

APPLICATION TO THE AUSTRALIAN GOVERNMENT DEPARTMENT OF ENVIRONMENT AND HERITAGE ON THE WESTERN AUSTRALIAN TROPICAL SHARK FISHERIES

(covering the Western Australia North Coast Shark Fishery and
the Joint Authority Northern Shark Fishery)

For Consideration Under Parts 13 and 13A of the
*Environment Protection and Biodiversity
Conservation Act 1999*

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Department of Fisheries
Government of Western Australia



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TABLE OF CONTENTS

FIGURES & TABLES -----	4
EXECUTIVE SUMMARY -----	5
1. INTRODUCTION -----	7
2. BACKGROUND & HISTORICAL OPERATIONS -----	9
2.1 History -----	9
2.2 Description of Gear -----	10
2.2.1 Demersal Longline	10
2.2.2 Pelagic longlines	11
2.2.3 Pelagic Gillnets	12
2.3 Catch History -----	13
2.4 Primary Target Species -----	15
2.4.1 Sandbar Shark (<i>Carcharhinus plumbeus</i>)	15
2.4.2 ‘Blacktip’ Shark (<i>Carcharhinus</i> spp)	17
2.5 Secondary Target Species -----	19
2.5.1 Lemon Shark (<i>Negaprion acutidens</i>)	19
2.5.2 Hammerhead Sharks (Family: Sphyrnidae)	19
2.5.3 Tiger Shark (<i>Galeocerdo cuvier</i>)	20
2.5.4 Pigeye Shark (<i>Carcharhinus amboinensis</i>)	21
2.5.5 Other Sharks and Rays	22
2.5.6 Skates and Rays	22
2.6 Bycatch and other Potential interactions -----	22
2.6.1 Sawfish (Family: Pristidae)	22
2.6.2 Turtles (Families: Dermochelyidae and Cheloniidae)	22
2.6.3 Dolphins (Family: Delphinidae)	22
3. NEW MANAGEMENT DIRECTIONS FOR THE TROPICAL SHARK FISHERIES -----	23
3.1 To Address Sandbar Shark Sustainability and Tropical Shark Management Issues. -----	24
3.2 Changes to the Western Australian Temperate Shark Fisheries That Will Benefit the Tropical Shark Fisheries -----	26
3.2.1 Effort reductions back to 2001/02 effort levels	26
3.2.2 Prohibition of the use of hooks on demersal gillnets or other static gear associated with gillnet fishing	26
3.2.3 Controls on the configurations of longlines	26
3.3 Changes targeting all shark stock and fisheries -----	27
3.3.1 Commercially protected fish status	28
3.3.2 Increases in penalties	29
3.3.3 A Prohibition on the use of wire traces	29
3.3.4 A Prohibition on the use of all demersal longlines in fisheries under State jurisdiction outside the four recognised shark fisheries-	29
3.3.5 Maximum size limit for dusky sharks	30
3.3.6 A Prohibition on attaching hooks to demersal gillnets and associated lines and floats	30

4. APPENDICES ----- 31

4.1 Extracts from the State of the Fisheries Report 2003/04

4.2 Stock assessment of the sandbar shark, *Carcharhinus plumbeus*, in Western Australia – Shark Section Research Advice Number 16

4.3 Section 43 Order

4.4 Ministerial Exemption

4.5 Matrix table

4.6 References

4.7 Acronyms

FIGURES & TABLES

Figure 1. Current fishing areas for the Western Australian tropical shark fisheries. -----	6
Figure 2. Western Australian Shark and Demersal Gillnet and Demersal Longline Fisheries. -----	8
Figure 3. Management boundaries of the tropical shark fisheries -----	10
Figure 4. Typical demersal longline configuration. -----	11
Figure 5. Typical gillnet fishing configurations. -----	12
Figure 6. Annual landings for the northern shark fisheries (WANCSF and JANSF) for the period 1994/95 to 2003/04. -----	17
Table 1. Species composition of the Taiwanese gillnet catch -----	13
Table 2. The reported catch composition for Western Australia’s tropical shark fisheries. -----	14
Table 3. Comparison of published and derived reproductive parameters for <i>Carcharhinus plumbeus</i> with those from McAuley et al., 2005 -----	16

EXECUTIVE SUMMARY

The Western Australian North Coast Shark Fishery (WANCSF) and the Joint Authority Northern Shark Fishery (JANSF) sit adjacent to each other on Western Australia's northern coast and are together known as the tropical shark fisheries (Figure 1).

There are 14 existing authorities to operate in the fishery and historically power hauled demersal longline has been the preferred gear type. Sandbar, 'blacktip' spp, hammerhead, pigeye and lemon sharks are the main target species but numerous other species of shark and rays are also taken.

These two fisheries have recently undergone a significant review initiated by concerns with the state of sandbar shark stocks. There was also recognition that effort in these fisheries needed to be more explicitly managed and that, in line with the objectives of the National Plan of Action for the conservation and management of Sharks (NPOA sharks), fishers needed to make fuller use of the sharks taken.

In recent months, the Minister for Fisheries has approved a number of major management changes for these fisheries that should help ensure the sustainability of all target and bycatch species. In most cases, the approved changes have only been implemented in the WANCSF. There is a need to follow Joint Authority management procedures in the JANSF that has resulted in delays to similar changes being implemented. Major changes include:

- a. Closure of the WANCSF between North West Cape (114°06'E longitude) and 120°E longitude and the area east of 120°E longitude and south of Broome (see Figure 1) (implemented).
- b. Introduction of effort control limits to contain effort within sustainable parameters (implemented in WANCSF).
- c. Tighter controls on the point of landing so the take by species in each of the tropical fisheries can be more closely monitored (implemented in WANCSF).
- d. Zoning the WANCSF and limits on the number of fishing days that can be used with particular gear types in each zone (implemented).
- e. Effort allocations that encourage greater use of gillnets (thus encouraging a movement of effort away from targeting larger slower growing, late maturing shark species for their fins to targeting smaller, faster growing, smaller size at maturity sharks for human consumption). (implemented for WANCSF).
- f. Compulsory fitting of satellite based vessel monitoring system (VMS) transponders so that vessel operations and compliance with the new zonings, time access and landing restrictions can be closely monitored by the Department of Fisheries (implemented in both fisheries).

- g. Maximum fin to fillet and fin to trunk landing ratios to encourage full use of the catch and to ensure consistency with anti-finning arrangements (implemented in WANCSF).
- h. Implementation of an observer program and daily catch and effort returns (planned for both fisheries).

Another change approved by the Minister for Fisheries that will have benefits for all of the State's shark fisheries is the commercial protection of sharks and rays. This will mean that (with some exceptions) there is a prohibition on possessing sharks outside the State's recognised commercial shark fisheries. Approval has also been given to commercially protect all at risk sawfish species.

Ongoing research and monitoring of the WA tropical shark fisheries will enable the Department to identify any further management changes necessary to ensure the recovery of over-fished stocks. Similarly, the introduction of fishing days based effort controls will provide an effective mechanism for any additional effort reductions, should they be considered necessary in the future.

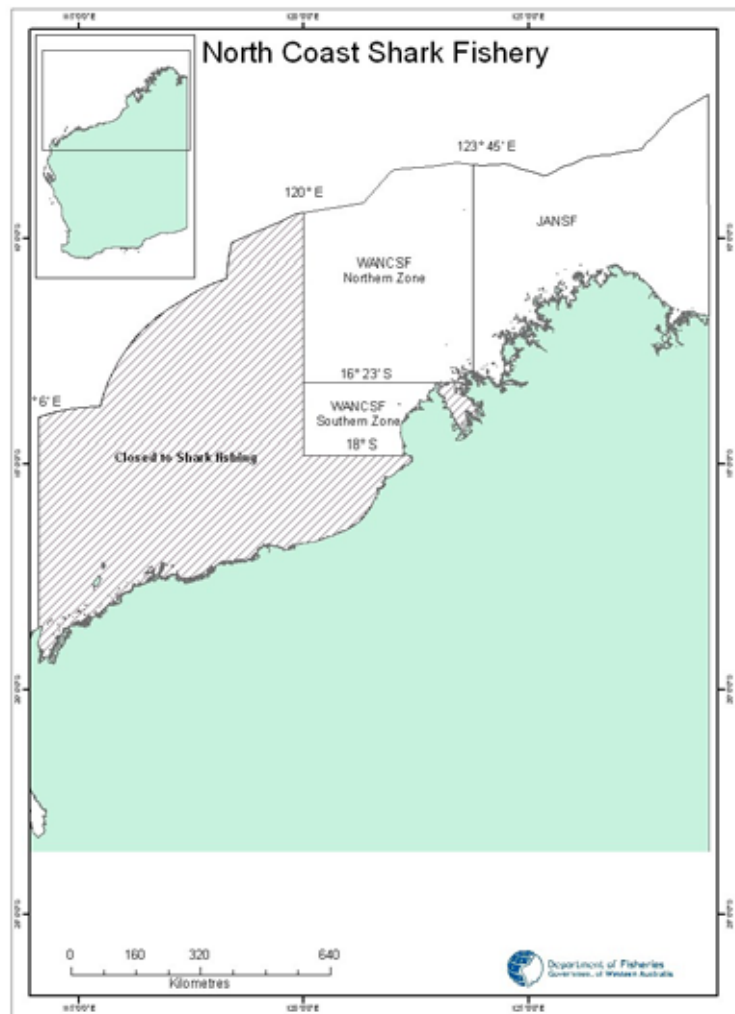


Figure 1. Current fishing areas for the Western Australian tropical shark fisheries.

1. INTRODUCTION

There are four fisheries in Western Australia that target sharks (Figure 2). These fisheries are often generically described as the Western Australian Shark Fisheries. They are:

- a. The Western Australia North Coast Shark Fishery (WANCSF);
- b. The Joint Authority Northern Shark Fishery (JANSF);
- c. The Joint Authority Southern Demersal Gillnet and Demersal Longline Managed Fishery (JASDGDLF); and
- d. The West Coast Demersal Gillnet and Demersal Longline (Interim) Managed Fishery (WCDGDLF).

The WANCSF and the JANSF are collectively known as the northern shark fisheries or, as in this report, the tropical shark fisheries. Similarly, while managed by gear type rather than species, the JASDGDLF and the WADGDLF are known as the temperate shark fisheries. This report covers the tropical shark fisheries. While this report primarily covers the tropical shark fisheries, as some unit stocks are shared between the tropical and temperate Western Australian Shark Fisheries, reference is also made to the latter.

As these fisheries have recently undergone a significant review and the resulting management changes are still in the process of implementation or determination. This is an interim report that covers:

- a. the background on the historical operations of the fisheries;
- b. the current status of management arrangements;
- c. the outcome of the recent sandbar shark stock assessment; and
- d. the changes that have been or are to be implemented in the two tropical shark fisheries.

This application is made under Part 13A of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) with the aim of receiving certification to continue exports from the fishery. This is required to provide the Department of Fisheries Western Australia (DFWA) with sufficient time to:

- a. review the ecological risk assessment completed in 2002 in light of the new research findings, catch and effort data and management changes, so that a more comprehensive report can be compiled which includes all updated risk assessments; and
- b. implement and determine the outcome of the proposed management changes recently approved by the Minister for Fisheries.

The main export product from these fisheries has been shark fins with the flesh being used in a number of low-grade ways. However, industry is currently exploring export markets for shark flesh to be used for human consumption.

Currently neither of the tropical fisheries are governed by management plans. The operations of the WANCSF are allowed under an exemption from Notice 602 of 1993 that prevents the use of fishing gear that would normally be used to target sharks. A copy of this notice can be found at www.fish.wa.gov.au under “legislation”. Fishers in the JANSF operate under the authority of conditions on fishing boat licences that allow them to use the type of gear required to target sharks.

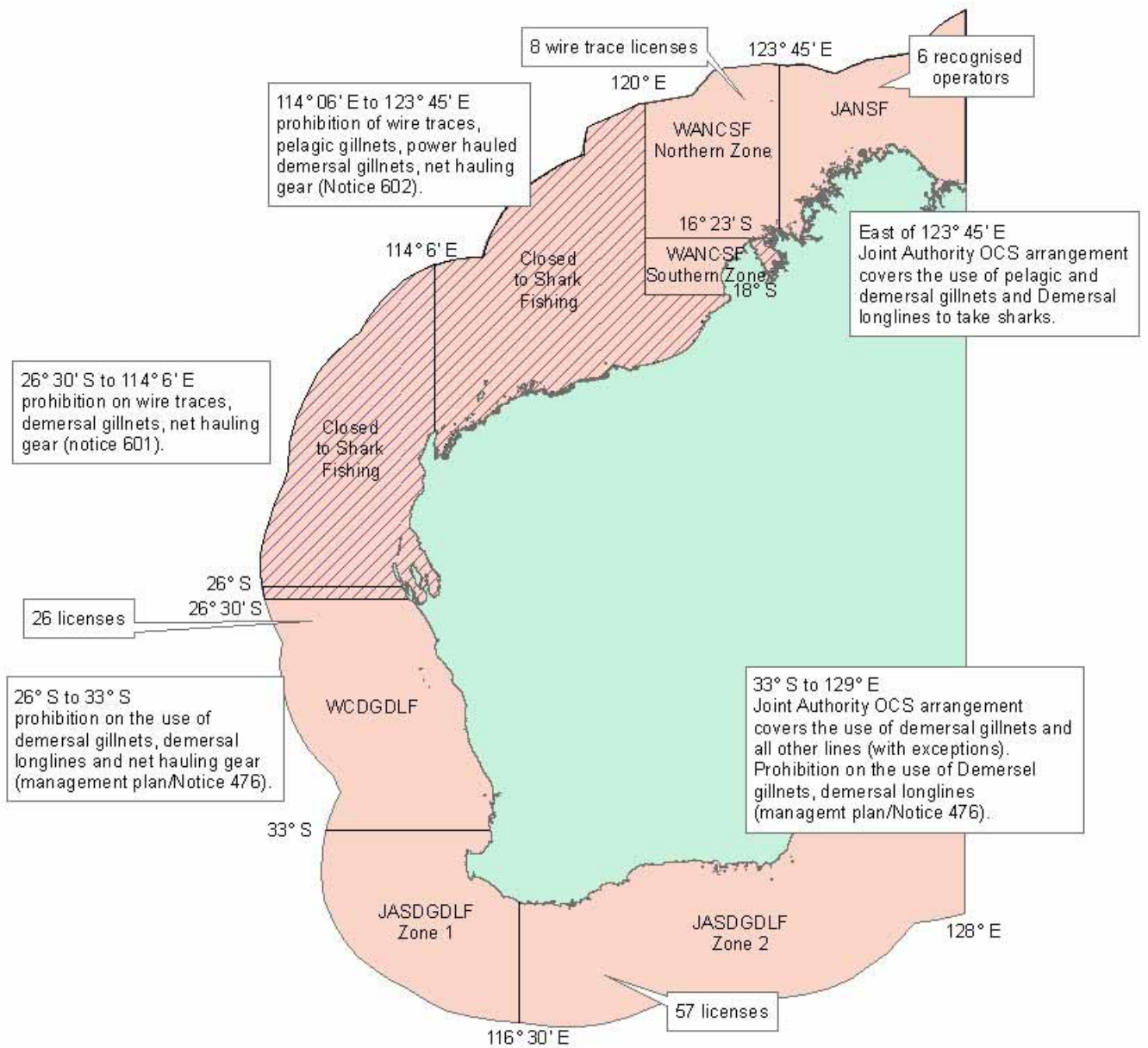


Figure 2. Western Australian Shark and Demersal Gillnet and Demersal Longline Fisheries.

2. BACKGROUND & HISTORICAL OPERATIONS

2.1 HISTORY

Various domestic and foreign shark fisheries have existed in northern Western Australia (WA) since the 1970s. A Taiwanese pelagic gillnet fishery operated to within 12 nm of the Australian coast between 1974 and 1986 (Stevens, 1999), although after 1978, the areas of operation of these vessels were gradually restricted. In 1983, Taiwanese vessels were restricted to waters north of 18°S, and in 1986 limits were placed on the length of gillnet permitted. Despite some limited shifts towards the use of longlines, these measures effectively made the fishery economically unviable (Kailola *et al.*, 1993; Stevens and Wayte, 1999) and Taiwanese shark fishing vessels ceased operating in Australian waters by mid-1986.

In the years immediately following the closure of the Taiwanese fishery, a few Western Australian fishing vessels continued to report small shark catches from northern WA during the late 1980s and early 1990s. The first initiative to manage the activities of Western Australian northern shark fishers was in May 1993, when a prohibition on the use of longlines and droplines containing metal in the snood, and restricting the use of demersal gillnets to a few licensees, effectively established a limited entry northern shark fishery. Following the Offshore Constitutional Settlement (OCS) in 1995, the use of longlines and gillnets off the northern Kimberley coast was designated as a Joint Authority fishery, with management responsibilities shared between the State and Commonwealth Governments.

The management boundaries of the tropical shark fisheries are shown in Figure 3. Aside from the management jurisdiction (either Joint Authority or solely state management), these fisheries are managed by the type of gear used as follows:

- Under Western Australian management and legislation, dropline fishing for sharks from longitude 114°06' E to the WA/NT border (129° E) and longline fishing for sharks from longitude 114°06' E to 123°45' E as the WANCSF.
- Under Joint Authority Management, and State legislation longline and gillnet fishing for sharks from longitude 123°45' E to the WA/NT border is managed by Joint Authority between Western Australia and the Commonwealth as the JANSF.

Until recently “permissive conditions” on individual fishing boat licences were used to impose the related gear restrictions. Under revised management arrangements (see Section 3) the Department has closed the area of the WANCSF and intends closing the area of the JANSF to shark fishing using Section 43 orders under the *Fish Resources Management Act 1994* (prohibiting the use of gear used to target sharks). Previously authorised WANCSF operators have subsequently been and currently authorised JANSF operators will be permitted to continue fishing under exemptions until the future of these fisheries is more certain and the adoption of more formal and common management arrangements can be considered.

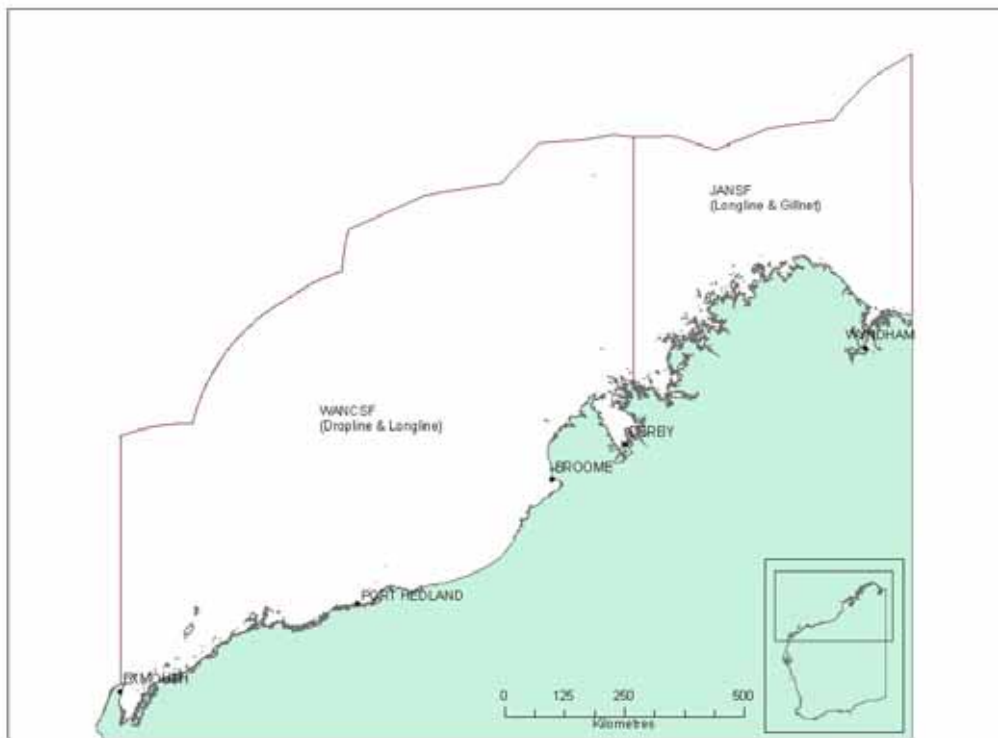


Figure 3. Management boundaries of the tropical shark fisheries

2.2 DESCRIPTION OF GEAR

2.2.1 Demersal Longline

Since at least 1997/98, the principal fishing method used in the WANCSF has been demersal longlining. Droplining is also permitted, but as a result of the configuration of the dropline gear used in this fishery was historically not distinguishable from the demersal longline gear. Operators generally set one line per day (usually overnight), although some vessels occasionally set twice per day. Hydraulically powered drums are used to set, retrieve and store the gear. Lines typically consist of between 2 nm (3.7 km) and 5 nm (9.25 km) of 12 mm polypropylene mainline, marked at one end or both ends with surface floats or flags attached to floats (Figure 4). Intermittent surface floats are also attached to enable retrieval of the gear in the event of the main line

being severed. The line is secured to the seabed with (approx. 10 kg) ballasts at either end and along the length of the mainline at intervals of approximately 200 m. The mainline is suspended above the seabed between ballasts by pressure resistant floats.

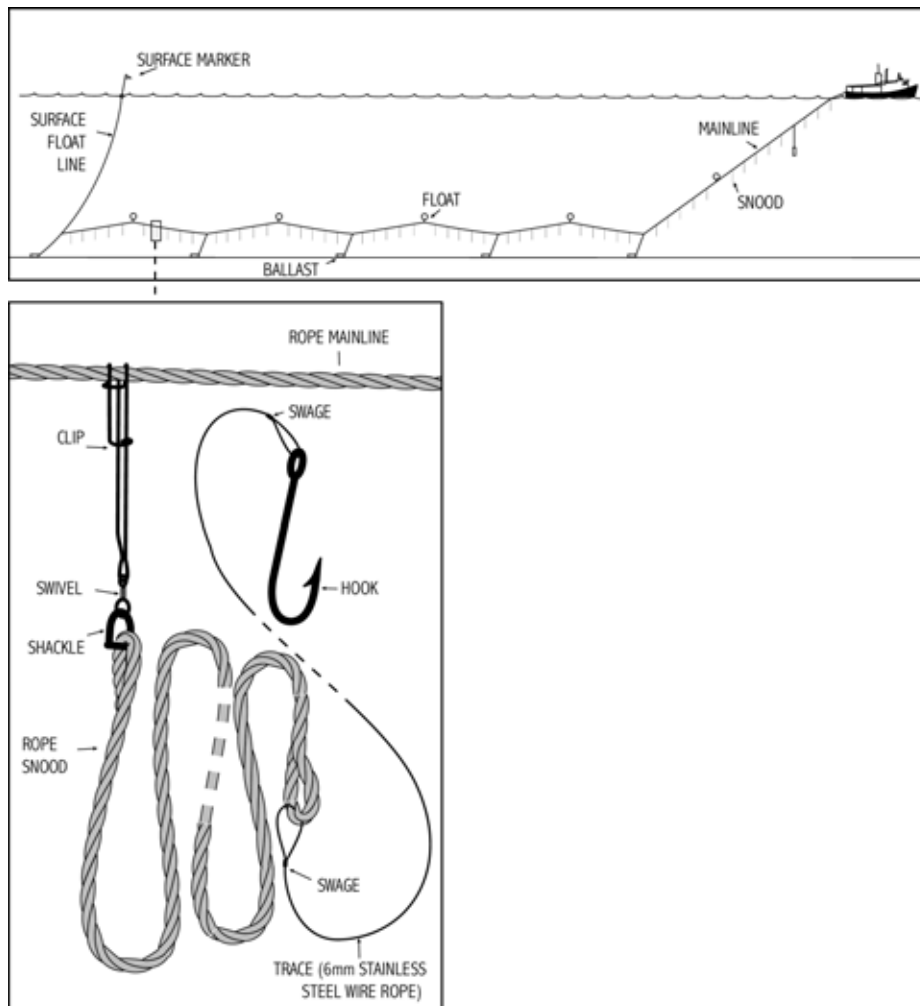


Figure 4. Typical demersal longline configuration.

Baited hooks are attached, at approximately 10 m intervals, to the mainline via a 2–3m snood (gangion) with a stainless steel shark clip. Snoods are comprised of 1–1.5 m of metal trace wire (typically 0.2 mm stainless steel wire rope) attached to a 1–1.5 m length of rope. The use of metal snoods on droplines and longlines in northern WA is prohibited outside of the shark fisheries. Size 10/0 straight-shanked hooks are currently the most popular hook-type used by the WANCSF fleet. Depending on availability, mullet (family: Mugilidae) is the preferred bait, although both mackerel (family: Scombridae) and shark are occasionally used.

2.2.2 Pelagic longlines

Pelagic longlines consist of a nylon monofilament or rope mainline suspended from the surface at regular intervals by float lines and are not designed to deliberately come into contact with the seabed in the manner of demersal longlines. The depth at which

the mainline and hooks float can be adjusted by changing the length of the buoy lines. Historically the pelagic longlines used in the JANSF were configured to primarily target mackerel, the snoods connecting the hooks to the mainline were usually entirely monofilament, although metal was permitted. Mackerel catches are now primarily managed as part of the new Interim Managed Mackerel fishery where trolling is the main fishing method used, however mackerel bycatch arrangements will need to be developed to allow for incidental catches by pelagic longlines in the JANSF. However, demersally-set longlines with metal snoods are now the main form of longlining used in the tropical shark fisheries to target sharks.

2.2.3 Pelagic Gillnets

Pelagic gillnets consist of nylon monofilament mesh hung between a positively buoyant ‘head line’ and a negatively buoyant ‘ground line’ (Figure 3). Nets can be configured to float with the head line at the surface or at depth by suspending them from surface floats. Historically this gear was only used intermittently in the JANSF. Accordingly, no detailed information is available on the characteristics (e.g., mesh sizes or net depth) of the nets that have been used over recent years in the JANSF.

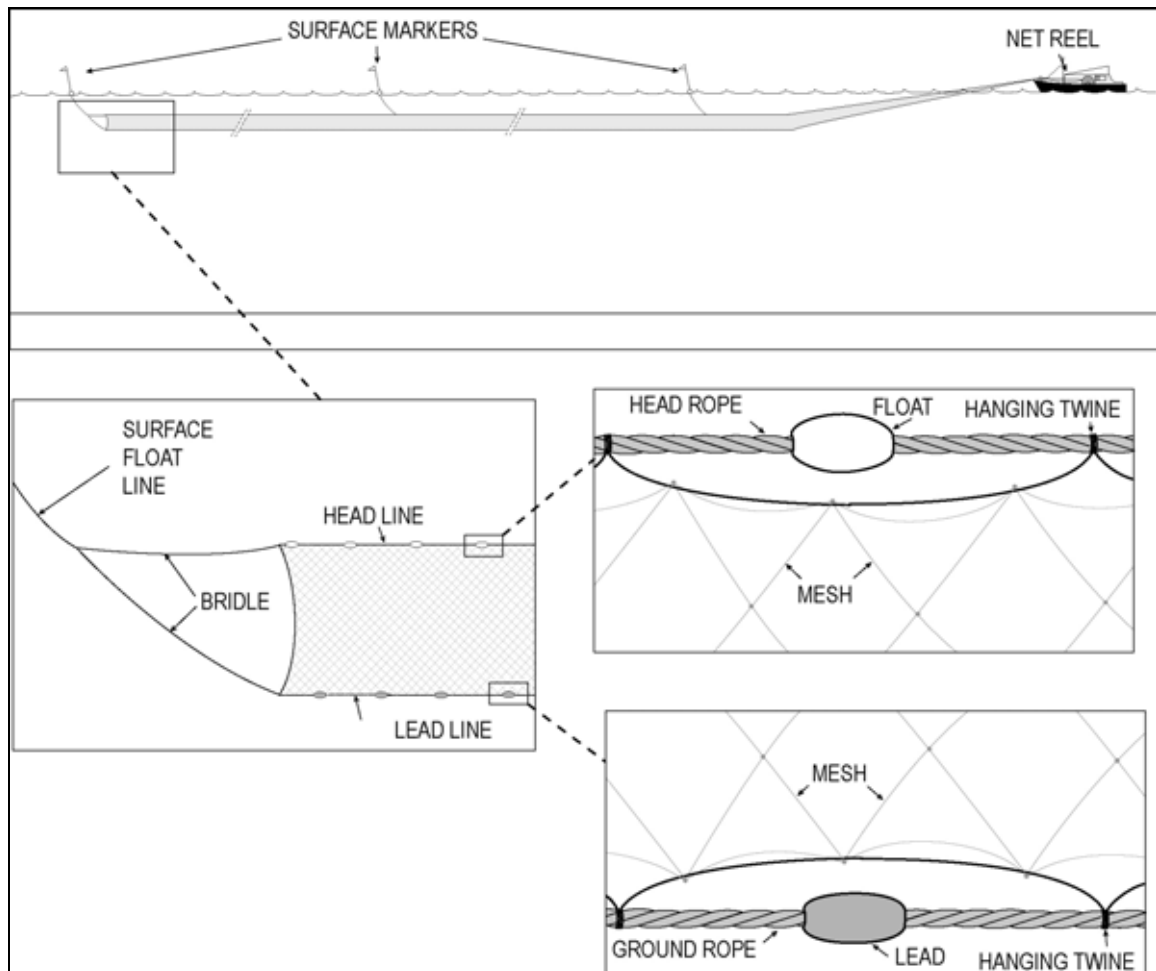


Figure 5. Typical gillnet fishing configurations.

2.3 CATCH HISTORY

Details of 2003–2004 catch data and other historical stock assessment and background on these fisheries, as reported in the DFWA's *State of the Fisheries Report 2003–2004*, at Appendix 4.1.

At its peak in 1977, the Taiwanese gillnet fishery landed 9,970 tonnes of processed shark (trunk weight) (Stevens 1999). The majority of the shark catch in this fishery was comprised of Australian blacktip (*Carcharhinus tilstoni*), and spottail shark (*Carcharhinus sorrah*) (Table 1), with a variety of other sharks, including several species of whaler sharks (family Carcharhinidae) and 3 hammerhead species (*Sphyrna* spp), constituting a minor component of their catch (Stevens and Davenport, 1991; Stevens and McLoughlin, 1991).

Table 1. Species composition of the Taiwanese gillnet catch

(Percentage by number based on observer data between 1981 and 1986. 'AFZ' refers to the catch taken from Commonwealth waters and 'Western' referring to the catch taken from waters between 3 and 12 nm. Table adapted from Stevens 1999.)

Species	AFZ		Western	
	%	SE	%	SE
Australian Blacktip <i>Carcharhinus tilstoni</i>	39.4	1.4	35.7	2.8
Spottail <i>C. sorrah</i>	16.3	0.8	16.6	1.9
Hammerheads <i>Sphyrna</i> spp	7.0	0.4	5.9	0.7
Yellowfin tuna <i>Thunnus albacares</i>	15.1	1.2	7.8	1.8
Spanish mackerel <i>Scomberomorous commerson</i>	3.0	0.3	2.3	0.7
Other mackerel <i>Scomberomorous</i> spp	4.9	0.5	4	1
Other fishes Various	14.3	–	27.7	–

During the late 1980s and early 1990s, small catches of shark (< 63 tonnes yr⁻¹) continued to be reported by a number of domestic fishers operating in northern WA under both State and Commonwealth jurisdiction. The identification of the species composition of these catches was poor, and shark catches were likely to be under-reported as they were a bycatch of fishing that was targeting scalefish (primarily family Scombridae) rather than sharks. Shark caught from WA waters may have also been reported to other jurisdictions as some vessels were based in the Northern Territory and others were operating under Commonwealth authority.

Due to the small number of active north coast shark fishers, confidentiality arrangements do not permit the publication of catch and effort data from the individual fisheries. Therefore for reporting purposes, these data have often been combined and the two regions are then considered as a single tropical shark fishery.

Following formal management of the WA tropical shark fisheries in 1993, catches remained low (< 100 t yr⁻¹) until the first full-time shark fishing vessels entered the fishery in 1997/98. At this time, the total shark catch as reported by the Catch and Effort Statistical System (CAESS) increased to 215 tonnes. Since 1997/98, catches have fluctuated dramatically as boats have entered and left the fishery, although catches have risen rapidly since 1999/2000. In 2003/04, the tropical shark fisheries'

total reported shark catch was 591 tonnes, and the species composition of this reported catch is shown in Table 2.

Table 2. The reported catch composition for Western Australia’s tropical shark fisheries.

Species	Catch (tonnes)				
	2000/01	2001/02	2002/03	2003/04	
<u>Primary species</u>					
Sandbar (thickskin)	<i>Carcharhinus plumbeus</i>	79	72	88	209
Blacktip	<i>Carcharhinus</i> spp	47	185	178	40
<u>Secondary species</u>					
Lemon	<i>Negaprion acutidens</i>	15	26	57	24
Hammerhead	Sphyrnidae	23	43	45	33
Tiger	<i>Galeocerdo cuvier</i>	34	37	43	51
Shovelnose/fiddler rays	Rhinobatidae, Rhynchobatidae	3	11	11	8
‘Bronze whaler’	<i>Carcharhinus obscurus</i>	9	6	7	17
Pigeeye	<i>C. amboinensis</i>	29	25	32	24
Grey reef	<i>C. amblyrhynchos</i>	7	6	7	9
Spot-tail	<i>C. sorrah</i>	–	–	3	–
Bull	<i>C. leucas</i>	–	–	–	19
Other sharks/rays		26	45	19	156
TOTAL		272	456	490	591

Comparisons of reported CAESS catches from the tropical shark fisheries with logbook and fishery-independent research data, suggest that catches of some species may in the past have been under-reported. This conclusion is supported by anecdotal reports regarding discarding of shark trunks within these fisheries. If significant under-reporting is occurring, it undermines the reliability of fishery catch and effort data in recent years. However as the stock assessment for the fisheries’ indicator species (*Carcharhinus plumbeus*) operates largely independently of catch and effort data, this will not have appreciably affected the stock assessment. Nonetheless, the likely underreporting does raises some concerns for the status of other ‘*k*-selected¹’ shark species that are caught by the tropical shark fisheries. These species include the tiger shark (*Galeocerdo cuvier*), pigeeye shark (*Carcharhinus amboinensis*), lemon shark (*Negaprion acutidens*) and the larger hammerhead sharks (*Sphyrna lewini* and *Sphyrna mokarran*).

Caution should also be exercised when relying on reported catch data as reported taxa might not represent the same species and may cause confusion when comparing catch data between fisheries. For example, the majority (97%) of “Hammerhead sharks” caught in the temperate shark fisheries are smooth hammerheads, *Sphyrna zygaena*, which are rare in the northern fisheries, and the majority (99%) of “blacktip sharks” caught in the temperate shark fisheries are spinner sharks, *Carcharhinus brevipinna*, which are only a minor component of the ‘blacktip’ catch in the tropical shark fisheries, (McAuley and Simpfendorfer, 2003).

¹ The term ‘*k*-selected’ is commonly used to describe animals which are slow-growing, late to reach maturity and with low fecundity.

2.4 PRIMARY TARGET SPECIES

2.4.1 Sandbar Shark (*Carcharhinus plumbeus*)

The sandbar shark, *Carcharhinus plumbeus* (Nardo, 1827), is a medium-sized grey-brown carcharhinid shark, which occurs in tropical and temperate coastal waters in most of the world's oceans (Springer, 1960; Compagno, 1984). In Australia, *C. plumbeus* occurs off the coast of Queensland, Northern Territory and Western Australia (Last and Stevens, 1994). In WA, *C. plumbeus* is primarily found between the Kimberley and Albany. The stock is segregated by size, with juveniles apparently preferring deeper continental shelf waters (> 100 m) south of Shark Bay but moving into shallower waters (50–100 m) between summer and early winter. Adults are most commonly found in depths greater than 40 m between the Eighty Mile Beach in the Pilbara and the Houtman Abrolhos Islands. Adults also inhabit deeper waters (> 100 m) south of the Abrolhos Islands during summer and autumn. Throughout their range, *C. plumbeus* are most common on, or just above the seabed and are only occasionally in surface waters. In WA, *C. plumbeus* is commonly called the 'thickskin' shark due to its dense covering of dermal denticles.

The biology of the sandbar shark in Western Australia has been extensively researched during a three year FRDC and Department of Fisheries funded study (McAuley et al., 2005). This study found that the biology of *C. plumbeus* in Western Australia differs markedly from other populations (Table 3). Reproduction is via placental viviparity, with pupping thought to occur between North West Cape and Albany during summer and autumn (McAuley and Gaughan, 2005).

Carcharhinus plumbeus were only a minor component of the catch in the Taiwanese pelagic gillnet fishery during the 1970s and 1980s (Stevens and Davenport, 1991; Stevens and McLoughlin, 1991). As the principal target species of the tropical shark fisheries, much of the fishing effort since 1997/98 has been targeted towards *C. plumbeus*. However, as most of the full time operators were then relatively new to shark fishing, the efficacy of this effort was low, but is improving as the fleet learns how to better target this species. In 2003/04, considerable fishing effort was directed at *C. plumbeus* between the west Kimberley and the Pilbara. The catches (Figure 6) of *C. plumbeus* in the tropical shark fisheries have dramatically increased in recent years. It should be noted however that the exact level of catch and quantity of the increase might not be fully reflected in these data due to the previously described discarding and/or underreporting.

Table 3. Comparison of published and derived reproductive parameters for *Carcharhinus plumbeus* with those from McAuley et al., 2005

(All lengths have been converted to centimetres Fork Length using either length conversion for the given study or, where length conversions have not been given, length relationships from the current study. Italicised values have been derived from the available data. Symbol definitions are: L_0 = size at birth, L_{max} = maximum size, L_{50} = size at which 50% of sharks are mature, L_{50}/L_{max} = proportion of maximum size at which 50% of sharks are mature).

	Western Australia		Western N. Atlantic	Western Indian Ocean	East China Sea	Hawaii	Northern Australia	
L_0	40-45		49	43-50	53-61	48-53	51	44-53
Male L_{max}	165	~158	197	166		181	148	177
Female L_{max}	166	~158	203	175		221	164	180
Male L_{50}	126	124	156	145		146-151	123	134
Female L_{50}	137	130	158	146		151	129	133
Male L_{50}/L_{max}	0.73	0.78	0.79	0.88		0.82	0.83	0.64
Female L_{50}/L_{max}	0.83	0.83	0.78	0.84		0.68	0.78	0.64
Litter size	6.5	7.9	9	7.2	6	7.54	5.5	3-8
Breeding season	Jan-Apr		Mar-Jun	Oct-Jan	Jun-Jul	April-May	Jun-Aug	Nov-April
Pupping season	Feb-Apr		Mar-Aug	Nov-Feb	Jun-Jul	Feb-April	Jul-Sep	Feb
Reference	McAuley <i>et al.</i> (2005)	Simpfendorfer <i>et al.</i> (1996)	Springer (1960)	Cliff <i>et al.</i> (1988)	Taniuchi (1971)	Joung and Chen (1995)	Wass (1973)	Stevens and McLoughlin (1991)

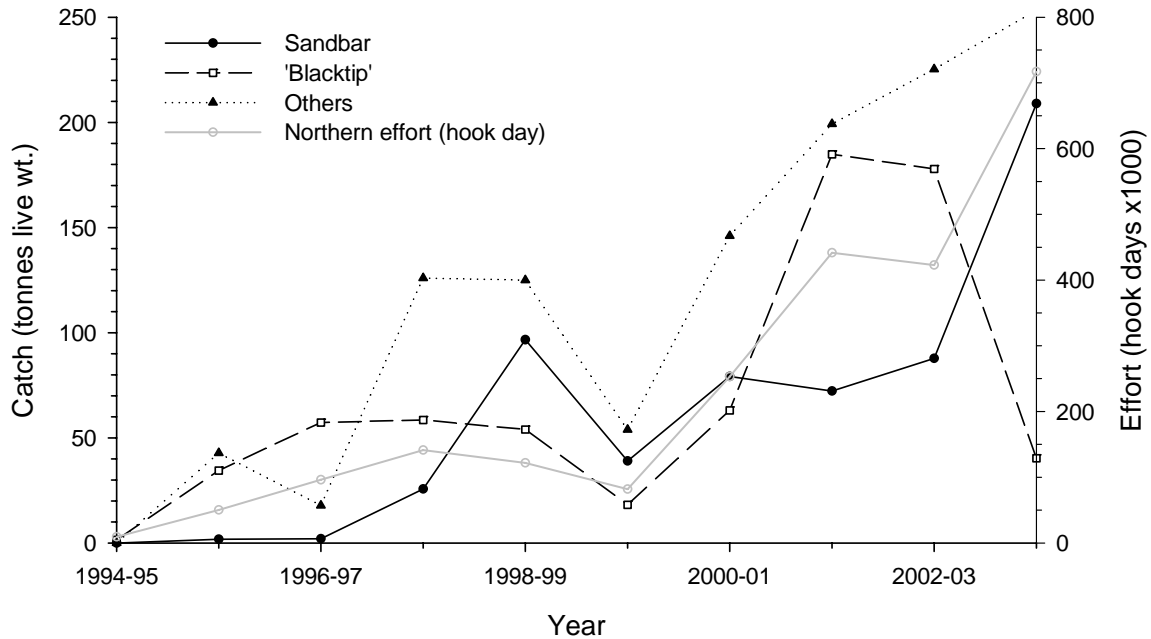


Figure 6. Annual landings for the northern shark fisheries (WANCSF and JANSF) for the period 1994/95 to 2003/04.

2.4.2 'Blacktip' Shark (*Carcharhinus* spp)

The name 'blacktip' shark is commonly used to describe several species of the family Carcharhinidae that have dark fin markings. The most commonly caught 'blacktip' shark species are the:

- spottail shark, *Carcharhinus sorrah*;
- common blacktip shark, *C. limbatus*;
- Australian blacktip shark, *C. tilstoni*; and
- spinner (longnose grey) shark, *C. brevipinna*.

The **spottail shark, *Carcharhinus sorrah*** (Muller and Henle, 1839), is a small species of whaler shark, which is common throughout the Indo-West Pacific and northern Australia between Point Quobba in WA and Gladstone in Queensland. Tagging and genetic studies have shown that there is a single stock off northern Australia. *Carcharhinus sorrah* inhabits shallow continental and insular shelves around coral reefs and over sand and mud flats, from the intertidal, to depths of at least 80 m. They occur throughout the water column, but are more common in midwater or near the surface (Compagno, 1984; Last and Stevens, 1994). Reproduction is placental viviparous, with pupping occurring in mid to late summer, after a gestation period of 10 months (Last and Stevens, 1994). Litter sizes vary between one and eight (average 3), with young born at between 45 and 60 cm TL. Females breed every year (Stevens and Wiley, 1986). Growth rates are rapid in pups (about 25 cm in the first year) and female sexual maturity is attained in 2–3 years, which is relatively early for a carcharhinid species (Davenport and Stevens, 1988). The diet of *C. sorrah* consists mainly of teleosts (many pelagic), and to a lesser extent, cephalopods and crustaceans.

Common and Australian blacktip sharks, *Carcharhinus limbatus* (Müller and Henle, 1839) and *C. tilstoni* were only distinguished as separate species in the mid 1980s (Stevens and Wiley, 1986). Recent research by DFWA indicates that *C. limbatus* is more common west of 120°E and *C. tilstoni* predominates to the east of this line (McAuley, unpublished data). Blacktip catches in the northern Kimberly are overwhelmingly comprised of *C. tilstoni* (J. Stevens, pers. comm.).

Carcharhinus limbatus (Muller and Henle, 1839) is a medium-sized species that is common throughout tropical and warm temperate waters around the world, where it is usually in mid and surface waters over continental shelves and in adjacent oceanic waters (Compagno, 1984; Last and Stevens, 1994). In Australia, the range of *C. limbatus* is uncertain due to confusion with the more common *C. tilstoni*, but it is known to occur across the north coast of Australia and as far south as Sydney on the east coast (Stevens, 1984). Female *C. limbatus* produce 1 to 7 pups every 2 years, following a gestation period of 10 to 12 months (Compagno, 1984). Reproduction is viviparous. There is considerable geographic variability in the size at maturity of common blacktip sharks. On the east coast of the US, males mature at about 145 cm TL and females at 156 cm TL (Castro, 1996), whereas in South Africa, males do not mature until they are about 200 cm TL and females until they are 210 cm TL (Wintner and Cliff, 1996). Age at maturity of *C. limbatus* from Florida, USA was found to be between 4 and 5 years for males and 6 and 7 years for females (Killam and Parsons, 1989) and 6 and 7 years respectively in South Africa (Wintner and Cliff, 1996). The age at maturity for Australian *C. limbatus* is unknown. Their diet consists primarily of teleosts, with some cephalopods and crustaceans.

Carcharhinus tilstoni (Whitley, 1950) has only been reported from northern Australia, where they occur in continental shelf waters between the mid-east coast of Queensland and North West Cape in WA (Last and Stevens, 1994; McAuley, pers. comm.). Tagging and genetic studies of *C. tilstoni* have shown there is a single stock off northern Australia (Last and Stevens, 1994). Reproduction is viviparous and annual, with females giving birth in January after a 10 month gestation period. Litter sizes range between 1 and 6, with an average of 3. Ageing studies show that this species grows relatively quickly (about 20 cm TL in the first year) and females attain sexual maturity in 3–4 years. Their diet consists primarily of teleosts, with some cephalopods and crustaceans.

The spinner shark (also known as longnose grey or ‘blacktip’), *Carcharhinus brevipinna* (Muller and Henle, 1839), is a medium sized species, which is common in warm-temperate and tropical waters over continental and insular shelves, near-shore to at least 75 m depth. The spinner shark is a schooling species and tagging studies (outside of Australia) indicate that this species is highly migratory. In WA, this species moves as far south as Cape Leeuwin in warmer months and even further east in stronger Leeuwin Current years (McAuley pers. comm.). Reproductive mode is placental viviparity, with litter sizes varying from 3 to 15. They have a gestation period of 12 to 15 months, with young born in mid to late summer. In WA, juvenile spinner sharks have been observed between the Pilbara and Perth. Size at maturity varies considerably between regions but in eastern Australia, males reach maturity at about 195 cm TL and females at about 210 cm TL. Both sexes grow to about 260 cm TL. The diet of *C. brevipinna* consists mainly of small teleosts (including many pelagic species) and cephalopods.

‘Blacktip’ species are still considered to be a primary component of the tropical shark fisheries as the reported catch in 2001/02 and 2002/03 exceeded any other shark species. In 2003/04, the catch (40 t) was only 20% of the previous years catch (Figure 6) but this decline is attributable to the shift of fishing effort away from pelagic gillnetting in the northern Kimberly and into demersal longlining in the Pilbara. In 2005, significantly increased effort controls were introduced in the tropical shark fisheries to reduce the impact on the *C. plumbeus* stock. Improved catch data and continued research will enable the Department to more accurately assess the commercial importance of this and other species in future years.

Species identification remains difficult between several *Carcharhinus* spp, and identification may vary between vessels. However, the accuracy will improve due to the introduction of the waterproof species identification guides. Observer data is used to standardise the species composition of reported catch from various vessels.

2.5 SECONDARY TARGET SPECIES

2.5.1 Lemon Shark (*Negaprion acutidens*)

Negaprion acutidens (Ruppell, 1837) is a large, pale yellowish brown whaler shark that attains 300 cm TL (Last and Stevens, 1994). *Negaprion acutidens* occurs in tropical, shallow inshore and offshore waters close to the bottom and is often found on and around coral reefs and on sandy plateaus near coral (Compagno and Niem, 1998). It is also commonly found close to the bottom in shallow sandy lagoons and turbid mangrove swamps. Maternal nourishment is via placental viviparity, and reproduction is biannual. *Negaprion acutidens* produce 1–14 pups after a gestation of 10–11 months. Size at birth is 60 cm and both sexes mature at about 220 cm. Their diet primarily consists of benthic crustaceans and molluscs, and to a lesser extent, teleosts and cephalopods (Cortes, 1999). Aside from 2003/04 the reported catch of *Negaprion acutidens* in the tropical shark fisheries has steadily increased over recent years with reported catch doubling from 2001/02 to 2002/03.

Lemon sharks are a secondary component of both the WANCSF and JANSF. In 2003/04, 24 t was reported from the tropical shark fisheries. Aside from 2003/04, the reported catch of lemon shark in the tropical shark fisheries has steadily increased over recent years with reported catch doubling from 2001/02 to 2002/03. In 2002/03 the catch exceeded 57 t and was the highest of any secondary species. The reduction in catch between 2002/03 and 2003/04 may be attributed to an increase in fishing effort redirected towards *C. plumbeus* in the area between the Pilbara and west Kimberley in 2003/04.

2.5.2 Hammerhead Sharks (Family: Sphyrnidae)

The **scalloped hammerhead**, *Sphyrna lewini* (Griffith and Smith, 1834), is a large species, which attains 346 cm TL (Last and Stevens, 1994). Globally, it is probably

the most abundant of the hammerhead species, and is cosmopolitan in tropical and warm temperate seas (Last and Stevens, 1994). This species occurs over continental and insular shelves (sometimes forming large migratory schools) and in adjacent oceanic water, where they are found on the surface and close to the bottom to depths of 275 m (Compagno, 1984; Last and Stevens, 1994). In Australia, *S. lewini*, is recorded throughout the north to about 34° South, although they are known to migrate further south in the warmer summer months. Reproduction is via placental viviparity and litter size is 13–23; young are born between October and January in northern Australia, after a gestation of 9–10 months (Stevens and Lyle, 1989). Birth size is 45–50 cm, and males mature at 140–160 cm, while females mature at about 200 cm. The diet of *S. lewini* consists mainly of teleosts (many pelagic) and cephalopods.

The **great hammerhead**, *Sphyrna mokarran* (Ruppell, 1837), is the largest of the hammerhead species, reportedly attaining 600 cm (Compagno, 1984), although the maximum recorded size in Australian waters is 445 cm (Stevens and Lyle, 1989). It has a circumglobal distribution in tropical and warm temperate seas. *Sphyrna mokarran* occurs throughout northern Australia and on the west coast has been sighted as far south as the Perth. They are highly migratory and found throughout the water column over continental and insular shelves to depths of over 80 m (Compagno, 1984; Last and Stevens, 1994). *Sphyrna mokarran* is placental viviparous, producing litters of 6–33 young in December and January in northern Australia, after a gestation of 11 months (Stevens and Lyle, 1989). Pups are born at about 65 cm. In Australia, males mature at about 225 cm and females at about 210 cm. Their diet consists of primarily demersal fish species (including numerous elasmobranchs), crustaceans and cephalopods.

The **winghead shark**, *Eusphyrna blochii* (Cuvier, 1816), is a small hammerhead species that grows to a maximum of 186 cm (Stevens and Lyle, 1989). *Eusphyrna blochii* has a distinctively wide and slender ‘hammer’, the width of which is roughly equal to half of the shark’s total length. They are found in shallow continental and insular shelf waters throughout the tropical Indo–West Pacific region, including northern Australia between northeastern Queensland and Port Hedland in WA. *Eusphyrna blochii* are viviparous, producing litters of 6–25 young in February and March after a gestation of 10–11 months. In Australia, size at birth is 45–47 cm. Males mature at about 108 cm and the females at about 120 cm. The diet of this species consists mainly of small teleost fish, together with smaller quantities of crustaceans and some cephalopods.

The reported catch of hammerhead sharks in the tropical shark fisheries has remained relatively constant over recent years although, consistent with reported lower total catch, the catch in 1999/2000 was comparatively low.

2.5.3 Tiger Shark (*Galeocerdo cuvier*)

Galeocerdo cuvier (Peron and Lesuer, 1822), is a very large species of whaler shark, which reportedly grows to over 600 cm TL (Compagno, 1984; Last and Stevens, 1994). *Galeocerdo cuvier* is a common and wide-ranging coastal-pelagic species, which is found in tropical and warm-temperate oceans around the world. Although preferring continental and insular shelf habitats to depths of around 140 m, they have

also been found substantial distances from shore and around oceanic seamounts and islands (Compagno, 1984).

In Australia, *G. cuvier* is distributed across the north coast, with records as far south as southern NSW on the east coast and Perth in WA (Last and Stevens, 1994). However, there are records from waters as far south as Esperance (McAuley, pers. comm.), presumably in response to years of stronger Leeuwin Current. *Galeocerdo cuvier* is the only member of the family Carcharhinidae with maternal input via aplacental (yolk-sac) viviparity. In Australia, *G. cuvier* produces between 10 and 80 pups in spring and early summer after a gestation period of about 12 months (Compagno, 1984; Last and Stevens, 1994). Size at birth is between 50 cm and 75 cm. In South Africa, males mature at 320 cm, while females mature at 350 cm (Wintner and Dudley, 2000), although Australian data indicates that males and females mature at 305 cm and 330 cm respectively (Stevens and McLoughlin, 1991). In South Africa, the reported age at maturity is 8 years for males and 11 years for females (Wintner and Dudley, 2000).

In the NW Atlantic, both sexes mature at about 7 years (Natanson *et al.*, 1999), although age at maturity for Australian *G. cuvier* is unknown. *Galeocerdo cuvier* has a truly omnivorous diet, taking a wide range of marine prey such as fish, crustaceans and cephalopods as well as birds, mammals and reptiles. Tiger shark diets are known to change ontogenetically and they are capable of taking advantage of locally abundant prey (Simpfendorfer *et al.*, 2001; Lowe *et al.*, 1996; Heithaus, 2001).

The reported catch of tiger shark in the tropical shark fisheries has steadily increased over recent years.

2.5.4 Pigeye Shark (*Carcharhinus amboinensis*)

Carcharhinus amboinensis (Muller and Henle, 1839) is a medium sized, solid-bodied whaler shark found in northern Australian waters from Carnarvon, Western Australia to Bundaberg, Queensland. They are also found in the eastern North Atlantic and Indo-West Pacific. *Carcharhinus amboinensis* are found in inshore areas of continental and insular shelves from the surface to depths of 100 m. In northern WA, juveniles are common in intertidal areas and are occasionally reported from estuaries and the lower reaches of rivers (McAuley, pers. comm.). Pups are born around November/December at 60–65 cm, with litter sizes of 6–13 (Stevens and McLoughlin, 1991). This species attains approximately 280 cm, with males maturing at about 210 cm and females at about 215 cm. The diet consists of bottom fishes, including elasmobranchs, crustaceans and cephalopods.

The decline in reported catch in 2003/04 may be a result of misidentification of *C. amboinensis* as *C. leucas* and increased fishing effort for *C. plumbeus* between the Pilbara and west Kimberley.

2.5.5 Other Sharks and Rays

The term ‘other sharks’ also includes all shark and ray species that were not identified in the catch reports that did not match a species listed in the DFWA database (usually a result of fishers using the generic category of “other sharks” or an unusual common name). In 2003/04, the reported catch of other sharks was 141 t (24% of the fisheries’ total shark catch).

2.5.6 Skates and Rays

The catches of skates and rays by the fishery consist of numerous orders, in particular, Rajiformes. Skates and ray catches are caught in very low numbers by demersal longlines. Whilst several endemic and uncommon species of skates and rays occur within the range of the WANCSF, catches are negligible due to their low abundance, the unsuitability of current gear configurations for catching them, and the small amount of fishing gear deployed at any time relative to the species’ ranges.

2.6 BYCATCH AND OTHER POTENTIAL INTERACTIONS

2.6.1 Sawfish (Family: Pristidae)

In Australia, up to five species of sawfish (family Pristidae) are found and one of these, the freshwater sawfish (*Pristis microdon* Latham, 1794), is currently listed as Vulnerable under the EPBC Act. *Pristis microdon* inhabits the sandy or muddy bottoms of shallow coastal waters, estuaries, river mouths, and freshwater rivers and lakes. Although Thorburn *et al.* (2004) described this species as a ‘marine opportunist’, the tropical shark fisheries generally operate some distance offshore, and they therefore pose a negligible risk to the freshwater sawfish. These fisheries nonetheless may have occasional catches of the four other species of sawfish.

2.6.2 Turtles (Families: Dermochelyidae and Cheloniidae)

The tropical shark fisheries operate in areas where turtles are commonly found. No turtle captures have been observed or reliably reported in the tropical shark fisheries. It is considered that the lack of reported captures is because the amount of gear being used is low relative to the fisheries’ operational area and as a result the likelihood of interactions is low.

2.6.3 Dolphins (Family: Delphinidae)

Dolphins (family Delphinidae) are found in the waters of the tropical shark fisheries. However, there have been no reported dolphin captures or mortalities. The predominant use of longline gear has reduced the likelihood of negative interactions with dolphins.

Proposed management changes will encourage greater use of gillnets, and it is recognised that this may increase the risk of dolphins being captured. As part of the planned observer program, DFWA will monitor the nature and level of fisher's interactions with dolphins and other protected species. Fishers will also be required to report to DFWA on their fishing returns all captures and other significant interactions with protected species.

3. NEW MANAGEMENT DIRECTIONS FOR THE TROPICAL SHARK FISHERIES

The Department of Fisheries, in liaison with the authorised operators and other stakeholders and interests groups, has undertaken a review of the management of these tropical shark fisheries with the objectives of:

- a. moving to effort control methods that limit fishing effort of the existing fishing fleet;
- b. encouraging a move from dependence on fins to fisheries based on taking sharks for the sale of their flesh for human consumption;
- c. ensuring more sustainable management of at-risk stocks of sandbar and dusky sharks and other more 'k-selected' species; and
- d. reducing the number of commercial fishers who can target sharks by restricting (with a few exceptions) commercial fishing to the recognised shark fisheries.

The general strategy being pursued is one of ensuring a management framework (Appendix 4.5) is in place that will ensure the ongoing sustainable management of the tropical shark fisheries and that management of these fisheries is in line with the objectives of NPOA-Sharks. Accordingly, many of the management initiatives and proposed changes are aimed at protecting an extensive portion of the ranges of higher risk species and reigning in the potential growth in fishing effort. The new and proposed management changes will allow DFWA to better manage the fisheries, monitor sustainability and determine the need and extent of future required changes.

As with all of the Western Australian Shark Fisheries, DFWA considers that management of the tropical shark fisheries is dynamic and will be improved as additional information becomes available. Over the next few years the Department is likely to have to frequently amend and fine-tune the management arrangements as it acquires more research data, learns more about the targeted stocks and better understands the impact of the fishing activities on ecological sustainability.

As an internationally recognised leader in the sustainable management of shark fisheries, DFWA considers that at this point there is a reasonable likelihood that management arrangements can, and will, allow these fisheries to continue to operate without any undue risk to ecological sustainability.

In summary the components of the new and proposed management arrangements that will impact of the ecological sustainability of the tropical shark fisheries consist of the following components:

- a. specific management changes to better manage the tropical shark fisheries;
- b. initiatives to address concern with the sustainability of sandbar shark stocks that span the temperate and tropical shark fisheries; and
- c. initiatives that while primarily focussing on addressing the sustainability of whiskery and dusky whaler stocks in the temperate shark fisheries, will also have an impact on the sustainability of shark stocks within the tropical shark fisheries.

3.1 TO ADDRESS SANDBAR SHARK SUSTAINABILITY AND TROPICAL SHARK MANAGEMENT ISSUES.

The release of research data on the State's sandbar shark stocks (see Appendix 4.2), ongoing concerns with the reliance of the tropical shark fisheries on shark fins and the need to more tightly manage the tropical shark fisheries has initiated changes to the management of these fisheries. These changes were negotiated with the Northern Shark Industry Association (NSIA) which had raised its own concerns about the sustainability of the fishery with DFMA and was proactive in recognising the need for improved and tighter management.

The details of the management changes currently being implemented in the WANCSF and the JANSF are as follows:

- In the JANSF
 - a. Effort controls on limits of 200 longline fishing days and 400 pelagic net fishing days, maximum net lengths, and maximum longline lengths.
 - b. Limitations on boats operating in the JANSF limited to single jurisdictional trips (i.e. to ensure the integrity of compliance, boats are not to fish within the Northern Territory Fishery while fishing in the JANSF and/or the WANCSF).
- In the WANCSF
 - a. An indefinite closure (of minimally 20 years) of the fishery between North West Cape (114°06'E longitude) and 120°E longitude and the area east of 120°E longitude and south of Broome (see figure 1).
 - b. giving effect to this closure by removing the existing licence conditions that currently allow operation of the WANCSF and providing exemptions to allow the fishers to operate in the remaining open area under strict conditions;
 - c. zoning of the open area to create a Broome zone and a Cape Leveque zone to provide additional protection in the Broome zone where sandbar sharks are still relatively common;
 - d. a maximum of 100 longline days and 200 net fishing days in the WANCSF;
 - e. limitations on fishing in the Broome zone to 100 days total, restricted to the October to January period;
 - f. explicit effort allocation for the use of gillnets and longlines;
 - g. maintaining DFMA's existing anti-finning regulations in the Broome zone;

- h. closure of King Sound, and other areas of fishery within the area of the Kimberley Gillnet and Barramundi Fishery to shark net and line fishing; and
 - i. introduction of a trip prohibition, while fishing in the Broome zone, on fishing in the Cape Leveque or JANSF fishery with a requirement to land the catch from the Broome zone in Broome.
- In both Western Australian Tropical Shark Fisheries (the WANCSF & the JANSF):
 - a. Effort management through a fixed number of allowed longline and gillnet fishing days;
 - b. limitations on gear configuration (net and line sizes);
 - c. prohibiting the use of automated longline and baiting gear;
 - d. with the exception of the Broome zone of the WANCSF, maximum fin (excluding upper tail fin) to fillet landing ratio does not exceed 11% of the total weight of fillets, if not filleted, the total landed-weight of fins (excluding upper tail fin) must not exceed 5.5% of the total weight of shark products;
 - e. introduction of compulsory satellite based VMS;
 - f. implementation of 10% observer coverage in the fishery with initial observer focus in the proposed Broome zone of the WANCSF;
 - g. establishment of a periodic review mechanism and setting of appropriate performance indicators and trigger points to assess stock status and determine future management responses;
 - h. introduction of tighter controls on provision of catch and effort data and introduction of compulsory logbooks for fishermen;
 - i. introduction of revised log books and requirements for fishers to log interactions with protected species; and
 - j. exemption of the tropical shark fishers from the provisions of the Mackerel (Interim) Management Plan by providing for any incidental catch of mackerel as bycatch and providing for the use of gillnets as a permitted mechanism to take this bycatch.

The closure in the WANCSF (Figure 1) has been put in place by a Section 43 order covering the whole of the fishery (see Appendix 4.3) with a Ministerial Exemption (see Appendix 4.4) providing for continued fishing in the balance of the fishery. This closure is considered likely to effect a 90% reduction in sandbar shark mortality.

FDWA intends to put in place a similar arrangement for management of the JANSF but, due to legislative complexity associated with the Joint Authority management arrangement, this is likely to take several months to implement. Meanwhile the fishery is operating under “agreed arrangements”.

3.2 CHANGES TO THE WESTERN AUSTRALIAN TEMPERATE SHARK FISHERIES THAT WILL BENEFIT THE TROPICAL SHARK FISHERIES

The Minister has recently approved a series of management arrangements for the temperate shark fisheries. While primarily aimed at ensuring the sustainability of at risk stocks of dusky, whiskery and sandbar stocks, these initiatives will also have flow-on benefits in the context of addressing the sustainability of spanning stocks that are also found in the tropical fisheries. This is particularly relevant in the case of sandbar and dusky sharks where significant numbers have previously been taken in the southern part of the WANCSF (albeit that a significant part of the WANCSF is now closed to commercial fishing).

Specific measures to be implemented in the temperate shark fisheries are:

3.2.1 Effort reductions back to 2001/02 effort levels

Designed to increase re-building of all shark stocks by bringing effort levels back to a long-term sustainable level.

3.2.2 Prohibition of the use of hooks on demersal gillnets or other static gear associated with gillnet fishing

Some gillnet operators have been rigging gillnets and other static gear (e.g. float lines) with hooks to take large sharks. The legality or otherwise of this practice has been “grey” because it could be seen as dropline fishing, which is a valid “open access” wetline fishery method under the operator’s fishing boat licence. This change will clarify the issue and make the practice illegal for shark fishers. (Note: Other fishing boat licence operators in the open access wetline fishery [and, it is proposed, in the future wetline managed fishery] can still use droplines, but will not be permitted to take shark).

3.2.3 Controls on the configurations of longlines

These controls are designed to limit the capacity of longlines to take large sharks, while keeping the gear method as a valid method in the fishery. The new configuration controls:

- a. limit the material used in traces and snoods to unsheathed monofilament nylon or monofilament fluorocarbon with a maximum width at any point of 1.8 millimetres;
- b. prohibit the use of metal in the material used for the mainline (with the exception of using metal in flags, swivels, sinkers, floats and connectors);
- c. prohibit the use of branch lines (requiring use of a single mainline);
- d. restrict the material used in the hooks (with the exception of the barb) to having a maximum width at any point of 3 millimetres;
- e. allow a maximum of two ferrules/swages/barrel locks/sleeves per snood;
- f. allow a maximum ferrule/swage/barrel lock/sleeve length of 25 millimetres;

- g. allow a maximum trace or snood length of 600 millimetres measured from the mainline to the eye of the hook (the length to include the full length of the swivel, snap fastener or other device that attaches the trace to the mainline);
- h. allow a maximum of one hook and one line per snood;
- i. allow the swivel, snap fastener or other device that attaches the trace to the mainline to be no longer than 150 millimetres; and
- j. limit the maximum external dimension (length or width) of a hook to 80 millimetres (i.e. the maximum dimension of any hook will be 80 millimetres and this will typically be the external measurement between the top of the eye and the bottom of the bend of the hook).

There is one possible risk and one possible benefit in this new approach to longline use. The possible risk is that it may increase the capacity of demersal longlines to take scalefish and/or, because of the reduction in the catch of large sharks, operators will seek to increase their catch of scalefish to compensate for the reduction in earnings from shark. Industry have been warned that this aspect will be under close scrutiny. The possible benefit is that, if the modified configuration proves useful for the take of small sharks (and does not increase scalefish catch) it may open up an avenue to move the fishery away from demersal gillnets, which have more potential to interact with protected species.

3.3 CHANGES TARGETING ALL SHARK STOCK AND FISHERIES

On 7 June 2005, the WA Minister for Fisheries, in response to recommendations from DFWA and the Western Australian Demersal Net and Hook Fisheries Management Advisory Committee (the MAC) approved significant changes to management of shark fishing and the State's recognised commercial shark fisheries (the temperate and tropical shark fisheries).

These changes were a primarily a result of:

- a. Increasing concerns with the need to take action to ensure the recovery and sustainability of dusky shark and whiskery shark stocks; and
- b. Concerns with increased targeting of sharks for their fins and particularly large dusky sharks by other commercial fishermen outside the State's four recognised shark fisheries.

Further background on the drivers for these changes can found in the *Fisheries Management Paper 180 - Future Management Arrangements For Western Australia's Temperate Shark Fisheries* that was released in August 2005 (see DFWA website under 'publications' for this document).

The changes approved by the Minister are as follows:

- a. Commercially protected fish status for sharks and rays (except within the Demersal Gillnet and Longline fisheries and a few other minor exceptions)

- b. a prohibition on using wire traces within the all the state managed commercial fisheries with exception of the mackerel fishery and the tropical shark fisheries;
- c. A prohibition on the use of longlines in fisheries under State jurisdiction outside the four recognised shark fisheries;
- d. A State-wide maximum size limit for dusky sharks; and
- e. A prohibition on attaching hooks to demersal gillnets and associated lines and floats.

Details of those changes, which will have significant impact on the operation of the tropical shark fisheries, are as follows.

3.3.1 Commercially protected fish status

The Minister has approved amendments of the *Fish Resources Management Regulations 1995* (FRMR) to make all sharks and rays commercially protected fish. Noting that the great white and whale sharks, were already totally protected, while the grey nurse shark will continue to be protected under the state's *Wildlife Conservation Act 1950*. The amendment prohibits the possession of sharks and rays by commercial fishers Statewide, except for the recognised shark fishers and other exceptions mentioned below. Recreational fishers will still be permitted to take sharks and rays as prescribed under current bag limits.

The amendment will be drafted pursuant to section 47 of the FRMA and operators in the following commercial fisheries will be provided with a defence to possessing sharks and rays (other than great white sharks, whale sharks and sawfish of the genus *Pristis*) under regulation 11 of the FRMR:

- a. Commercial Fishing Licence holders who possess sharks and rays under the authority of an authorisation that provides for the use of demersal gillnet, demersal longline or pelagic gillnet;
- b. The Marine Aquarium Fish Managed Fishery (in accordance with the management plan);
- c. The Kimberley Gillnet and Barramundi Managed Fishery;
- d. any other fishery where the take of sharks and rays is specifically provided in a management plan (e.g. Northern Demersal Scalefish Managed Fishery); and
- e. persons who are permitted to possess sharks or rays in accordance with an authorisation as provided for under Commonwealth law.

Although not listed as exceptions above, the Minister has also agreed, initially through a Section 7 Exemption, to allow operators in the Rock Lobster Fisheries to continue to take wobbegong sharks (Family *Orectolobidae*) (only one per day) and agreed to exempt the Pilbara Fish Trawl Interim Managed Fishery, WANCSF and the 80 Mile Beach Gillnetters from the prohibition on the possession of sharks and rays under section 7 of the FRMA. These fisheries will be permitted to continue to take sharks and rays until shark and ray bycatch issues are resolved.

3.3.2 Increases in penalties

To underpin the commercial protection of sharks and rays, the prescribed values for sharks and rays (including sharks and rays not treated in accordance with the anti-finning regulations [Reg 16C]) will be as follows:

- a. fins: -\$120 per kg and \$24 per fin; and
- b. whole shark or trunk (or part other than fins) -\$8 per kg and \$120 per fish.

If a person is convicted of contravening regulation 16C (anti-finning regulation) or section 47 of the FRMA (Commercially Protected Fish), the mandatory penalty under section 222 of the FRMA will be ten times the values above, although the exact amount of the penalty will depend on the court's decision on which matter (fins, trunks numbers or weight) to base the penalty. In line with the significant increase in penalties a conviction to contravening regulation 16C will also attract a 'black mark' under section 224 of the FRMA. A conviction under section 47 already attracts a 'black mark' under section 224.

3.3.3 A Prohibition on the use of wire traces

The Minister has approved a prohibition on the use of wire traces in all WA commercial fisheries Statewide, including in the JASDGDLMF and the WCDGDLMF, but with the exception of the Mackerel (Interim) Managed Fishery and the WANCSF and the JANSF. DFWA will draft a Prohibition Order on the use of wire traces by commercial fishers Statewide, under section 43 of the FRMA. While there are already two wire trace prohibitions in place north of 26° 30' S longitude, the drafting of a new Statewide Order would allow these outdated Orders to be replaced with one simple prohibition.

3.3.4 A Prohibition on the use of all demersal longlines in fisheries under State jurisdiction outside the four recognised shark fisheries-

The Minister has approved a prohibition on the use of longlines outside the shark fisheries, noting that improved definitions of longlines will need to be developed. DFWA will also be investigating the impacts of a prohibition on the use of longlines in the WCDGDLMF and Fishing Boat Licences operating in the WANCSF in response to the outcomes of the sandbar shark stock assessment.

The Minister has agreed to DFWA drafting an Order under section 43 of the FRMA to prohibit the use of longlines in all non-target shark commercial fisheries under State jurisdiction.

3.3.5 Maximum size limit for dusky sharks

Dusky sharks will be commercially protected and therefore commercial operators outside the target shark fisheries will not be permitted to possess dusky sharks. However, the target shark fisheries will be permitted to continue to take dusky sharks that have an interdorsal fin measurement of less than 70 cm (approximate equivalent to a 1.5 m fork length), provided they are landed with the fins attached to the trunk. This will ensure compliance of the interdorsal fin measurement legislation.

While the proposed partial area closures for the WANCSF (Figure 1) are primarily to protect sandbar sharks, the closures will also offer full protection to dusky sharks. Large breeding dusky whalers appear to gather in the Pilbara waters of the WANCSF in the summer months and accordingly this area may be particularly important to recovery of dusky stocks.

3.3.6 A Prohibition on attaching hooks to demersal gillnets and associated lines and floats

The WA Minister for Fisheries has agreed that a prohibition on using hooks attached to gillnet lines and associated gear in the JASDGDLMF and the WCDGDLMF be introduced. Operators that have been using hooks have been affecting the recovery of dusky shark stocks, and may also be affecting sandbar shark stocks. DFWA is investigating this issue so that appropriate legislation may be drafted.

4. APPENDICES

- 4.1 Extracts from the State of the Fisheries Report 2003/04**
- 4.2 Stock assessment of the sandbar shark, *Carcharhinus plumbeus*, in Western Australia – Shark Section Research Advice Number 16**
- 4.3 Section 43 Order**
- 4.4 Ministerial Exemption**
- 4.5 Matrix table**
- 4.6 References**
- 4.7 Acronyms**