, and all of them were short-term and did not have continuity (Barros, 1963; Moura & Paiva, 1965; Lessa et al., 1998; Travassos et al., 2002), and there is no record of the recreational catch.

Figure 1 – Typical boats of local fisheries association of Fernando de Noronha Archipelago.

Training workshops were offered at ANPESCA's processing plant in September 2007 (Figure 2). The facilitators employed a variety of participative methodologies in order to develop a collaborative fisheries monitoring programme.

Figure 2 – Processing plant of the local fisheries association of Fernando de Noronha Archipelago.

Visualisation techniques such as a seasonal calendar and a resource use map were applied during this workshop to generate baseline information on the archipelago's fisheries activity (Figure 3).

Figure 3 – Application of visualisation techniques in training workshops in Fernando de Noronha Archipelago.

Seasonal calendars were used to observe possible changes in the abundance of local species along the year. First, the fishermen were asked what species are more frequent in their captures in each month, and a table with the popular names in the first column and months of the year in subsequent columns was constructed. The degree of abundance of each species was categorized with colours (red – rare; green – intermediate; blue – abundant) (Figure 3 and Table 1).

Figure 3 - Seasonal calendar produced by the local fishermen.

Table 1 – Representation of the seasonal calendar produced by the local fishermen of Fernando de Noronha Archipelago.

FISH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
BARRACUDA	X	X	X	X	X	X	X	X	X	X	X	X
WAHOO	X	X	X	X	X	X	X	X	X	X	X	X
DOLPHINFISH	X	X	X	X	X	X	X	X	X	X	X	X
RAINBOW RUNNER	X	X	X	X	X	X	X	X	X	X	X	X
TUNA	X	X	X	X	X	X	X	X	X	X	X	X
DOG SNAPPER	X	X	X	X	X	X	X	X	X	X	X	X
AFRICAN POMPANO	X	X	X	X	X	X	X	X	X	X	X	X
BLACK JACK	X	X	X	X	X	X	X	X	X	X	X	X
HORSE-EYE JACK	X	X	X	X	X	X	X	X	X	X	X	X
YELLOW JACK	X	X	X	X	X	X	X	X	X	X	X	X
SAILFISH	X	X	X	X	X	X	X	X	X	X	X	X
TRIGGERFISH	X	X	X	X	X	X	X	X	X	X	X	X

Red = rare; Green = intermediate abundance; Blue = very abundant.

A resource use map was prepared to illustrate the main fishing sites and the spatial distribution of the species according to the fishermen's knowledge. A transparent sheet was overlapped on the nautical chart of the archipelago, and the participants were asked to mark the relative position of the fishing locations, and the species that are common in each site (Figures 4 - 5 and Table 2).

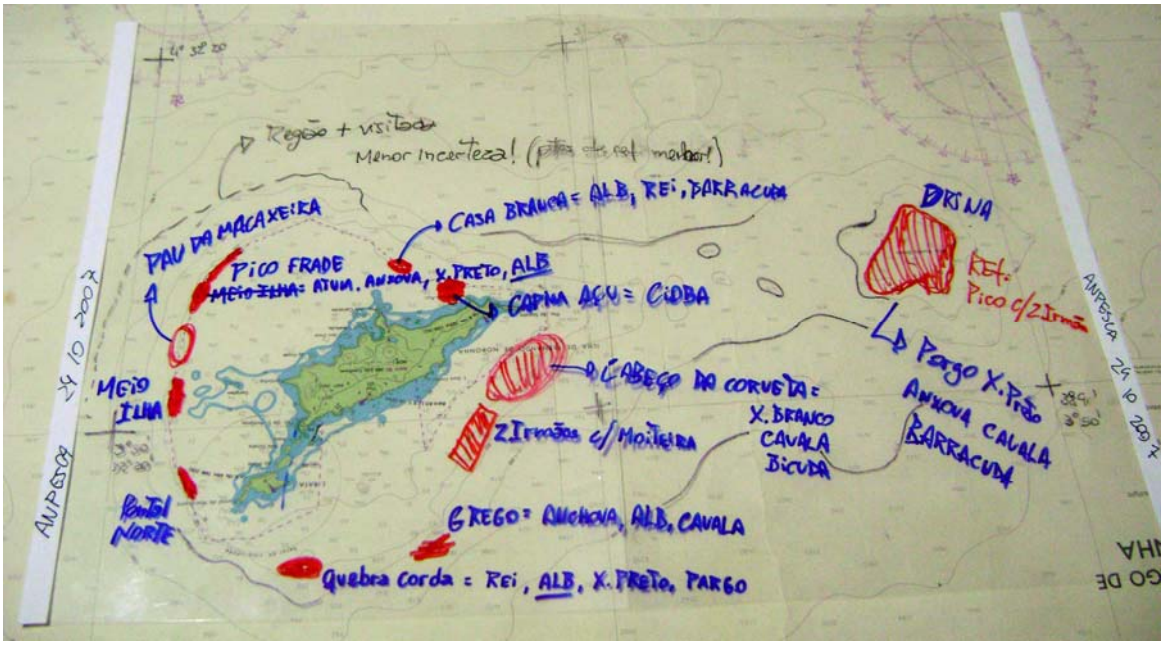

Figure 4 - Resource use map produced by the local fishermen.

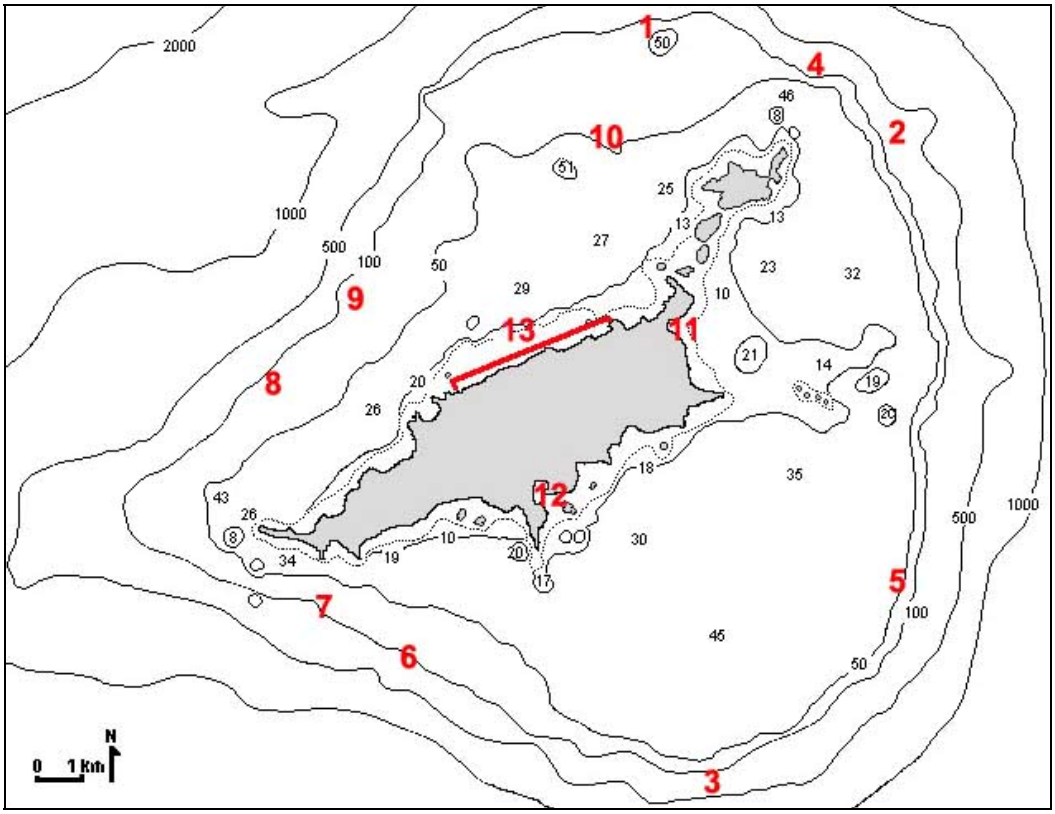

Figure 5 – Representation of Fernando de Noronha Archipelago's fishermen resource use map (see Table 2 for name of each location).

Table 2 – Main fishing sites and respective species captured by commercial fisheries in Fernando de Noronha Archipelago.

POINT	NAME	SPECIES CAPTURED
1	Quebra Corda	Rainbow Runner, Tuna, Black Jack, Dog Snapper
2	Pontal do Norte	Wahoo, Barracuda, Horse-eye Jack
3	Meio da Ilha	Tuna, Rainbow Runner
4	Pau da Macaxeira	Tuna, Rainbow Runner
5	Pico com Frade	Tuna, Rainbow Runner, Black Jack
6	Casa Branca	Tuna, Rainbow Runner, Barracuda
7	Capim Açú	Dog Snapper
8	Cabeço da Corveta	Horse-eye Jack, Wahoo, Barracuda
9	Dois Irmãos	Dog Snapper, Black Jack, Rainbow Runner, Wahoo, Barracuda
10	Grego	Rainbow Runner, Tuna, Wahoo
11	Enseada das Caieiras	Recreational Fisheries
12	Sueste	Recreational Fisheries
13	Porto - Dois Irmãos	Recreational Fisheries

After conclusion of the workshops, two monitoring agents where selected. Although the monitoring emphasis is the shark catch, previous surveys indicate that teleost fishes were the main fisheries resources of the archipelago (Travassos et al., 2002). Therefore, agents were trained to monitor the entire production and separate sharks from other fish. The data collection of commercial fisheries was performed from Mondays to Saturdays during the landing time at ANPESCA's processing (17:00 – 19:00 h). Recreational fisheries were monitored almost daily in the main recreational fishing site, the Enseada das Caieiras, where fishing activities take place only during low tide on the top of a large extension of a reef barrier (Figure 6). The time of fishing and monitoring practises are restricted to the low tide period and varied daily.

Figure 6 – Enseada das Caieiras, the main location of the recreational fisheries in Fernando de Noronha Archipelago.

Results

Objective 1 – Offer short term workshops on marine conservation and fisheries and coastal management

The project activities were started between end of August and September 2007. First, formal meetings were scheduled in the fishermen's association (ANPESCA) to introduce the research team and project aims, and also to discuss a preliminary workshop and monitoring plan. Initially, the members did not show interest in implementing a fisheries monitoring programme because they believed the fisheries production would be compared among fishermen, and that the worst fishermen would be punished in some way. They also argued that they did not want to evaluation how they manage their incomes.

The team returned a week later and further explained that the project's goal would be the collection of information to manage the fishermen's resources aiming the sustainability of their activity, and not to compare individual efficiencies or evaluate their financial control. The benefits that they would obtain monitoring the catch were further explained, and examples of data collection and use were provided in detail. After all, they were attracted by the idea and agreed to discuss the monitoring plan.

Thus, the goals, methods and benefits of the monitoring plan were presented in a preliminary lecture. The participants had many questions concerning the objectives and data applicability, and the team provided examples of monitoring plans elsewhere, and they finally agreed to implement the proposed monitoring programme. The preliminary schedule of the training workshops schedule was then presented and all members of the association were formally invited to participate. Subsequently, the team attended an interview broadcasted by the local radio and TV station, in which the importance of the fisheries monitoring to the conservation of sharks and other fish species was explained, and the invitation to join the workshop was extended to other members of the archipelago.

The training workshops were accomplished at ANPESCA's processing plant from the September 2nd to 13th 2007. Each workshop lasted approximately 15 h and was attended by 30 participants, including fishermen, community leaders and other members (Figure 7). Didactic kits were distributed at the beginning of each workshop, and T-shirts and caps at their conclusion, to further stimulate the involvement of the attendants with the project. The following issues were covered: a) Fish Biology – feeding, reproduction, growth and ecology; b) Fish Identification – morphology and distinctive characters; c) Oceanography – topography, currents, temperature, and phenomena that might affect fisheries production; d) Fisheries management – stock determination, sustainable exploitation, legislation, fisheries and coastal management; e) Sharks – biology and ecology, identification of local species, management and conservation.

Figure 7 - Training workshops with fishermen in Fernando de Noronha Archipelago.

Objective 2 – Select and train local agents of fisheries monitoring

The workshops enable identifying the most interested participants and those with appropriate profile to collect data. Those members and the captains of the commercial fleet were further invited to participate of a specific training focusing data collection, fish identification and catch record. This second workshop was performed between September 13th and 17th, lasted 10 h, and was attended by 20 participants (Figure 8). After conclusion of this second workshop, two monitoring agents were selected and subjected to further a practical training on the procedures of data collection and monitoring the commercial and recreational landings. During the subsequent week, the agents were supervised by the facilitators and practiced all procedures of data collection. By the end of September 2007, after few adjustments in the sampling strategy, the definitive protocols we designed and the monitoring plan was implemented.

Figure 8 - Training workshops with monitoring agents and captains of the commercial fleet of Fernando de Noronha Archipelago.

Objective 3 – Implement and supervise the local agents in the execution of an experimental monitoring period of the shark catch and the consumption of shark meat

A) Commercial Fisheries

The commercial fleet was monitored between October 2007 and July 2008. During this 10-month period, the total catch was 29.11 tons (Figure 9), comprising 16 species of fishes (Appendix 1). The mean production per month was 5.24 tons, and three distinctive peaks of production were noted during this period: a higher one from October to December 2007 with 7.77 tons/month, an intermediate catch of 5.75 tons from January to March 2008, and a lower production of 2.96 tons/month from April to July 2008. Although the effort was similar from October 2007 to March, the production was relatively lower from January to March 2008. According to the fishermen there is a higher availability of fish between October and December, what would explain in part the greater catches during this time of the year. Further monitoring may reveal if this trend is regular between years. The lower mean production from April to July was probably due to a decrease in the fishing effort during this period, as approximately 50% of the fishermen left the archipelago to get involved in the

lobster fishing season in the Brazilian northeastern coast. After this period, they returned to the archipelago and it was possible to detect a subtle increase in the production.

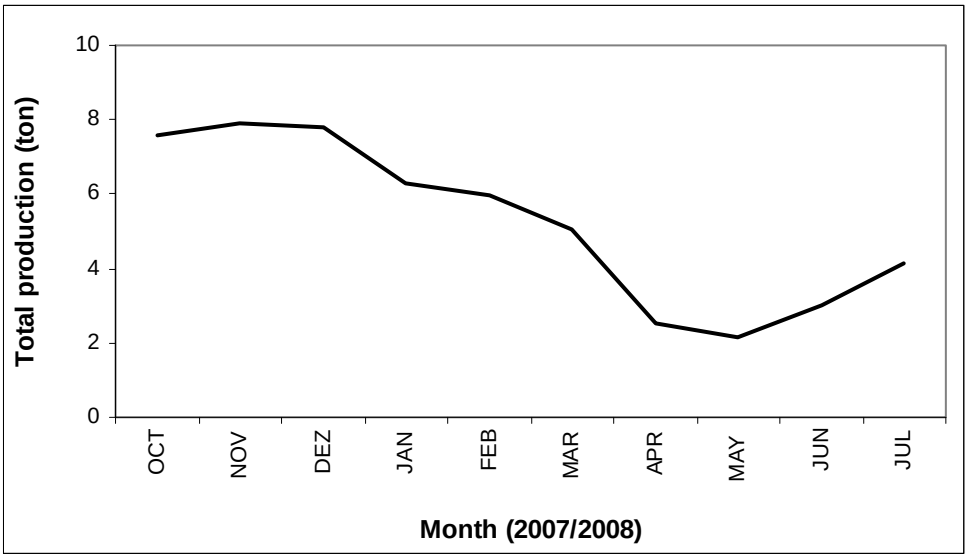

Figure 9 – Total production (ton) per month of the commercial fisheries in Fernando de Noronha Archipelago between October 2007 and July 2008.

The catch is rated on basis of the meat quality and its market value (Table 3). The first-rated species have white meat and a high commercial demand, the second-rated fishes have reddish meat and an intermediate demand, whereas the third-rated species have fibrous meat and are mainly consumed by the fishermen.

Table 3 – Market category and trade value of the fish species captured by the commercial fisheries in Fernando de Noronha Archipelago.

COMMON NAME	MARKET CATEGORY	TRADE VALUE (US$/Kg)
BARRACUDA	1st	4.4
DOLPHINFISH	1st	4.4
RAINBOW RUNNER	1st	4.4
WAHOO	1st	4.4
AFRICAN POMPANO	2nd	3.7
BLACK JACK	2nd	3.7
BLUE RUNNER	2nd	3.7
DOG SNAPPER	2nd	3.7
HORSE-EYE JACK	2nd	3.7
MARBLED GROUPER	2nd	3.7
SAILFISH	2nd	3.7
SOUTHERN RED SNAPPER	2nd	3.7
TUNA	2nd	3.7
YELLOW JACK	2nd	3.7
SHARKS	3rd	no value
TRIGGERFISH	3rd	no value

The first-rated fishes represented almost two thirds of the mean production during the monitored period (Figure 10), and this trend began to change in March 2008 (Figure 11) with the beginning of the tuna season, which is regarded as second-rated. According to observations of the monitoring agents, Rainbow Runner represented more than 60% of the catch.

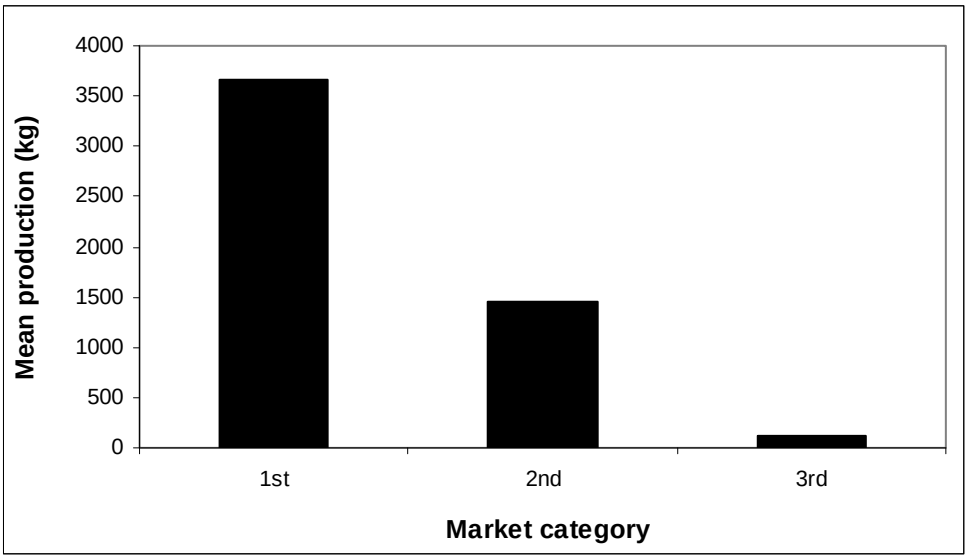

Figure 10 – Mean production (kg) of the market categories of the commercial fisheries in Fernando de Noronha Archipelago between October 2007 and July 2008.

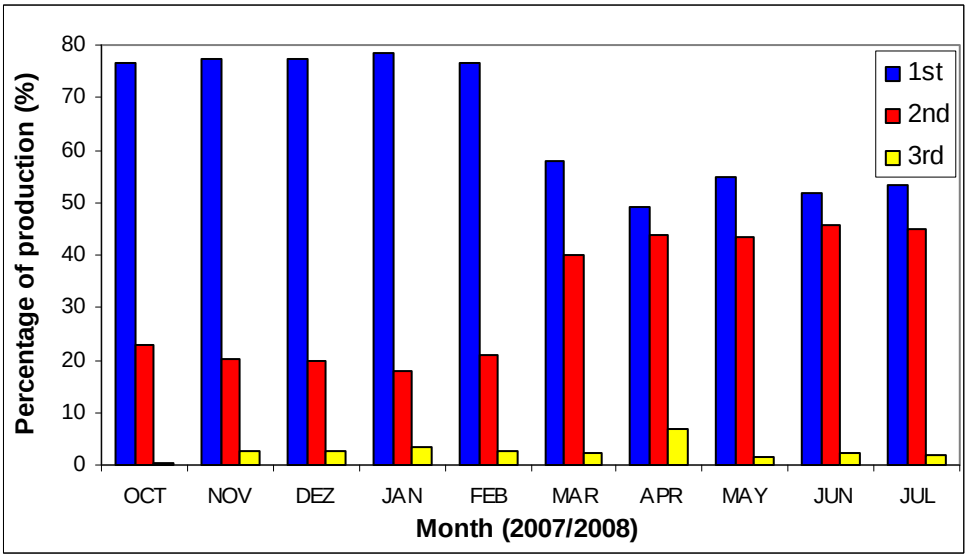

Figure 11 – Percentage of total catch of each market category per month by the commercial fleet in Fernando de Noronha Archipelago between October 2007 and July 2008.

Sharks comprised only 2.68% of the mean production, and 11 sharks were captured during the ten months of data collection, with a mean production of 71 kg/ month (Figure 12). However, field observations of the agents and the research team indicate that the shark catches are higher than those reported. This is probably because two of the local species, the nurse and lemon sharks, are prohibited since 2004. As the fishermen are afraid of being punished by the inspectors of the environmental agency (IBAMA), they generally land the shark carcasses in pieces that are hidden inside bags and are not weighted at the association's processing plant.

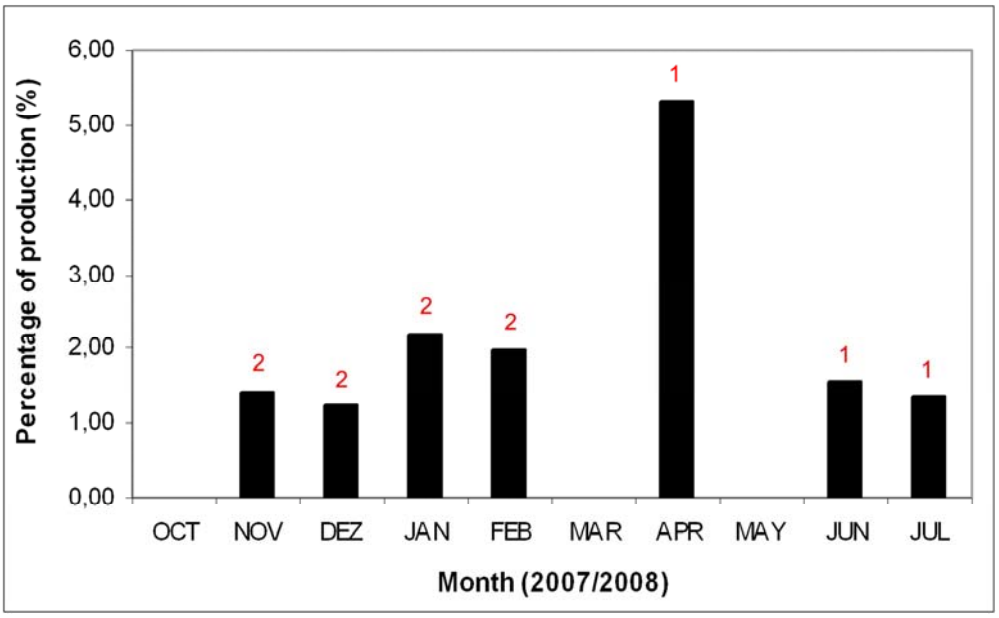

Figure 12 – Percentage of shark production by the commercial fleet in Fernando de Noronha Archipelago between October 2007 and July 2008. The red numbers above bars indicate the number of sharks caught.

B) Recreational Fisheries

The fisheries production in Enseada das Caieiras was composed by 12 species (Appendix 1) and the total catch was 2.74 tons. The mean production per month during the 10-month monitoring was 192 kg. The greater catches were recorded in January, December and July 2008 (335 kg, 315 kg and 297 kg, respectively) (Figure 13). The months of higher catches coincides with the months of school vacation, when it is evident an increase of the number of boys fishing, with a consequent increase in the effort. The production was relatively stable in the other months. Species of Carangidae fishes (Yellow Jack, Blue Runner, Horse-eye Jack, Rainbow Runner and Black Jack) were the most fishes important in this activity, representing approximately 73 % of the total catch (Figure 14), a trend that remained stable during the whole monitoring (Figure 15).

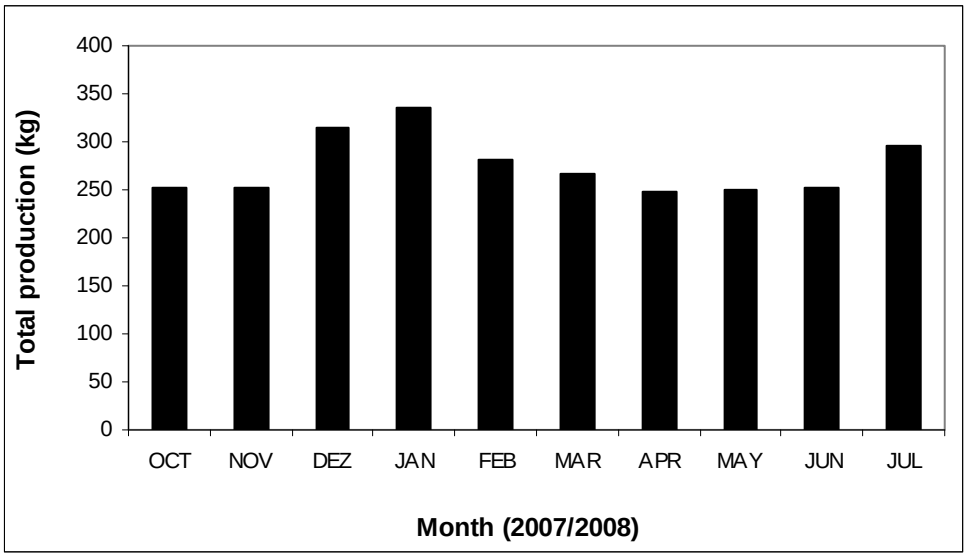

Figure 13 – Total production (kg) of the recreational fisheries per month in Fernando de Noronha Archipelago between October 2007 and July 2008.

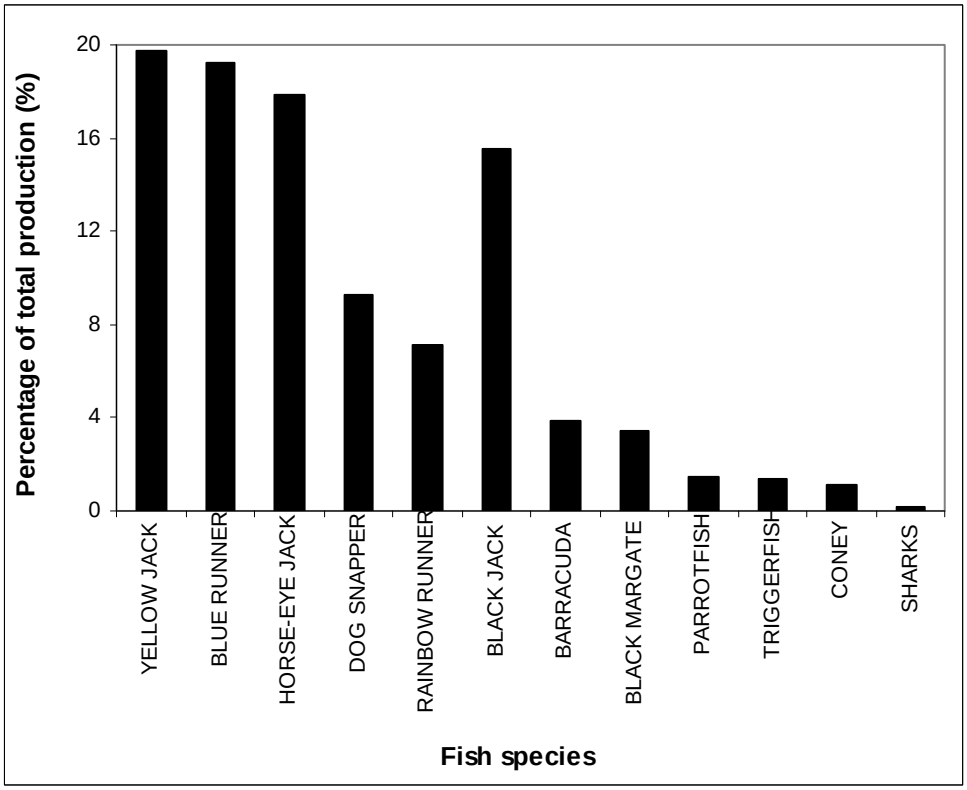

Figure 14 – Percentage of each species caught by the recreational fisheries in Fernando de Noronha Archipelago between October 2007 and July 2008.

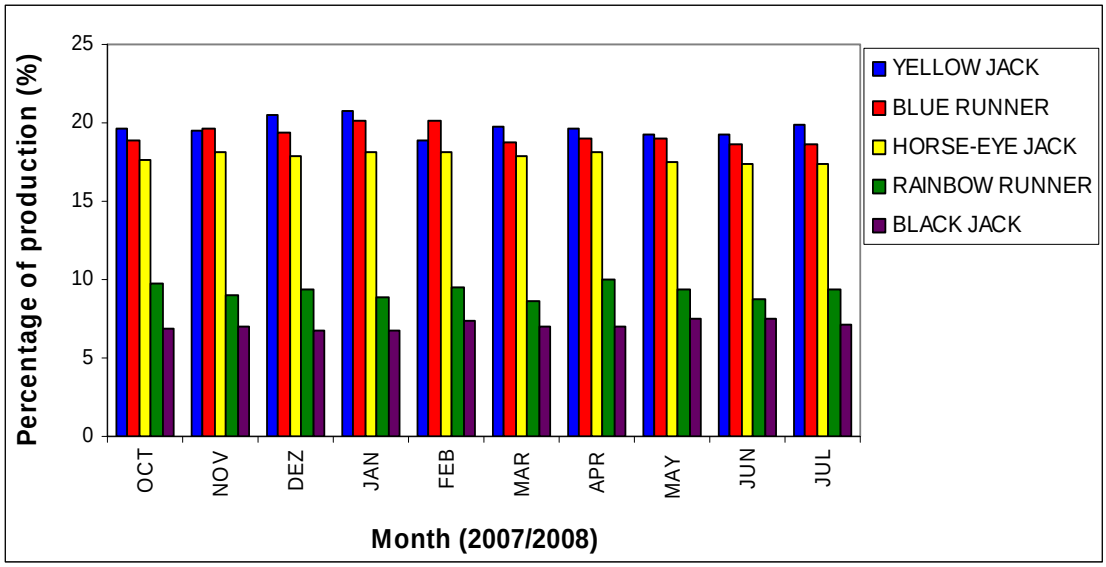

Figure 15 – Percentage of Carangidae species caught in the recreational fisheries in Fernando de Noronha Archipelago between October 2007 and July 2008.

Sharks comprised 0.51% of the total production, totalling 14 neonate sharks captured on March 2008 (Figure 16). Those neonates were captured in quick succession in three different occasions: five sharks in the first two occasions, and four individuals in the third. Based on observations, these neonate sharks are apparently capture for leisure and not eaten.

Figure 16 – Neonate lemon sharks caught in the recreational fisheries in Fernando de Noronha Archipelago.

C) Consumption of shark meat in the local restaurants

Interviews with the owners of local restaurants were conducted weekly from October 2007 to April 2008. Results demonstrated that most of the local restaurants that offered shark in their menu purchased the meat from the cities of Recife and Natal in the Brazilian mainland. The owners of the restaurants also stated that there is a small demand of shark meat. They usually purchase a mean of 30 kg/month of this item at US$1.5/ kg. In view of those results it was decided to suspend the data collection in the restaurants during the last four months of the project, as it consumed a lot of time of the agents and because the shark meat consumed came from outside the archipelago.

Discussion

The 10-month fisheries monitoring demonstrates that it is possible to implement a long-term programme conducted by the fishermen, and the activities performed have encouraged them to learn more about their activity and the importance of manage their resources to achieve its sustainability. Also, this first contact with data collection and management techniques will be important to increase their acceptance of a longer monitoring and also to disseminate the crucial role of their decisions in the conservation of the local natural resources.

However, several problems were detected during the monitoring, and will have to be considered when planning future initiatives. The main problem that prevented a more detailed quantification of the commercial production was the local practise of grouping unrelated species of fishes in wide categories based on the meat quality and market value. The attempt of solving this matter by weighting each species separately with coloured containers has failed. This is because consumers' ordinary practise is to arrive at the processing plant between 17:00 and 19:00 h and wait for the arrival of the fishing boats. As soon as the catch is landed and weighted it is immediately traded, so the fishermen argued that weighting each species separately would take extra time and interrupt the regular weighting and trading dynamics. Even tough, the agents were able to experimentally quantify part of the production by species during the last three months of the monitoring, but it will take further time and educational work to convince them of the real need and importance of this practise to manage their production.

The total production recorded during the 10-month monitoring of the commercial fleet was relatively low when compared to the fisheries production recorded in previous years (Barros, 1963; Moura & Paiva, 1965; Lessa et al., 1998; Travassos et al., 2002). The fishermen attribute this decline of the production in recent years to the illegal activity of fishing ships from Recife and Natal that operate at night in the surroundings of the archipelago and may have a daily production of several tons. This may be a real possibility, but a collaborative action of IBAMA, the Brazilian Navy and the local fishermen would be necessary in order to confirm and prohibit this action. Although this may play a role in the recent decline of the local fisheries production, the association is poorly administrated by its president and several unsatisfied members have left it in the last two years. As result, the number of fishermen operating, and consequently, the effort is lower than in previous years and may contribute to the observed decline. This situation attests an urgent need of a complete reorganisation of the administrative body to solve these problems. The fact that most of the

local fishermen left for the lobster fishery in the Brazilian coast is an indicator of an urgent need of an administrative reform in the association. According to the fishermen, this situation never happened before, especially because the lobster season in the coast coincides with the tuna and albacore season in the archipelago, a time of the year in which the catches and profits are usually high. The fishermen that left to the lobster fishing are subjected to worse working conditions and smaller incomes than if they stayed in the archipelago during the tuna season, hence the most plausible explanation is their disappointment with the current administrative conditions of the association.

When it comes to the recreational fisheries, data collection was restricted to the main fishing location and only during daytime, and therefore, is still far from being complete. However, the monitoring of other locations during daytime and also at night would demand more agents, fieldwork effort and resources, and could have compromised the data collection of the more productive commercial fisheries. Even though, the results obtained were extremely useful to a preliminary characterization of this activity and provided important subsides to plan a specific monitoring plan of this activity in the future. For example, the school vacation season may be a factor that influences the recreational fisheries catches along the year, as an increase in the number of students practising recreational fishing during this period was evident. This also demonstrates the necessity of conducting educational activities of fisheries management directed to students in the local school.

Results of the fisheries monitoring indicate a low catch of sharks, and also demonstrate that bonefishes are responsible for most of economical income provided by fisheries. Eleven sharks ranging from 1.6 to 2.5 m of total length (LT) were captured during the 10-month monitoring. However, these figures reflect only the carcasses that were landed and weighted at ANPESCA's processing plant, and field observations of the research team and agents indicate a higher catch of sharks. The commercial fishermen were informed about the two species whose capture is forbidden and are aware that other species are allowed, but even though, most of them still prefer not reporting all catches to avoid some kind of punishment. They also state that the capture of sharks is generally restricted to days of a low bonefish production, and that the shark meat landed is usually consumed by their families, as a way of bringing food for home. In the recreational fisheries, the catch was composed of neonate sharks captured mainly by students in the summer vacation. This time of the year coincides with the parturition season, a time when the young sharks frequent tide pools and are very fragile and vulnerable.

In addition, informal interviews indicate the possibility of finning in the archipelago, as a few fishermen have links with the fin trade of the city of Natal in northeastern coast of Brazil, where they receive US$ 375/kg of fin. This fact further motivates the practise of part of the commercial fleet to land the shark carcasses in pieces hidden in bags, and avoid weighting the catch in the processing plant. Therefore, even in view of the limitations of the fisheries monitoring in quantifying the catch, field observations indicate some degree of fishing pressure over the shark populations of the archipelago. This pressure will further affect the recruitment and recover of those populations, which were already exploited by a directed fishery few years ago (Garla, 2004; Noronha Oceanic Fisheries Enterprises, unpublished data).

Therefore, although the catches of part of the local species of shark species is already prohibited, the characteristics of the archipelago's fisheries, such as the habit of not reporting all the catches, difficult access to fishing sites access, night fishing, make inspection and monitoring activities a hard task. Reversing this situation will depend on a long-term

educational work directed to the commercial fleet in order to implement the fisheries monitoring as a permanent practise and develop stronger links with the fishermen. In addition, an educative work should also be developed with the students of the local school in an attempt to avoid or reduce the capture of neonate sharks during the parturition season. A complementary action to be discussed with the fishermen and the local administration and environmental institutions is the creation of specific shark management measures, based on the results of the ongoing ecological studies developed by the research team. Further educational work will be need to demonstrate the fishermen that those future measures will not affect the fishery production given the low market value of sharks. Finally, it is expected that the conclusion of the ongoing educative campaign of the Shark Project will help to demonstrate fishermen and other local stakeholders (tourism agencies, hotel and restaurant owners, dive operators, and government agencies) the benefits of valorising sharks as tourism resources to the local economy, what would provide more profits than their capture for fisheries purposes.

Acknowledgements

The research team thanks the Brazilian Environmental Agency (IBAMA) and the General Administration of Fernando de Noronha (ADEFN) for research permits. We also wish to thank the following people of those institutions for collaboration and assistance in the project implementation and for the financial resources and material support that has made this work possible:

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Appendices

Appendix 1 - Fish species captured by the commercial and recreational fisheries in Fernando de Noronha Archipelago.

ENGLISH NAME	CIENTIFIC NAME	FAMILY	LOCAL NAME
TRIGGERFISH	*Canthidermis sufflamen*	Balistidae	CANGULO
AFRICAN POMPANO	*Alectis ciliaris*	Carangidae	GALO DO ALTO
YELLOW JACK	*Carangoides bartholomaei* and *Caranx ruber*	Carangidae	GUARAJUBA
BLUE RUNNER	*Caranx crysos*	Carangidae	XIXARRO
HORSE-EYE JACK	*Caranx latus*	Carangidae	XARÉU BRANCO
BLACK JACK	*Caranx lugubris*	Carangidae	XARÉU PRETO
RAINBOW RUNNER	*Elagatis bipinnulata*	Carangidae	ANCHOVA
SHARKS	*Carcharhinus* spp., *Negaprion brevirostris* and *Sphyrna* spp.	Carcharhinidae Sphyrnidae	TUBARÃO
DOLPHINFISH	*Coryphaena hippurus*	Coryphaenidae	DOURADO
BLACK MARGATE	*Anisotremus surinamensis*	Haemulidae	CABO VELHO
SAILFISH	*Istiophorus albicans* and *Makaira nigricans*	Istiophoridae	AGULHÃO
DOG SNAPPER	*Lutjanus jocu*	Lutjanidae	CIOBA
SOUTHERN RED SNAPPER	*Lutjanus purpureus*	Lutjanidae	PARGO CACHUCHO
PARROTFISH	*Sparisoma* spp.	Scaridae	BUDIÃO
WAHOO	*Acanthocybium solandri*	Scombridae	CAVALA
TUNA	*Thunnus albacares* and *Thunnus atlanticus*	Scombridae	ALBACORA
CONEY	*Cephalopholis fulva*	Serranidae	PIRAÚNA
MARBLED GROUPER	*Dermatolepis inermis*	Serranidae	GOSTOSA
BARRACUDA	*Sphyraena barracuda*	Sphyraenidae	BARRACUDA