Progress made on the:

Implementation of the Seychelles National Plan of Action for the Conservation and Management of Sharks – 2007

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Background

Shark fishing has a long history in Seychelles and has significant historical socio-economic importance, whilst diving represents a significant component of the tourism industry. The mass coral bleaching event of 1997/98 heightened the importance of macro-fauna, such as sharks and turtles, to the dive industry. The shark stocks of the Seychelles therefore represent an important resource that fulfils diverse economic, social and environmental roles **(Seychelles NPOA for the conservation and management of sharks, 2007).**

The shark stocks of Seychelles, like many around the world, have been the subject of increasing conjecture in recent years with concerns as to the sustainability of current exploitation and in particular due to the common practice of "finning". With the increase the demand for shark fins on the Asian market the targeting of sharks and the practice of "finning" by local fishers has increase dramatically over recent years as opposed to the previous situation were sharks were mostly taken as by-catch and were released, (**Seychelles NPOA for the conservation and management of sharks, 2007).**

The Ministry of Environment and Natural Resources (MENR) and the Seychelles Fishing Authority (SFA) develop a National Plan of Action for the Conservation and Management of Sharks (NPOA-Sharks 2007) in accordance with FAO guidelines under its International Plan of Action (IPOA) sharks. The Seychelles NPOA – Shark was produced in April 2007.

Seychelles Shark Fishery

Seychelles has a long history of shark fishing. As early as the 1780s sharks were being utilised to generate medicinal products and the potential to produce fish oil from cartilaginous fish had also been noted, *Seychelles NPOA for the conservation and management of sharks, 2007*. The emergence of the Southeast Asian "tiger economies" in the 1980s and the Chinese economy in the 1990s served to increase the market demand for shark fin, and exports increased due to increased targeting by the artisanal fishery.

A local semi-industrial long-line fishery was introduced in 1995, and the catches of shark by local vessels went on the increase despite the introduction of a ban on the use of shark's gill net in 1998. Targeting amplified in 2003 after the introduction of an importation ban on the exportation of swordfish (the main target species of the semi-industrial longline fishery) onto the European Market. This continued up to 2007 despite the lifting of the ban in 2005.

Whilst the landing of shark meat remained constant at around 20 Mt, a significant drop of around 50% (from 18 to 9 Mt) was recorded in landing of shark fins in 2008 compared to 2007, when landing of both shark meat and shark fins were at it highest. This may be attributed to recent changes in the incentives provided to fishermen by the Seychelles government. Fishers targeting sharks are not refunded taxes paid on fuel. A 35% drop in fishing trips targeting sharks were reported in 2008. It should however be noted that underreporting have always been an issue with this activity. Since the very beginning, shark fishing activities were poorly monitored and fishers were either not reporting it as bycatch in swordfish fishery, or they were being greatly under-reported.

Implementation of the Seychelles Shark NPOA- 2007

The NPOA sets out a four-year action plan with 11 work programmes that seek to address the 10 goals of the IPOA-Sharks. The Mission of the first 4-year phase of this National Plan of Action is twofold:

1. *to establish the necessary capacity, systems and databases to enable the informed adaptive management of shark stocks in Seychelles*

and

2. *to implement an active and progressive precautionary approach to the management of targeted and non-targeted shark fishing effort that takes into account the transitional needs of stakeholders.*

Many actions with different priority level were identified. The following activities were identified as medium to high priority, needing urgent attention (within 6 to 12 months of the launching of the NPOA SHARK - 2007.

Table 1. Progress made on various activities identified as medium to high level priority.

Actions	Status
Work Programme 1: Co-management of the NPOA	
Formalise Scientific Committee ToR, mandate and *modus operandi*.	Completed
Launch and commence operation of SC.	Completed
Multi-stakeholder Steering committee (SC) established and meeting when necessary,y but at least once every quarter.	
Work Programme 2: Addressing stakeholder concerns	
Identify and agree on number, location and size of dive areas where artisanal fishermen agree not to place anchored long lines ("drag").	Area Identified Demarkation may be required
Develop and agree on format and nature of monitoring that dive centres will undertake at specified sites.	In progress
Negotiate and determine distance from the islands of Mahe, Praslin and La Digue within which boats involved in setting longlines agree to not set their lines.	It was in agreement that longline should not be set on the Mahe plateaux
Multistakeholder workshops were held and stakeholders have agreed on various issues. However still in informal state, although some measures are being practiced on a voluntary basis.	
Work Programme 3: Data gathering and Data management	
Develop user-friendly identification keys with standardised terminology and nomenclature incorporating Creole names.	Funding secured by an NGO to begin work
Develop standardised data gathering methods and user-friendly data charts that incorporate necessary information	Outstanding
No change so far to the data gathering and data management methods. Logbook return is on the decline as fishers are not getting incentives when targeting sharks hence not submitting logsheets.	
Work Programme 4: Research	
Status of shark stocks, their distribution (temporal and spatial), biology andecology.	Funds secured from IRD for research
Identification of critical habitats (aggregation areas, breeding/pupping grounds)	Funds secured from IRD for research
Identification of migration routes, and barriers to migration.	Funds secured from

	IRD for research
Socioeconomic study of Seychelles shark fishery (economic requirements for landing whole shark, scope for production of value-added shark products, scope for expansion of local products market, identification of international shark product markets).	SFA working on value added product.
Investigation and valuation of potential dive tourism.	In progress
Survey and assess local knowledge of shark stocks and shark fishing (seasonality,species location, methods).	Funds secured from IRD for research

Funds have been secured under the Jeunes Equipes associées à l'IRD (JEAI) programme for the Behavioural Ecology of Marine Animal research program to study the behavior of shark around MPA through acoustic tagging, Under Water Visual Census. Research will begin in January 2010. SFA have a brand new product development laboratory and work on value added product are in progress.

Work Programme 5: Managing effort in line with a precautionary approach

Survey and identify current artisanal shark fishermen, the number of boats and number of "drag" under use.	Ongoing
Legislate to license the fishery and give licenses only to current operators	Under consideration

Work Programme 6: Develop/access markets for shark products

Liberalise fin export to allow local fisherman to export their own fin.	Under consideration

Work Programme 7: Optimising use of shark catch

To be addressed in the longer term (Cross-cutting with other work programme).SFA working on value added products.

Work Programme 8: Non-consumptive sustainable use

Identify and declare no shark fishing areas	In progress

Consultation with Stakeholder ongoing.

Work Programme 9: Review and Improve Administrative, Management and Conservation Measures

Assess current management arrangements for sharks against the objectives and actions of this Shark-plan and whether they are enforceable and consistent with the ecologically sustainable use of sharks.	Ongoing

Work Programme 10: International cooperation

To be addressed in the longer term.

Work Programme 11: Education and awareness

Public education and awareness campaign	Funds to be secured
Ongoing and cross cutting activity. NGO seeking funds for Education and awareness campaign.	

Conclusion

The implementation of the NPOA –Shark 2007 has progress relatively slow since it was produced in April 2007. However with the setting up of the Scientific Committee , things are picking up. Funds are being secured by both NGO's and the Government (Seychelles fishing Authority) to address many of the activities identified under the various work programmes. The BEMA- SEYSHA research project will address many of the gaps identified under research (work-programme 4), regarding biology, ecology and behavior of coastal shark in the Seychelles. The objective is to improve our knowledge on the behavioural ecology of some coastal shark species in the Seychelles, so that they can be used with other types of knowledge to decide if spatial management should be implemented, and the design of it.

The consultative approach adopted in the implementation of the NPOA – SHARK is very positive and effective as stakeholders are already implementing some actions even in the absence of legislations or formal agreements (areas where artisanal fishermen should not set " drag". It is anticipated that more activities will be completed in 2010.

References

Seychelles national plan of action for the conservation and management of sharks. Seychelles Fishing Authority, Victoria, Seychelles**, 2007. 59 p.**

Progress made on

Mitigation of depredation in the Seychelles Semi-industrial longline fishery

Background

An analysis of depredation data collected by the Seychelles Fishing Authority since the onset of the semi-industrial longline fishery targeting swordfish and tuna in 1995 revealed an overall depredation rate of 21% , representing 4.2 fish lost/1000 hook, and was regarded as one of the highest in the world. For swordfish only, which is the main target species (60% of catches), it was estimated that the economical loss was about 340 €/1000 hook set which represent an overall loss of nearly 1,000,000 €over the 1995-2006 period. Based on anecdotal information from fishers, the main culprits were presumed to be short finned pilot whale (*Globicephala macrorhynchus*), false killer whale (*Pseudorca crassidens*) and several pelagic sharks.

Given this high depredation rate and the significant economic loss they cause, an action plan to mitigate the depredation rate by cetaceans on the Seychelles semi-industrial longline fishery was drawn up in 2006. In this light 3 research cruises were conducted onboard a commercial semi-industrial fishing vessels between 2006 and 2008. The first trip conducted in 2006 had the following objectives (a) understand the fishing operation in order to design suitable mitigation devices (b) identify marine mammals involve in depredation on semi-industrial longline fishery and (c) attempt to identify and record acoustic signal generated by the vessel which may attract predators. The second trip, conducted in 2007 was mainly to test the "SPIDER" depredation mitigating devices. During the third and final trip an improved versions of the device were tested in November 2008.

Conclusions of the study

The study shows that other species of cetaceans are likely to be involved in depredation on the semi-industrial longline fishery. Spinner dolphins, riso's dolphins, pygmy killer whales and rough toothed dolphins were identified in the vicinity of the fishing gears and were considered as potential predators.

Tests of the 'SPIDER' mitigating devices were not very successful as it failed in its dissuasive purpose. Furthermore fitting the device on the fishing gear took considerable time and effort. The second improved device aimed to provide total physical protection to the captured fish, tested during the third cruise in November 2008, yielded similar results in term of time and effort required to set it up. The protection provided were inadequate (especially to swordfish) as in many cases when the device had been triggered, the captured fish was still depredated. Given that swordfish comprises about 60% of the catch, this mean at least 60% of the catch will not be adequately protected from predators.

To date there has not been any further work on improving the "SPIDER" depredation mitigation device due to lack of funds. Further research is anticipated once funds are secured. Collaboration with scientists from Japan (Dr.Nishida) working on the same problematic have long been established and recently 65 different devices "STREAMERS" were provided to the Seychelles Fishing Authority. Tests will begin as soon as the swordfish fishing season resume after the South East Monsoon.