PJ335c

Identification of synergic projects
for the extension of the CRISP programme

July 2006

CRISP

Coral Reef Initiative for the South Pacific
Initiative Corail pour le Pacifique Sud

Coastal Shark Fisheries in the Pacific
- A brief Overview of Current Knowledge -

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with the collaboration of
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CRISP

Coral Reef Initiative for the South Pacific
Initiative Corail pour le Pacifique Sud

The Initiative for the Protection and Management of Coral Reefs in the Pacific, championed by France and open to contributions from all quarters, aims to develop a vision for the future for these unique ecosystems and the peoples who depend on them for their livelihood. It seeks to put in place strategies and projects to preserve the biodiversity of the reefs and for the future development of the economic and environmental services that they offer both locally and globally.Further, the Initiative is also intended to serve as a vector for regional integration between the developed and the developing countries of the Pacific. The Initiative aims to:

- combine cross-cutting networking activities, local field projects and conservation and economic development objectives;
- combine research, management and development;
- combine the contributions of different scientific disciplines, including biology, ecology, geography, economics, sociology, law and anthropology;
- be active in all areas - land and marine - that have a bearing on the reefs, including watershed management and land tenure arrangements;
- avoid creating a new structure but, instead, make financial resources available to already active partners who indicate an interest in developing and consolidating their activities in a spirit of regional cooperation.

The CRISP is mentioned as a "programme" referring to a group of several "projects".
These "projects" are grouped in three CRISP components, integrating different sub-components :

Component 1 : Integrated Coastal Management (ICM)
- 1A : Ecoregional Strategy for Conservation of Coral Reef and Ecosystem Biodiversity
- 1B : Marine Protected Areas
- 1C : Capacity Building
- 1D : Integrated Coastal and Watersheds Management

Component 2 : Coral Reef Ecosystems Development (CRED)
- 2A : Status of Coral Reefs and Use of Their Resources
- 2B : Rehabilitation of Coral Ecosystems
- 2C : Development of Marine Active Substances
- 2D : Development of Reef Data Base for the Pacific

Component 3 : Coordination and Programme Strenghening (COPS)
- 3A : Institutional/technical support and communication
- 3B : Coordination, capitalization and extension of the CRISP Programme

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Component 3
sub-component 3B

SUB-COMPONENT 3B :
COORDINATION, CAPITALIZATION AND EXTENSION OF THE CRISP PROGRAMME

Project 3B1 - Coordination and evaluation of the CRISP programme :
- *Activity 1 - Preparation and validation of action plans*
- *Activity 2 -Coordination of actions*
- *Activity 3 - Evaluation of actions and reporting*

Project 3B2 - Promotion and capitalization of the CRISP programme :
- *Activity 4 - External promotion of the programme and its outputs*
- *Activity 5 - Capitalization and dissimination of outputs*

Project 3B3 - Extension and development of partnerships :
- *Activity 7 - Identification of synergic and complementary actions*
- *Activity 8 - Setting up of financial and technical partnerships*

funding :

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"From a resource management point of view, therefore, the only rational approach to the conservation of sharks is through regional co-operation"

Watts and Wu (2005)

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Pictures from the report are provided by Bruno Leroy (SPC) except the picture of the ABSTRACT which belongs to the first author.

Abstract

Sharks are found throughout the world in a wide variety of habitats and developed different life histories traits. Though sharks make up only a small percentage of the world's recorded fish landings, they are extremely versatile and are a valuable resource. They are of primary importance in some regions of the world, sustaining important fisheries in some countries. Moreover, they have been, and are, a cheap but valuable source of protein for coastal communities dependent on subsistence fisheries. Humans can utilize much of the carcass for food or other uses. Sharks are exploited for their meat, fins, skin, liver, teeth, cartilage and other internal organs.

Sharks are increasingly becoming endangered on a world-wide scale. The main reason for this is the demand for their fins which are being used for shark fin soup, an Asian delicacy. The extermination of Asian shark stocks has led to an increase in the price of the fins and this in turn has led Asian fishing operators to target sharks further and further away from their home countries, including the Pacific region. It has also contributed to the development of specific fisheries whereas elasmobranchs were so far essentially by-catches.

From the point of view of Fisheries Departments of the Pacific countries, fishing pressure on reef sharks is not high, although no data is available for most of these countries. Assessment of the information collected through literature and questionnaires shows that Pacific shark catches seem to be poorly documented. This bibliographic study enhances the need for rapid assessment techniques using biological information to evaluate the risk from the effects of fishing on shark conservation.

Key word: shark depletion, coastal fisheries, coral reefs, Pacific, management, conservation.

Résumé

Les requins occupent une large gamme d'habitats au sein des océans du globe dans lesquels ils ont développé divers traits de vie. Bien qu'ils ne représentent qu'une faible proportion des débarquements de poisons à l'échelle mondiale, les requins sont d'un intérêt économique évident. Ils sont à l'origine d'une importante pêcherie industrielle pour certains pays notamment dans le Pacifique et font également l'objet d'une pêche de subsistance pour les communautés côtières. Les requins sont exploités pour leurs viande, nageoires, peau, foie, dents, cartilages et organes internes.

A l'échelle mondiale, les requins sont de plus en plus menacés. La raison principale en est l'exploitation alimentaire de leurs nageoires en Asie. L'extermination des stocks de requins dans les zones périphériques au marché du sud est asiatique a engendré une extension de la pression sur les élasmobranches jusque dans des régions éloignées, dont le Pacifique. Elle a aussi contribué au développement de pêcheries spécifiques alors que les élasmobranches constituaient jusque là des prises accessoires.

Du point de vue des services de pêche des pays du Pacifique, la pression sur les requins côtiers n'est pas élevée. Pourtant aucune donnée n'existe pour une majorité de ces pays. Un inventaire des informations recueillies dans la littérature et dans un questionnaire montre que les captures de requins côtiers dans le Pacifique sont peu documentées. Cette étude bibliographique souligne la nécessité d'employer des méthodes d'évaluation rapide à partir de données biologiques pour estimer la pérennité des stocks de requins et leur nécessaire conservation.

Mots clés: raréfaction des requins, pêcheries côtières, récifs coralliens, Pacifique, gestion, conservation.

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While comprehensive global data on the decline in stocks of shark species are still in short supply, recent research in specific regions and on specific shark populations has revealed dramatic reductions.

In recent years, scientists, NGOs and some political leaders have begun to realise the potentially devastating effects of the worldwide decline in shark stocks. For some countries in the developing world, the decline of fish stocks generally has led to an increased effort to catch sharks for human consumption, but now sharks too are becoming more difficult to find. This has already led to food shortages, particularly among coastal communities, and could have serious long-term consequences (Watts and Wu, 2005). The main reason for shark stock depletion is definitely the demand for their fins which are being used for shark fin soup, an Asian delicacy (Knights, 2002). The extermination of Asian shark stocks has led Asian fishing operators to target sharks further and further away from their home countries, including the Pacific region. It has also contributed to the development of specific fisheries whereas elasmobranchs were so far essentially by-catches.

If sharks traditionally benefited from a privileged status in the Pacific region where they are culturally very important (Hayes, 1996), they don't seem to escape anymore to an increasing pressure responding to the asian demand on shark fins.

This study first presents the general knowledge on shark exploitation and vulnerability. Then, the status of coastal shark fisheries in the Pacific Islands is addressed from the angle of the data available for this region and on the basis of information collected through a questionnaire that was sent to the fisheries department of the Pacific countries. In the last part, prospects for management and regulation are discussed.

2. BACKGROUND

2.1. Shark vulnerability

The vulnerability of sharks is linked to their K-selected life-history strategy (Stevens *et al.*, 2000) and to the growing market for shark 'products' (especially fins).

2.1.1. Intrinsic factor: low biological productivity

Most sharks and rays that have been studied have slow growth, late maturity and very low fecundity compared to bony fishes (Camhi *et al.*, 1998). These attributes result in very low intrinsic rates of increase (Smith *et al.*, 1998) and very low resilience to fishing mortality (Hoenig and Gruber, 1990). Such populations decline more rapidly and are not able to rebound as quickly as other fishes after population reductions (Sminkey and Musick, 1995; 1996). Thus, only moderate levels of fishing can be carried on these low biological productivity species without depletion and stock collapse (Camhi *et al.*, 1998; Musick, 1999; Cortes, 2000).

2.1.2. Extrinsic factor: growing market for sharks

Shark meat has been used as food in coastal regions for over 5 000 years (Vannuccini, 1999). Most historical use of shark meat was local because the meat does not travel well without refrigeration. Fisheries for spiny dogfish (*Squalus acanthias*) and the soupfin shark (*Galeorhinus galeus*) boomed in the 1930s off the West Coast of the US to meet the demand for Vitamin A from shark livers. In the Pacific island region, growing acceptance of shark meat by consumers in the late 1970s and the upsurge in the value of shark fins in the 1980s drove exponential growth in shark fisheries in the region. According to FAO statistics, world production of shark fins has increased from 1 800 tonnes in 1976 to 6 030 tonnes in 1997, peaking at 6 400 tonnes in 1989 (Figure 1).

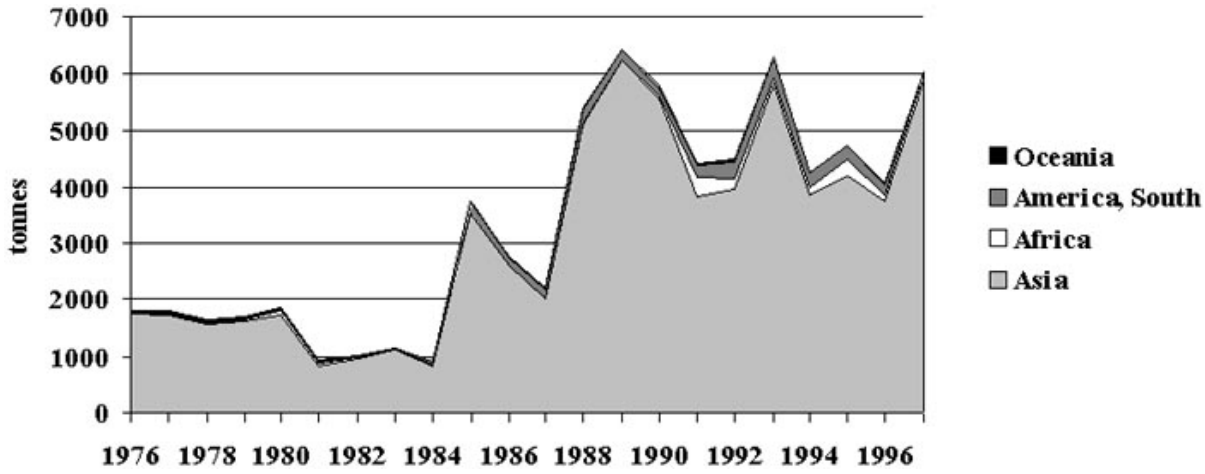

Figure 1. World production of shark fins by continent in tonnes, 1976-1997. Source: FAO-FIDI.

Sharks and their relatives may provide a multitude of usable products including but not restricted to: meat, fins, liver, skin, cartilage, and jaws and teeth (Musick, 2004). The demand for shark fins has grown rapidly in recent years, such that they are now among the world's most expensive fishery products. Similarly, the demand is rising for shark cartilage and other products for medicinal purposes (Walker, 2004).

The biggest and fastest growing market of all for shark fins is China, though there are huge markets in Japan, Hong Kong, Singapore and Korea (Figure 1). Although the shark fin itself has no taste, only texture, shark fin soup has become a prestige product in many Asian cultures (Knights, 2002). Therefore, tens of millions of sharks taken in fisheries each year have their fins removed and their carcasses discarded overboard (Fowler and Musick, 2002). This practice, called finning, represents a considerable waste, as the fins, on average, account for only about 5% of the total weight of a shark (Vannuccini, 1999).

2.2. Global shark fisheries

2.2.1. Fishing gears

Sharks are captured with a wide variety of types of fishing gear and vessel. Sharks are mostly taken by gillnet, hook or trawl in industrial and artisanal fisheries (Walker, 2004). Small amounts are taken in traditional and recreational fisheries (including game fishers and divers) and bather protection programs by beach gillnet and drumline fishing.

Shark fisheries can be classified as “coastal hook and gillnet fisheries”, “demersal trawl bycatch fisheries”, “deepwater bycatch fisheries”, “pelagic bycatch fisheries” (primarily bycatch in tuna longline and purse seine fisheries), and “freshwater fisheries” (*in* Walker, 2004).

Coastal hook and gillnet fisheries operate in continental shelf regions. The configuration of the fishing gear depends on the topography of the fishing grounds and on the available species mix of shark, chimaerid and teleost species. Much of the artisanal catch is taken by bottom-set longlines and by bottom-set gillnets, mostly made of monofilament webbing with some consisting of multifilament webbing (Walker, 2004).

At least half of the sharks killed are “bycatch”, snagged while fishermen are targeting other species on longlines or in enormous trawl nets, gillnets or purse seines.

2.2.2. Fisheries data

World catches of cartilaginous fishes (sharks, rays and chimaerids) reported by FAO have grown considerably, from 271 800 tonnes in 1950 to 822 000 t in 1999 (Vannuccini, 1999). This growth was fairly regular, with some sluggish periods (early 1950s and most of the 1970s) and some sustained increases (1955-73 and 1984-98). These landings equate to hundreds of millions of individual specimens being harvested every year (Hueter, 1998). In Northwest Atlantic the shark coastal species recorded between 1992 and 2000 declined by an estimated 61% (Baum *et al.*, 2003). Declines for species of the genus *Carcharhinus*, range between 49 to 83% (Baum *et al.*, 2003).

The available data on world shark fisheries is considered to be rather limited and questionable. Even if FAO statistics are the most comprehensive available, it is not possible to determine the exact volume of shark from within the total chondrichthyan catches. There are problems of species identification and lack of species-specific reporting. Many of the estimated 465 shark species are small, deep-water ones, seldom seen or caught. About 100 species are encountered in commercial fisheries throughout the world.

Also, there are several reasons for regarding the data as significantly underestimating actual chondrichthyan catches. This is due to the lack of reporting, in particular on bycatch or sharks discarded at sea, as well as on those taken by recreational, subsistence and artisanal fisheries. Many countries do not report the enormous numbers of sharks taken as bycatch. According to

Bonfil (1994), the estimated annual elasmobranch bycatch at the end of the 1980s was between 260 000 and 300 000 tonnes or 11.6 to 12.7 million fish, of which the greater part was sharks, mainly blue sharks. Like other aspects of shark fisheries, incidental capture is very poorly documented.

However, evidence from the history of fisheries around the world, both targeting these fishes and taking them as bycatch, shows a major decline in chondrichthyan population size (Stevens *et al.*, 2000).

2.3. Ecological and economical consequences of shark over-exploitation

2.3.1. Ecological consequences

As fishing effort increases, characteristic and predictable changes may occur in fish assemblages (Walker, 2004). Large animals decline or disappear from the assemblage and are replaced by smaller ones. This results in a gradual drift towards shorter-lived, faster-growing species. This is accompanied by an initial increase and later a decrease in the number of species in the exploitable population although the number of fish actually appearing in the catch can increase to a maximum level.

Nevertheless, the removal of sharks occupying the role of top predators in their ecosystems can have not only the expected effect of releasing control over their main prey, but sometimes unexpected second and third degree effects on non-prey species through trophic linkages (Stevens *et al*., 2000; Schindler *et al*., 2002).

2.3.2. Economic consequences

Sharks provide tremendous economic benefits to those countries that have a diving industry but it is likely that, if the fishing industry is permitted to continue over-exploiting sharks in areas such as the Pacific Corridor (eastern tropical Pacific: the Galápagos Islands (Ecuador), Gorgona and Malpelo Islands (Colombia), Coiba Island (Panamá) and Cocos Island (Costa Rica)), there will be no possibility of shark tourism for many decades.

Currently, the Galapagos Islands generate about a third of Ecuador's US$430 million-a-year tourism business (Anonymous, 2003), although there is no information as to how much of that business is generated by shark diving. Whatever the case, the diving industry will collapse if sharks disappear from the reserve. A second example in the Bahamas: a single live reef shark is estimated to be worth US$250,000 a year through dive tourism, whereas a dead reef shark has a one-time value of $50-60 to a fisherman (Anonymous, 2002)

3. PACIFIC FISHERIES

3.1. Regional information

Oceania comprises 24 countries and territories and covers a total area of approximately 30 million sq. km., most of which is ocean. There are few industrial-scale fisheries that specifically target chondrichthyans. Those that do are based primarily in Australia and New Zealand. The largest fishery in terms of annual catch is the southern shark fishery off southern Australia. This fishery primarily takes catches of school shark (*Galeorhinus galeus*) and gummy shark (*Mustelus antaricus*) which is consumed locally. Other smaller target fisheries include the fishery for carcharhinid sharks off northern Australia, the West Australian shark fishery and the fisheries for rig (*Mustelus lenticulatus*) and school shark (*Galeorhinus galeus*) in New Zealand (Nichols, 1993).

Many subsistence and small-scale commercial fisheries for shark exist throughout the South Pacific region. Subsistence shark fishing is carried out by Polynesian, Micronesian and to a lesser, extent, Melanesian countries (Hayes, 1996). The shark flesh is used for domestic consumption and teeth and jaws are commonly sold as curios to the tourist industry (Nichols, 1993). Sharks form an important part of the island culture in many countries, however, catches are poorly documented.

Within the South Pacific the most common sharks inhabiting reefs and lagoons are members of family Carcharhinidae (Hayes, 1996). Hence, these species are the most important subsistence and artisanal catches (Nichols, 1993). Species common to shallow water reefs include the black-tip shark (*Carcharhinus melanopterus*), lemon shark (*Negaprion acutidens*), and white-tip shark (*Triaenodon obesus*). Species of Rhizoprionodon sharks are common to the nearshore waters of the high islands of Melanesia, whereas the common black-tip shark, Australian black-tip shark and spot-tail shark (*Carcharhinus sorrah*) are common in more open lagoon waters adjacent to areas with wide continental shelves (Nichols, 1993). In deeper water, the grey reef shark, silver-tip shark (*Carcharhinus albimarginatus*) and large species such as the tiger shark (Galeocerdo cuvier), bull shark (*Carcharhinus leucas*), Java shark (*Carcharhinus amboinensis*) and several species of hammerhead shark (*Sphyma spp.*) are found. The blue shark (*Prionace glauca*) is also of commercial importance in the Pacific where it is widely caught by hook and line and in pelagic and bottom trawls (Nichols, 1993).

In the Western Central Pacific, chondrichthyans formed 0.9% of the total catch in 1990 (Stamatopoulos, 1993). This corresponds to a total catch of chondrichthyans of 97 224 t, with a rising trend.

3.2. Country information from literature

In this part, sharks' vernacular names are employed in the text while the scientific names can be found in Table 1. The countries studied in this part and in the next one are showed in Figure 2.

Table 1. Sharks' vernacular and scientific names. Species appear in the alphabetic order of the vernacular name.

Common name	*Scientific name*
Australian black-tip shark	*Carcharhinus tilstoni*
Blackfin shark	*Carcharhinus limbatus*
Black-tip shark	*Carcharhinus melanopterus*
Bull shark	*Carcharhinus leucas*
Cloudy catshark	*Scyliorhinus torazame*
Crocodile shark	*Pseudocarcharias kamoharai*
Dogfish	*Centrophorus spp.*
Ghost shark	*Cetorhinus maximus*
Great white	*Carcharodon carcharias*
Grey reef shark	*Carcharhinus amblyrhynchos*
Grey spiny dogfish	*Squalus mitsukurii*
Galapagos shark	*Carcharhinus galapagensis*
Gummy shark	*Mustelus antarcticus*
Hammerhead shark	*Sphyma spp.*
Java Shark	*Carcharhinus amboinensis*
Lemon shark	*Negaprion acutidens*
Mako shark	*Isurus oxyrinchus*
Milk shark	*Rhizoprionodon acutus*
Oceanic whitetip shark	*Carcharhinus longimanus*
Pelagic thresher	*Alopias pelagicus*
Port Jackson shark	*Heterodontus portusjacksoni*
Rig	*Mustelus lenticulatus*
Sand shark	*Carcharias taurus*
Sandbar shark	*Carcharhinus plumbeus*
School shark	*Galeorhinus galeus*
Shortspine spurdog	*Squalus mitsukurii*
Silky shark	*Carcharhinus falciformis*
Silver-tip shark	*Carcharhinus albimarginatus*
Spot-tail shark	*Carcharhinus sorrah*
Swell shark	*Cephaloscyllium ventriosum*
Tiger shark	*Galeocerdo cuvier*
Whiskery shark	*Furgaleus macki*
White-tip shark	*Triaenodon obesus*

Figure 2. Oceania region and countries studied.

3.2.1. American Samoa

There is no overall information on shark fisheries for this country. The American Samoa fishery statistics report that shark landings (all species combined) amounted to 880 kg in 2004 (Hamm *et al*., 2004).

3.2.2. Australia

Sharks have traditionally been an important part of diet of coastal Aborigines and Torres Straits Islanders (Last and Stevens, 1994). The commercial fishery for school sharks began in Victoria's bays and estuaries immediately after European settlement and became significant after the 1920s (Kailola *et al*., 1993). The Victorian fishery began to include catches of gummy shark and continued to dominate chondrichthyan catches for many years (Bentley, 1996). Its relative importance declined with the development of other domestic shark fisheries (Western Australia) as well as fisheries based on foreign fleets (Tawainese gillnetting vessels). Today, the capture of chondrichthyans for household consumption is insignificant in comparison to commercial operations.

From 1987 to 1991, shark and ray fisheries represented 5% of all catches in Australia, equivalent to 1.5% of the world elasmobranch catch (the third highest percentage in the world (Bonfil, 1994). According to FAO, the total Australian catch of cartilaginous fishes (10 236 t) was less than 1% of world catches. Unlike the world catch, the reported Australian ray catch was less than 2% of the shark catch. Much of the shark catch is target species, which are usually reported accurately.

3.2.3. Cook Islands

Shark flesh is not commonly consumed in Rarotonga and consumer acceptance of shark flesh is generally low. However, sharks are taken as part of the deep water drop-line fishery in the Cook Islands and incidental captures of sharks have increased with the increasing incidence of fishing around FADs.

Experimental line fishing conducted in Cook Islands waters by the SPC found sharks to constitute 2% of the catch by number and 15% by weight. In l978 and l979 4 and 26 tonnes of sharks and rays were taken respectively in the southern Cook Islands, or 0.5 and 3% respectively of the total fish catch for these years (Anon, 1980).

3.2.4. Federated States of Micronesia

Marine resources are the country's largest natural resource, but little information is available on shark catches. Sharks are used as a subsistence resource in Kosrae and on Fais Island in Yap State. Sharks are also caught as a bycatch of the tuna longline and purse-seine fisheries but no information on catch is available

Catches consist largely of Carcharhinid sharks and commercial fishing is for fins only. Sharks are caught as part of the fishery for deep-slope species which targets snappers. Sharks accounted for 9% of the catch by number and 22% by weight (Dalzell and Preston, 1992).

3.2.5. Fiji

Little is known about the shark resources of the Fijian region, as little research has been done on the shark fauna (Nichols, 1993) but exploitation is believed to be light (Richards *et al*., 1994). Until recently, reef fish was readily available, thus shark was not considered an important food fish (shark is not consumed in many areas of Fiji due to traditional taboos on its use, however, it is readily accepted in the Rotuma and Rabi communities).

With the increase in population and greater ease of exporting there have been moves to develop shark fisheries both to supply the local demand for fish and to earn foreign exchange. There is an international trade in dried and frozen shark fin mostly taken as bycatch in the pelagic longline fishery and Fiji is a significant exporter of shark fin. Hong Kong is the largest importer of shark fin and Fiji exports significant quantities of the product to this market (Hayes, 1996).

From the data supplied by observers on board local longline vessels, blue sharks together with oceanic white-tip and silky sharks are the most commonly caught in Fiji's EEZ (Swamy, 1999). Grey reef shark, and mako shark are also quite abundant and, combined with the three species mentioned above, form the major part of the bycatch. Hammerhead and white tip shark are quite common in the inshore areas and a few species also venture into the fresh water, especially the larger rivers. Only a few species are retained while most of the shark species are discarded (Swamy, 1999).

This information corroborates the dropline fishing surveys carried out by the Secretariat of the Pacific Community (SPC): two species were recorded as bycatch (silver-tip and grey reef sharks). Other species recorded are the black-tip shark the white-tip reef shark, lemon shark, tiger shark and the bull shark. A substantial amount of blue shark is taken by longline vessels in Fijian waters: in 1994, a total of 16 tonnes or 0.4% of the longline catch was made up of this species (Anon, 1994).

3.2.6. Hawaii

More than 2 800 tonnes of sharks were landed in Hawaii in 1998 (Camhi, 1999). Since 1991, the proportion of sharks killed has increased by 2 500%. Sharks that are encountered by the fishermen in the nearshore coastal waters include sandbar, gray reef, black-tip, white-tip, hammerhead, Galapagos and tiger sharks. However, most sharks taken in Hawaii State waters are caught as bycatch in fisheries targeting other species, such as mahimahi, whaoo and tunas. Those sharks are mainly oceanic sharks: 50% are shortfin mako and 28% are thresher sharks. There have been no population assessments on these species, so there are no data to indicate whether the current level of exploitation is sustainable. According to Camhi (1999) the growth of an inshore fishery that targets coastal sharks is a major concern that needs immediate attention.

3.2.7. Kiribati

The people of Kiribati have in some parts traditionally credited the sharks with intelligence equalling that of a man (Nichols, 1993). In the Line Islands of Kiribati, sharks plays a leading role in mythology where it is believed to be the most important of all the fish spirits.

Elasmobranchs currently make up only 3.4% of total artisanal fisheries landings in Kiribati with catches only recorded from Onotoa to Aranuka (Anon, 1995).

3.2.8. Marshall Islands

Sharks are widely distributed throughout the islands from the reef to offshore areas. Although a variety of species are caught, harvesting consists largely of Carcharhinid sharks (Smith, 1992). Sharks are used as a minor subsistence resource and are taken as bycatch in the tuna longline fishery. Japanese, Taiwanese and US longline vessels operate in the Marshall Island EEZ for tuna and have a bycatch of sharks.

Annual shark catched are variable; catches by Japanese fishing vessels were recorded from 1987 to 1991 and peaked at 28 000 t in 1990. Sharks are also caught by the deep-slope fisheries predominantly targeting snappers (Lutjanidae) and groupers (Seranidae). Results from a dropline fishing survey conducted by the SPC in 1991 lists sharks as constituting 8% of the total catch by number and 49% by weight (Dalzell and Preston, 1992).

3.2.9. New Zealand

Shark has been utilized since pre-European times when Maoris made extensive use of school shark for food, oil and skin (Annala, 1995). Maori fishers traditionally caught large numbers of

spiny dogfish during the two last centuries. Rig was probably an important species and is still caught in small quantities by Maori in part of the North Island. However, these catches are insignificant compared to the commercial catches (McKoy, 1988).

Commercial shark fishing in New Zealand dates back to the early 1900s but was probably negligible prior to the 1940s, with small landings only from bycatch of other fisheries (NIWA Fisheries, unpublished data). Initial catches were based on longlining for school sharks, particularly the pregnant females which migrate into shallow water in spring (Palmer 1994). Around 1940, an increased wave of effort in shark fishing occurred as sharks were harvested for the vitamin-A-rich oil from their livers. School shark and dogfish livers were employed for this purpose, with the carcasses generally being dumped.

The fishery developed rapidly to a peak of over 2 500 tonnes per year, then collapsed in the mid 1950s with the development of synthetic Vitamin A. The demand for shark fillets in Australia saw another increase in shark fisheries and in l97l some 3 000 t (Annala, 1995) of school shark, rig and ghost shark were landed, with 600 t of this total exported to Australia. Last decade, Chondrichthyan fisheries were moderately important for New Zealand with catches making up 2 % of the total fishery production (Bonfil, 1994). Nevertheless, New Zealand is the leader in Oceanian shark fisheries with 19 810 t of shark landings in 1999.

3.2.10. Palau

Palau has an abundant and diverse population of sharks, but no commercial catch data are available (Nichols, 1991). A shark fishing survey carried out by the South Korean fisheries research and development agency in 1975 found hammerheads, milk sharks, white-tip sharks and sand sharks to be the most abundant. No commercial fishery targeting sharks has developed. Anon (1992), lists no sharks in either fish production statistics or export statistics.

3.2.11. Papua New Guinea

Small quantities of shark were caught by artisanal fisheries prior to 1980 (Stevens, 1993). Taiwanese gillnetters began fishing in the Gulf of Papua according to a gillnet survey conducted during 1977. Catch figures are only available for 1981 and 1982 when 810 000 and 405 000 t of shark were caught respectively. Mako sharks are important to sport fishing in PNG (Nichols, 1993).

The main shark species taken are oceanic in habitat (Kumoru, 2003a,b). They are the silky shark and oceanic white-tip but some more coastal species, such as grey reef shark and silver-tip, are also taken in significant numbers, along with a range of other species such as black-tip, hammerhead, blue, thresher, mako, tiger, and crocodile sharks, as well as some pelagic rays. The

fins and meat of most species are marketable, but some species are of low value, e.g. blue shark and may not be retained.

Nine vessels have been licensed to fish for sharks since 2003 and this number was to be reviewed after two years as part of a fishery review. Shark exports ranged from around 1 900 t in 2000 to 1 300 t in 2003. Until recently, most of the meat and fins were exported to Taiwan, with frozen fins commanding a much higher price, which itself varied considerably by species. An increasing amount of the shark meat is now processed locally, for domestic consumption (Kumoru, 2003a) but unfortunately no data is available.

3.2.12. Solomon Islands

Sharks are caught by subsistence and small-scale artisanal fishers in some areas of the Solomons, generally as a bycatch of fishing for deep-water bottom fish or of tuna purse-seining (Skewes, 1990). Subsistence fishers eat the flesh of the shark and the shark fin is sold for export. Shark worship has traditionally been common in the Solomon Islands and still continues on some islands (Nichols, 1993). Local Gilbertese communities hunt shark for domestic consumption especially in the Wagina area in the Western Province (Skewes, 1990).

Shark landings comprise mainly Carcharinid sharks. The inspection of the catch from a shark longliner in 1984 found that 62% of the catch was made up of spot-tail shark (Skewes, 1990).

3.2.13. Tokelau

Shark fishing is generally carried out by older men in Tokelau who use nylon lines with wooden floats and hooks. They anchor on the reef and drift over deeper water. Caches of up to 50 sharks a night have been taken by some fishermen (Nichols, 1993).

3.2.14. Tonga

Fishing has always been an important subsistence activity in Tonga. Traditionally, shark contributed substantially to the fish portion of the diet, especially on the outer islands (Bell *et al*., 1994). Sharks were captured by noosing, where a shark is enticed alongside a boat with a coconut rattle, bait is then thrown in and, as the shark follows the bait, a noose is slipped around the shark and it is dragged on board. Modern methods are now used and consist of a hook and length of chain attached to a nylon rope and floats (Hayes, 1996).

A two-year fisheries project during 1980 and 1981 identified the following species in Tongan waters: grey reef, white-tip, black-tip, hammerhead, mako and tiger shark. The blue shark, great

white shark and pelagic thresher have also been identified (Bell *et al*., 1994). Landings of shark at Vuna and Faua in Nuku'alofa in the 1993 artisanal fishery were estimated at 364 kg of shark for the 12-month period, or less than 0.1% of the total finfish landings (Bell *et al*. 1994).

3.2.15. Vanuatu

Shark is currently a bycatch of the deep reef slope fishery, the main artisanal fishing activity in Vanuatu (Dalzell, 1992). Although some fishers specifically target shark for commercial sale, shark makes up a very minor portion of the catch (Dalzell and Preston, 1992). Mako sharks are important to sport fishing in Vanuatu (Nichols, 1993). Shark meat is marketed commercially in the local fish market in Port Vila and a substantial amount of shark fin is exported. Shark fin exports are only known to have occurred up to 1989.

Catches from fishing trials conducted by Fisheries Department vessels in 1983 and 1984 showed sharks to comprise 10% and 16% of catch by weight respectively. The only source of data on shark sales is the Natai fish market from 1988 to 1992; shark purchases for this period range from 725 kg in 1989 to 1 289 kg in 1991.

3.2. Country information from questionnaire

In early June 2006, a questionnaire (see appendix) was sent out to assess the impact of reef shark fisheries in 15 member countries of the Secretariat of the Pacific Community: American Samoa, Cook Islands, Fiji, French Polynesia, Guam, New Caledonia, Northern Mariana Islands, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu, Wallis and Futuna. Only one-third (5) countries responded:

- Cook Islands stated that reef sharks were not fished or targeted commercially and that there were neither accidental nor incidental catches.

- French Polynesia answered that there were shark fisheries in the country until April 2006. In fact, the government decided on April 28th 2006 to stop this activity for at least a 10-year period to protect all shark species in the EEZ except Mako shark. Any kind of market using shark parts is prohibited, accidental catches should be released back into the sea and shark feeding is severely regulated. However, before April 2006, sharks were fished to be consumed locally (meat, fins), sold at the market place (teeth, full jaws) or sold on to middlemen for export (fins). Most of the catches were oceanic sharks while the minority was reef sharks: black-tip shark, grey reef shark, lemon shark, silver-tip shark and white-tip shark. These specimens were caught using net, small-scale longline and fish pen traps.

- In Guam, there is no industrial shark fishery: the shark take is predominantly non-commercial and incidental. The catch comes from nets, spearing, shoreline hook-and-line, trolling and boat-based bottom fishing.

- Northern Mariana Islands do not have an active fishery for reef sharks. They are not looked upon favourably by fishers because dealing with such bycatch during fishing operations is time-consuming and dangerous according to the Fishery Department. One individual is attempting to take sharks commercially using longlining. However, his venture has been less than successful. The Fishery Department is unsure whether he is still taking sharks.

- New Caledonia answered that some sharks were fished for subsistence (meat) and to be sold on the local market (teeth, full jaws). The available data on shark fisheries is questionable because they come from a professional fishery which is not the main fishery in the country when compared to recreational and subsistence activities and also because there is absolutely no recording of landings.

In conclusion, the majority of Heads of Fisheries did not answer our questionnaire. The five answers to the questionnaire all say that no significant effort is expended to catch reef sharks. This information is interesting because, from the point of view of Fisheries Departments, fishing pressure on reef sharks is not high, although no data is available for 80 % of these countries.

4. SYNOPSIS OF PACIFIC ISLAND SHARK FISHERIES AND RECOMMANDATIONS

4.1. Questionable data

Most available data from shark catches concern the professional and even industrial pelagic fisheries. FAO assumes that the data presented in their reports are mostly collected from commercial or industrial fisheries while recreational, subsistence and artisanal fisheries are “likely to be substantially under-reported” (Valuccini, 1999). These data do not match up with the subsistence economy of most of the Pacific Island nations (Hayes, 1996).

Besides shark catch data may be rather variable depending on the source of information. For example, annual landing data obtained from the Division of Aquatic Resources of Hawaii range from 31 to 117 t between 1997 and 2001, while for Camhi (1999), 2 800 t of sharks (including sharks taken solely for their fins) were landed during 1998 in Hawaii.

4.2. Limited data

Assessment of the information collected through literature and questionnaires shows that Pacific shark catches seem to be poorly documented. Table 2 indicates that for most Pacific countries (at least 64 % of the studied nations): Federated States of Micronesia, Guam, Kiribati, Marshall Islands, Nauru, New Caledonia, Northern Mariana, Nuie, Palau, Solomon Islands, Tokelau, Tonga, Vanuatu and Wallis and Futuna, fisheries authorities do not have accurate valid data and certainly none that could help in shark management efforts.

Table 2. Shark fisheries in Pacific Island countries. Data were obtained from literature and questionnaires (fisheries departments).

Country	Total catch (t)	Specific composition		Fishery	Source of information
		Reef shark	Other shark		
American Samoa	< 1	Black-tip Nurse White-tip	Blue Mako Thresher	Artisanal and accidental	Hamm *et al*. (2004)
Australia	10 236	Black-tip Tiger Sandbar	Crocodile Dogfish Gummy Mako Pelagic thresher Port Jackson School Spot-tail Swell Whiskery	Industrial	FAO (1999)
Cook Islands	26	Black-tip Grey reef Hammerhead Silver-tip White-tip	Silky	Artisanal	Anon (1980) Hayes (1996)
Federated States of Micronesia	?	?	?	Artisanal	Dalzell and Preston (1992)
Fiji	8 642	Bull Black-tip Grey reef Hammerhead Lemon Tiger White-tip	Blue Mako Oceanic white-tip Silky Thresher	Mainly industrial	Hayes (1996)

Country	Total catch (t)	Specific composition		Fishery	Source of information
		Reef shark	Other shark		
French Polynesia	217	Black-tip Grey reef Lemon Silver-tip Tiger White-tip	Blackfin Mako Oceanic white-tip Pelagic thresher	Artisanal and industrial	Fisheries department of the country (2005)
Guam	< 1	Black-tip Grey reef Hammerhead Nurse Silver-tip Tiger White-tip		Artisanal supposed	Hamm *et al*. (2004) and Fisheries Department (2005)
Hawaii	2 800	Hammerhead Tiger	Blue Mako Oceanic white-tip Pelagic thresher	Industrial	Camhi (1999)
Kiribati	3 012	?	?	Mainly industrial (Japan, Korea and USA have permission to operate in Kiribati waters)	FAO (1999)
Marshall Islands	?	?	?	Mainly industrial (Japan, Taiwan and USA operate in Marshallese waters)	Hayes (1996)
Nauru	?	?	?	?	No information
New Caledonia	4	Black-tip Tiger White-tip	Mako	Artisanal	Fisheries Department (2001)
New Zealand	19 810		Gost Rig School Grey spiny dogfish	Industrial	FAO (1999)

Country	Total catch (t)	Specific composition		Fishery	Source of information
		Reef shark	Other shark		
Northern Marianas	?	Black-tip Grey reef		Artisanal	Hamm *et al*. (2004) and Fisheries Department (2006)
Nuie	?	?	?	?	No information
Palau	?	Hammerhead Sand White-tip	Milk	Accidental	Anon (1992)
Papua New Guinea	1 300	Grey reef Hammerhead Silver-tip Tiger	Blue Crocodile Mako Oceanic white-tip Silky Thresher	Industrial and artisanal	Kumoru (2003)
Solomon Islands	?	Spot-tail shark	Dogfish	Artisanal	Skewes (1990)
Tokelau	?	?	?	Artisanal	Nichols (1993)
Tonga	?	Black-tip Gray reef Hammerhead Silver-tip Tiger White-tip	Blue Great white Mako Pelagic thresher	Artisanal	Hayes (1996)
Vanuatu	?	Silver-tip	Cloudy catshark Mako Shortspine spurdog	Artisanal	Hayes (1996)
Wallis and Futuna	< 1	Black-tip Tiger White-tip		Accidental	Juncker (Pers. obs.)

4.3. Recommendations and conclusion

Without such basic biological information as abundance, age and growth, and population structure, it is difficult for fishery managers to determine the effects of current fishing pressure on these populations or to develop informed management to ensure the long-term sustainability of specific elasmobranch populations (Camhi, 1999). This information lacking mainly because, until recently, sharks were not economically valuable and were therefore neglected by fishery managers (Camhi, 1999).

However, because of their comparatively low biological productivity and, for many species, because of their high catch susceptibility, most chondrichthyan species require management action long before sufficient data are available to undertake full stock assessment. It is therefore necessary to apply rapid assessment techniques to assess the risk from the effects of fishing (Walker, 2004)

Regulation of shark fisheries does not mean a complete ban on fishing for these species but restrictions that may allow populations to recover. Successful sustainable shark fisheries are possible. This is particularly true for:

- smaller species that mature early and have a relatively large number of young. The fishery for gummy sharks in Australia stands as a good example. Success in this fishery has come through knowledge of the biology of the species and active management measures (mostly through regulation of mesh size in the gillnet fishery) (Walker, 1998; Stevens, 1999),
- species with higher production rates continue while species with lower rebound potential are driven to stock collapse (Musick, 1999; Stevens *et al*., 2000). For example the sand tiger (*Carcharias taurus)* and dusky shark (*Carcharhinus obscurus*) populations, which have very low intrinsic rates of increase, collapsed in the western North Atlantic shark fin fisheries in the late 1980s and show only modest signs of recovery (after ten years of fishery regulation), while the more productive sandbar shark (*Carcharhinus plumbeus*), although depleted, continues to drive the fisheries (Musick *et al*., 1993; Musick, 1999).

Technical measures such as the following should be considered:

- Regulation of fishing gear,
- MPAs, which are highly suitable for the management of chondrichthyan species known to aggregate, where they are vulnerable to capture or disturbance by human activities (Bonfil, 1999),
- Fishing area closure (of an area to all or selected fishing gears for continuous or selected time periods),
- Size limits: Legal minimum sizes can be used to avoid growth overfishing. Legal maximum sizes can be used to avoid recruitment overfishing (Walker, 2004).

As a regional approach should be considered, a synthesis of the existing legal framework in the Pacific countries would be particularly interesting. In spite of recent initiatives, such as French Polynesia which banned in 2006 all shark fisheries (except mako shark), this analysis would probably show that few appropriate regulations are implemented for providing an efficient conservation of reef sharks in the Pacific countries.

5. REFERENCES

Annala JH (1995) Report from the fishery assessment plenary: stock assessments and yield estimates. Unpublished report held in MAF Fisheries Great Point Library, Wellington

Anon (1980) Statistics of artisanal fishing in the southern group, 1979. Agriculture and fisheries statistical working paper no 15. Ministry of agriculture and fisheries, Rarotonga

Anon (1992) Palau division of marine resources: annual report for 1991. Ministry of resource and development, Palau

Anon (1994) Fiji fisheries division: Annual report 1994. Ministry of agriculture, fisheries and forests, Suva

Anon (1995) Status of the inshore fisheries management in Kiribati. South Pacific Commission and forum fisheries agency workshop on the management of South Pacific inshore fisheries, Noumea

Anonymous (2002) Pelagic fisheries in the Galapagos marine resources reserve: a statement by the IUCN species survival commission's shark specialist group (SSG)

Anonymous (2003) Finning threatens Galapagos sharks

Baum JK, Ransom AM, Kehler DG, Worm B, Harley SJ, Doherty PA (2003) Collapse and conservation of shark populations in the northwest Atlantic. Science 299: 389-394

Bell LAJ, Fa'anunu, Koloa T (1994) Fisheries resources profiles: kingdom of Tonga. FFA report no 94/5, Tonga

Bentley N (1996) Chapter 2: Australia. In: Sant G, Hayes E (eds) The oceania region's harvest, trade and management of sharks and other cartilaginous fish: an overview, Sydney, pp 11-41

Bonfil R (1994) Overview of world elasmobranch fisheries. FAO Fisheries Technical Paper, Rome

Bonfil R (1999) Marine protected areas as a shark fisheries management tool. Proceedings of the 5th Indo-Pacific Fish Conference: 217-230

Camhi M (1998) Sharks on the line: a state-by-state analysis of sharks and their fisheries. Living Ocean program, New York

Camhi M (1999) Sharks on the Line II: an analysis of Pacific state shark fisheries. National Audubon Society, Living Oceans Program, New York

Camhi M, Fowler S, Musick J, Bräutigam A, Fordham S (1998) Sharks and their relatives: ecology and conservation. Occasional Paper of the IUCN Species Survival Commission 20

Cortés E (2000) Life history patterns and correlations in sharks. Rev Fish Sci 8: 299-344

Dalzell P, Preston GL (1992) Deep reef slope fishery resources of the South Pacific. A summary and analysis of the dropline fishing survey data generated by the activity of the SPC fisheries programme between 1974 and 1988. Secretariat of the Pacific Community, Noumea

Division of aquatic resources (2001) Commercial marine landings summary trend report, calendar year 2004. Department of land and natural resources, Hawaii

FAO (1999) Case studies of the management of elasmobranch fisheries. FAO, Rome

Fowler SM, Musick JA (2002) IUCN shark specialist group finning position statement

Hamm DC, Chan TS, Graham CJ (2004) Fishery statistics of the Western Pacific - Volume XIX. NOAA Fisheries, Honolulu

Hayes E (1996) The oceania region's harvest, trade and management of sharks and other cartilaginous fish: an overview. In: Sant G, Hayes E (eds). TRAFFIC Oceania, Syndey, pp 1-10

Hoenig JM, Gruber SH (1990) Life-history patterns in the elasmobranchs: implications for fisheries management. In: Pratt HL, Gruber SHJ, Taniuchi T (eds) Elasmobranchs as living resources: advances in the biology, ecology, systematics, and the status of the fisheries. NOAA Technical Report NMFS 90, pp 1-16

Hueter RE (1998) Science and management of shark fisheries - Introduction. Fisheries research 39: 105

Kailola PJ, Williams MJ, Stewart PC, Reichelt RE, McNee A, Grieve C (1993) Australian fisheries resources. Bureau of Resource Sciences, Department of Primary Industries and Energy, and the Fisheries Research and Development Corporation, Canberra

Knights P (2002) Sharks at risk Defenders magazine, pp 13-17

Kumoru L (2003a) Papua New Guinea shark longline fishery Fishing Line, Port Moresby, pp 3

Kumoru L (2003b) The shark longline fishery in Papua New Guinea. 16th meeting of the standing committee on tuna and billfish, Australia, pp 1-5

Last PR, Stevens JD (1994) Sharks and rays of Australia, Melbourne

McKoy JL (1988) Report from the fishery assessment meeting

Musick JA (1999) Ecology and conservation of long-lived marine animals. Am. Fish. Soc. Symp., Bethesda, pp 1-10

Musick JA (2004) Shark utilization. In: Musick JA, Bonfil R (eds) Elasmobranch fisheries management techniques. APEC, Singapore, pp 323-336

Musick JA, Bransletter S, Colvocorosses JA (1993) Trends in shark abundance from 1974 to 1991 for the Chesapeake Bight region of the U.S. Mid-Atlantic Coast. In: Bransletter S (ed) Conservation biology of elasmobranchs. NOAA Tech. Rep. NMFS 115

Nichols PV (1991) Republic of Palau: marine resources profiles. FFA Report no 91/59, Suva

Nichols PV (1993) Sharks. In: Wright A, Hill L (eds) Nearshore marine resources of the South Pacific. Information for fisheries development and management. Forum Fisheries Agency, Honiara

Palmer G (1994) Spiny Dogfish - Pest or potential. Seafood New Zealand 31-36

Richards A, Sharma S, Swamy K (1994) Fiji fisheries resource profile forum fisheries agency. FFA Report no 94/4. South Pacific Forum Fisheries Agency, Honiara

Sant G, Hayes E (1996) The Oceania Region's Harvest, Trade and Management of Sharks and other Cartilaginous Fish: An Overvie. Traffic Oceania, Sydney

Schindler DE, Essington TE, Kitchell JF, Boggs C, Hilborn R (2002) Sharks and tunas: Fisheries impacts on predators with contrasting life histories. Ecol Appl 12: 735-748

Skewes T (1990) Marine resource profiles: Solomon Islands. Report no 90/61. South Pacific Forum Fisheries Agency, Honiara

Sminkey TR, Musick JA (1995) Age and growth of the sandbar shark, *Carcharhinus plumbeus*, before and after population depletion. Copeia 1995: 871-883

Sminkey TR, Musick JA (1996) Demographic analysis of the sandbar shark, *Carcharhinus plumbeus*, in the western North Atlantic. Fish Bull 94: 341-347

Smith AJ (1992) Federated states of Micronesia marine resources profiles. FFA report no 92/17. South Pacific Forum Fisheries Agency

Smith SE, Au DW, Show C (1998) Intrinsic rebound potentials of 26 species of Pacific sharks. Mar Freshwat Res 41: 663-678

Stamatopoulos C (1993) Trends in catches and landings, pacific fisheries: 1970-1991. FAO, Rome

Stevens JD (1993) The status of Chondrichthyan resources in the south west Pacific. Report of the south west Pacific subgroup of the IUCN shark specialist group. CSIRO

Stevens JD (1999) Variable resilience to fishing pressure in two sharks: the significance of different ecological and life history parameters. In: Musick JA (ed) Life in the slow lane: ecology and conservation of long-lived marine animals. Am. Fish. Soc. Symp. 23, Bethesda, pp 11-15

Stevens JD, Bonfil R, Dulvy N, Walker P (2000) The effects of fishing on sharks, rays, and chimaeras (chondrichthyans), and the implications for marine ecosystems. ICES J Mar Sci 57: 476-494

Swamy K (1999) 20 shark fisheries in Fiji: their management and issues of future concern. In: Shotton R (ed) Case studies of the management of elasmobranch fisheries. FAO, Rome, pp 480-920

Vannuccini S (1999) Shark utilization, marketing and trade. FAO Fish. Tech. Paper, 389, Rome

Walker TI (1998) Part 2: southern Australian shark fishery management. In: Shotton R (ed) Case studies of the management of elasmobranch fisheries. FAO Fisheries Technical Paper. no 378. Food and Agriculture Organization of the United Nations, Rome, pp 480-920

Walker TI (2004) Management measures. In: Musick JA, Bonfil R (eds) Elasmobranch fisheries management techniques. APEC, Singapore, pp 285-322

Watts S, Wu V (2005) At rock bottom: the declinning sharks of the eastern tropical pacific. Wildaid, San Francisco

APPENDIX

11 questions on reef sharks fisheries in Pacific Islands

The goal of this questionaire is to assess the impact of reef sharks fisheries in the Pacific Islands.

If you wish to take part in this study, we ask that you fill in the questionaire below by marking an « X » in the boxes ☐ and sending it back to us before **June 15th, 2006.**

Email to : crisp@spc.int

or

by post : CRISP - CPS
M. Juncker
BP D5
98 848 Noumea Cedex
New Caledonia

Note : Some sharks live in the vicinity of coral reefs; they are called reef sharks (see pictures page 6). Others live in the high sea; they are called pelagic sharks. This questionnaire focus only **on reef sharks** fisheries.

Q1) In your country, are reef sharks fished commercially or targetted?

☐ yes → go to question Q3

☐ may be → go to question Q3

☐ do not known → go to question Q2

☐ no → go to question Q2

Q2) Are you aware of any accidental or incidental reef shark catches?

☐ yes, which species (see names page 7): → go to question Q5

☐ no → end of questionaire

Q3) Which reef shark parts are used? in what quantity?

Part of reef shark	Used Specify : - locally consumed - direct sale - sale on market places - resold to middlemen for export	Quantity
☐ Fins		Number:
☐ Meat		Weight:
☐ Teeth		Number:
☐ Full jaws		Number:
☐ Others, specify:		Unity:

☐ do not known which part

☐ do not known which used

☐ do not want to answer

Q4) Do you know the number of exporters of shark products?

☐ 1

☐ 2 to 3

☐ 4 to 10

☐ > 10

☐ do not known

☐ do not wish to answer

Q5) What species of reef sharks are caught? (see pictures page 7)

- [ ] Silvertip shark *(Carcharhinus albimarginatus)*
- [ ] Grey reef shark *(Carcharhinus amblyrhynchos)*
- [ ] Bullshark *(Carcharhinus leucas)*
- [ ] Blacktip reef shark (*Carcharhinus melanopterus)*
- [ ] Sandbar shark (*Carcharhinus plumbeus)*
- [ ] Tiger shark (*Galeocerdo cuvier)*
- [ ] Lemon shark (*Negaprion acutidens)*
- [ ] Whitetip reef shark (*Triaenodon obesus)*
- [ ] others, specify:
- [ ] do not known

Q6) Do you know what type of fishing gear is used to catch reef sharks?

- [ ] net
- [ ] small-scale or small-vertical longline
- [ ] handline
- [ ] spearfishing
- [ ] others, specify:
- [ ] do not know

Q7) In your opinion, is there a significant effort expended in your country to catch reef sharks ?

- [ ] yes, since when:
- [ ] may be
- [ ] do not know
- [ ] no
- [ ] do not wish to answer

Q8) What are your sources of information?

- [ ] fishermen
- [ ] divers
- [ ] yachtsmen
- [ ] fisheries department
- [ ] people involved in the business
- [ ] non gouvernemental organizations
- [ ] « informal »
- [ ] do not wish to answer

Q9) Do you have any data on the catches of reef sharks?

- [ ] yes
- [ ] no

Q10) Are you willing to share these data with us on an informal basis and have this stored on the SPC Regional database?

☐ yes (you may send them with this questionaire)

☐ no

Q11) Are there any regulations or policies that affect the taking of reef sharks?

☐ yes (please send a copy with this questionaire)

☐ no

Reef sharks list

Species	
Silvertip shark *Carcharhinus albimarginatus*	
Grey reef shark *Carcharhinus amblyrhynchos*	
Bullshark *Carcharhinus leucas*	
Blacktip reef shark *Carcharhinus melanopterus*	
Sandbar shark *Carcharhinus plumbeus*	
Tiger shark *Galeocerdo cuvier*	
Lemon shark *Negaprion acutidens*	
Whitetip reef shark *Triaenodon obesus*	

PJ335c

Identification of synergic projects
for the extension of the CRISP programme

July 2006

CRISP

Component 3

sub-component 3B

Coastal Shark Fisheries in the Pacific

- A brief Overview of Current Knowledge -

Abstract :

Sharks are found throughout the world in a wide variety of habitats and developed different life histories traits. Though sharks make up only a small percentage of the world's recorded fish landings, they are extremely versatile and are a valuable resource. They are of primary importance in some regions of the world, sustaining important fisheries in some countries. Moreover, they have been, and are, a cheap but valuable source of protein for coastal communities dependent on subsistence fisheries. Humans can utilize much of the carcass for food or other uses. Sharks are exploited for their meat, fins, skin, liver, teeth, cartilage and other internal organs.

Sharks are increasingly becoming endangered on a world-wide scale. The main reason for this is the demand for their fins which are being used for shark fin soup, an Asian delicacy. The extermination of Asian shark stocks has led to an increase in the price of the fins and this in turn has led Asian fishing operators to target sharks further and further away from their home countries, including the Pacific region. It has also contributed to the development of specific fisheries whereas elasmobranchs were so far essentially by-catches.

From the point of view of Fisheries Departments of the Pacific countries, fishing pressure on reef sharks is not high, although no data is available for most of these countries. Assessment of the information collected through literature and questionnaires shows that Pacific shark catches seem to be poorly documented. This bibliographic study enhances the need for rapid assessment techniques using biological information to evaluate the risk from the effects of fishing on shark conservation.

Key words : shark depletion, coastal fisheries, coral reefs, Pacific, management, conservation