The Common Wild Capture Fishery Methodology[1]

Methodology developed with scientific advice from Thünen Institute of Baltic Sea Fisheries

Version 4.01

Unit of Assessment

Scientific Name	*Galeorhinus galeus*
English Name	Soupfin shark, Tope, Vaalhaai
(FAO) Area of capture	FAO 47 - South East Atlantic and Area 51 - Western Indian Ocean
Country, Province, State (within EEZ)	South Africa
Stock, ICES Area	South Africa - Orange River in the Western Cape to Kei River in the Eastern Cape
Capture method	Shark demersal longlines
Management authority	Department of Agriculture, Forestry and Fisheries (DAFF)

Picture

Score: Total Assessment Score*: **RED**

Individual Category Score*:

1. Target Stock | 2. Ecological Effects of Fishery: | 3. Management:

MSC available?	Yes/**No**/in certification	*Details:*
FIP available?	Yes/**No**	*Details:*

Assessment Details

Current Assessment Status	DRAFT **/ FINAL**	Date	**2015**

Summary

Soupfin sharks (Galeorhinus galeus) are slow growing, long living, late maturing fish. They are listed on IUCN's list for threatened species as Vulnerable and stocks in South Africa are showing signs of being overfished.

The shark demersal longline sector targets sharks using a demersal (bottom set) double-line

[1] Please note this is a version of the methodology where the scoring has been removed.

system. There is limited information available of the current ecosystem impacts of the fishing, such as discards, bycatch and ETP species due to the lack of an effective observer programme. Historically, there have been concerns of the impacts to vulnerable seabirds and sharks.

Management for the sector is considered partly effective. The sector is principally managed through a total allowable effort (TAE) limitation as well as area and bycatch limitations. There is no formal scientific or management working group for this fishery and therefore it is currently managed as part of the linefish working groups.

Main references

DAFF 2013 National Plan of Action for the Conservation and Management of Sharks (NPOA). Department of Agriculture Forestry and Fisheries; Branch: Fisheries. Cape Town.

DAFF. 2014a. Status of the South African Marine Fisheries Resources. Department of Agriculture, Forestry and Fisheries; Brach: Fisheries, Cape Town.

DAFF. 2014b. Permit Conditions: Demersal shark longline, Fishing Season 2014. Department of Agriculture, Forestry and Fisheries; Branch: Fisheries. Cape Town.

Da Silva, C. and McCord M.E. 2013. "Soupfin shark (*Galeorhinus galeus)* in B.Q. Mann (ed.) *South African Marine Linefish Species Profiles,* Special Publication, Oceanographic Research Institute, 9:287-288.

da Silva, C., Booth, A.J., Dudley, S.F.J., Kerwath, S.E., Lamberth, S.J., Leslie, R.W., McCord, M.E., Sauer, W.H.H. and Zweig, T. 2015. The current status and management of South African's chondrichthyans fisheries. *African Journal of Marine Science* 37(2):1-14.

McCord, M. E. 2005. Aspects of the ecology and management of the soupfin shark (*Galeorhinus galeus)* in South Africa. MSc thesis, Rhodes University, Grahamstown, South Africa.

Disclaimer

This assessment is carried out by a qualified assessment team composed of experienced fisheries biologists from the nature conservation organizations WWF, NSF, and associated institutions. The information provided in this assessment has been collected according to high scientific standards. All judgments are delivered independently of commercial interests. This is an assessment methodology to indicate the relative sustainability of a fishery. This methodology is not a certification of sustainability, nor does it allow the fishery or retailer to make any claims about the species or stock or a certain product. This is a desk-based assessment. Each assessment undergoes a quality control (cross-check) regarding consistency by a member of the assessment team. However, no rights whatsoever can be based upon the advice. This methodology is not to be used by third parties without consulting the WWF Global Seafood Coordinator.

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CATEGORY 1: **STOCK STATUS AND BIOLOGY**

Depending on the available amount of information, there are 3 possible tracks on which the stock status is rated. Question 1 sets the course which track is applicable.

Q1

Are adequate* stock assessments of the target stock available?

	Detailed fishery data is available AND a reliable quantitative stock assessment is conducted on a regular basis AND reference points are defined	→ **Track A** (QA2-A6)
B	**Substantial fishery data is available, but no reference points are defined** OR reference points are defined but a recent quantitative stock assessment is lacking	→ **Track B** (QB2-B5)
	Little or no fisheries data AND no stock assessment AND no reference points are available OR [Bycatch]: Species is not targeted directly - it is taken as bycatch which is retained/landed**	→ **Track C** (QC2-C5)

**Bycatch species which are not appropriately managed in a species-specific manner. If fishery data is available, go to track A or B, respectively.

Annotations

Biological reference points and stock assessment data are outdated.

A stock assessment was conducted in 2005 using per-recruit analyses and biological reference points were also estimated in 2005 (McCord 2005 cited in da Silva & McCord 2013).

References

da Silva & McCord. 2013. See main references.
McCord. 2005. See main references.

TRACK B/*data-moderate*. *Substantial fishery data available, but no reference points defined.*

QB2

How precise is the available fishery-specific information*?

**E.g. landings, total catch (including CPUE), fishing effort, size/age distribution.*

Note to assessor: Consider only data sources that are relevant for the UoA (e.g. no CPUE for pelagic stocks

TRACK B

	The available data is detailed enough to allow for a solid and comprehensive description of the stock
X	Not all of the above mentioned parameters can be described with sufficient accuracy

Annotations

The available information does not allow for a reliable description of the stock.

Although catch data is available, there is not a recent, standardised CPUE available. Further the catch data is not always reliable due to incorrect identification of shark species caught and the large volume of soupfin caught as bycatch in the trawl sector (Da Silva & McCord, 2013; DAFF, 2013; da Silva et al. 2015). There is an indication that DAFF will be updating the catch data to include a recent CPUE index in 2015 (C. da Silva, pers. comm.).

References

Personal communication Charlene da Silva (Department of Agriculture, Forestry and Fisheries)
da Silva & McCord. 2013. See main references.
DAFF. 2013. See main references.

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da Silva et al. 2015. See main references.

QB3

TRACK B

Do fishery-specific data indicate that the target stock is in good condition with regard to biomass?

- [ ] YES - Stock is in good condition or underfished
- [ ] YES - Stock is appropriately used or fully fished
- [x] Stock size is uncertain OR **unknown**
- [ ] NO - Stock is overfished

Annotations

Stock size is unknown.

A per –recruit analyses conducted in 2005 estimated the stock to be 40-50% optimally exploited and that any further increase in fishing effort will negatively affect the stock (McCord, 2005 cited in Da Silva & McCord, 2013). No stock assessment has been conducted since then and an increasing trend in reported catches is of concern (McCord, 2005 cited in Da Silva & McCord, 2013). The Status of the Marine Resources report 2014 has listed the soupfin stock as severely depleted and under heavy fishing pressure (DAFF 2014).

References

DAFF. 2014. See main references.
da Silva & McCord. 2013. See main references.
McCord. 2005. See main references.

QB4

TRACK B

Do fishery-specific data indicate that the fishing rate is appropriate to sustain the long-term yield in the future?

- [ ] YES – Stock is fished at a rate likely to maintain stock at, or increase stock towards, good condition *[overfishing is not occurring]*
- [x] Stock is fished at a rate that risks maintaining stock at, or decreasing stock towards unsustainable levels *[at risk of overfishing]* OR **fishing rate on the target stock is unknown**
- [ ] NO – Stock is fished at a rate that is reducing stock to unsustainable levels, OR is preventing recovery of depleted stock *[overfishing is occurring]*

Annotations

Fishing rate of target stock is unknown.

Based on the stock assessment conducted in 2005, the stock was thought to be optimally exploited and any increase in fishing effort would cause a decline in stock levels (McCord 2005 cited in Da Silva & McCord 2013). Reported catches indicate an increasing trend in the quantities of soupfin landed which has historically mirrored declines in more valuable linefish species (da Silva et al. 2015). The latest DAFF report indicates that soupfin stock is depleted and therefore close to, or actually being, overfished (DAFF 2014a).

References

DAFF. 2014a. See main references.
da Silva & McCord. 2013. See main references.
da Silva & McCord. 2005. See main references

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da Silva et al. 2015. See main references.

QB5 TRACK B

Do management measures* exist that will likely ensure the long-term productivity and/or the recovery of the stock?

- [ ] Management of target stock is fully effective
- [ ] Management of target stock is partly effective OR stock status is healthy despite the absence of specific management measures
- [x] Management of target stock is marginally effective OR: **Effectiveness of management of target stock is unknown**
- [ ] Management of target stock does not exist OR is not effective

Annotations

Effectiveness of management is unknown.

Regulatory measures are currently in place for the shark demersal longline sector in the form of a Total Allowable Effort (TAE) limitation of 6 vessels for the commercial sectors (da Silva et al 2015). The fishery is also restricted from fishing in water north of the Kei River (DAFF, 2014a cited in da Silva et al. 2015).

Soupfin are also targeted in the commercial linefish, recreational and subsistence sector. The commercial linefishery is managed through a TAE allocation whilst the recreational and subsistence fishers are managed by a bag limit of 1 per person per day. Soupfin are caught bycatch in the trawl sector which is currently not regulated (da Silva & McCord, 2013).

The slow growth and late maturity makes soupfin sharks susceptible to overfishing and therefore a maximum size restriction is recommended to decrease fishing of larger sharks. Area closure and off-shore MPAs should also help the population. In 2010, shark demersal longline catches were estimated to comprise 26% - 50% of total soupfin catches, further highlighting the need for effective management across multiple fishing sectors (DAFF 2013, da Silva et al. 2015).

References

DAFF. 2013. See main references.
DAFF. 2014. See main references.
da Silva & McCord. 2013. See main references.
da Silva et al. 2015. See main references.

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CATEGORY 2: **ECOLOGICAL EFFECTS OF THE FISHERY**

Q7

Does the fishery negatively impact* any species (fish and non-fish) that is listed as threatened, endangered or protected (ETP) OR overfished OR biologically highly vulnerable***?**

** Impacts only to be considered on population level*
*** List examples as of QC2*
**** Highly vulnerable species: e.g. selected species of elasmobranchs, demersal deep sea finfish (e.g. of the families Macrouridae, Sebastidae, Trachichthyidae)*

- [ ] NO - The fishery under assessment does not cause significant damage to any listed, overfished, or highly vulnerable species
- [ ] NO - The fishery under assessment is not likely to cause significant damage to any listed, overfished, or highly vulnerable species
- [ ] There is no OR conflicting information concerning the effects on listed, overfished, or highly vulnerable species
- [x] **YES - The fishery under assessment is likely to cause significant damage to some listed, overfished, or highly vulnerable species**
- [ ] YES - The fishery under assessment causes significant damage to any listed, overfished, or highly vulnerable species

Annotations

A number of threatened and vulnerable species are caught in this fishery.

The two primary target species for the fishery are soupfin sharks (*Galeorhinus galeus*), and smoothhound sharks (*Mustelus mustelus*) (DAFF 2014a). The fishery is also allowed to also target spiny dogfish (*Squalus spp.),* St. Joseph's sharks *(Callorhinchus capensis),* Carcharhinus spp. and all species of skates and rays. In addition, cape gurnards (*Chelidonichthys capensis),* jacopever (*Helicolinus dactylopterus)* and smooth hammerhead sharks (*Sphyrna zygaena)* may be landed if caught by the fishery but may not be directly targeted (DAFF 2014). Bull sharks (*Carcharhinus leucas)* and oceanic white tips (*Carcharhinus longimanus)* may not be landed if caught.

Table 1: Estimated dressed weight of target shark and permitted shark bycatch species (t) landed by the South African demersal shark longline fishery during 2011 & 2012 (DAFF 2014). The final column provides the proportion of the listed species caught by the demersal shark longline sector out of the total South African landed commercial catch from 2010 to 2012 (da Silva et al. 2015). Note that with respect to the latter proportion of catches, these may be overestimates for some species as the catch records from other fishery sectors are poor in some cases (da Silva et al. 2015).

Species	Catches (t) in 2011	Catches (t) in 2012	Proportion of total SA commercial landed catch made by the demersal longline sector (%)
White spotted smooth-hound sharks Mustelus palumbes)	Unknown	Unknown	1 - 10
Spiny dogfish (*Squalus* spp.)	0	3.3	< 1
St. Josephs sharks (*Callorhinchus capensis*)	0.3	0.1	< 1
Smooth hammerhead sharks (*Sphyrna zygaena*)	0	2.9	26 -50
Broad-nose sevengill cow sharks (*Notorynchus cepedianus*)	0	1.0	11 - 25
Short-fin mako sharks (*Isurus oxyrinchus*)	0	2.2	11 -25
Requiem sharks (*Carcharhinus* spp.)	8.9	7. 1	Species specific
Skates and rays	6.7	6.1	Species specific
Catsharks (Scyliorhinidae)	Unknown	Unknown	**

Species caught that are listed as Near Threatened or Vulnerable by the IUCN Red list are indicated below.

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Near threatened

Bronze whaler (*Carcharhinus brachyurus*) (Duffy & Gordon, 2003)**

Vulnerable

Dusky shark (*Carcharhinus obscurus*) (Musick et al. 2009)**
Smooth hammerhead (*Sphyrna zygaena*) (Casper et al. 2005) **
Spiny dogshark (*Squalus acanthias)* (Fordham et al. 2006)*
Short-fin mako sharks (*Isurus oxyrinchus*) (Cailliet et al. 2009)

Endangered

Spearnose skates (*Rostroraja alba)* (Dulvy et al. 2006)

** Targeted species.*
***Species not directly targeted but can be retained as bycatch.*

Sea-bird interactions

There is some concern regarding interactions between this fishery and seabirds, in particular the white-chinned petrel, which is listed as Vulnerable on the IUCN Red list (Birdlife International 2012). Due to the lack of an observer programme, these interactions have not been studied in the shark demersal longline fishery.

These interactions, however, have been extensively studied in the hake demersal longline fishery. This is relevant because the two fisheries have similar fishing methods and it is likely that some of the ecosystem impacts overlap. The concern is that birds are caught on the lines as they dive to catch the bait. This is especially prevalent when offal is discarded on the same side as the lines and during the laying of the line. Estimates of seabird catch for the hake demersal longlines fishery were around 225 seabirds per year (Peterson et al. 2008). Substantial progress has been made to minimize bird mortalities through the introduction of bird scaring lines (tori) and gear modifications aimed at minimizing bird mortalities. The permit conditions now specify that these tori lines have to be utilized on all demersal shark longline vessels (DAFF 2014a). There are also a number of gear recommendations within the permit in order to ensure the lines sink as fast as possible (DAFF 2014a). However, it is not presently known whether tori lines are used in the sector and what the current mortalities are as there is no observer programme to monitor interactions.

References

BirdLife International 2012. *Procellaria aequinoctialis*. The IUCN Red List of Threatened Species < http://www.iucnredlist.org/details/22698140/0 > Downloaded 6 August 2015

Cailliet, G.M., Cavanagh, R.D., Kulka, D.W., Stevens, J.D., Soldo, A., Clo, S., Macias, D., Baum, J., Kohin, S., Duarte, A., Holtzhausen, J.A., Acuña, E., Amorim, A. & Domingo, A. 2009. *Isurus oxyrinchus*. The IUCN Red List of Threatened Species <http://www.iucnredlist.org/details/39341/0> Downloaded 22 September 2015

Casper, B.M., Domingo, A., Gaibor, N., Heupel, M.R., Kotas, E., Lamónaca, A.F., Pérez-Jimenez, J.C., Simpfendorfer, C., Smith, W.D., Stevens, J.D., Soldo, A. & Vooren, C.M. 2005. *Sphyrna zygaenaa*. The IUCN Red List of Threatened Species < http://www.iucnredlist.org/details/39388/0> Downloaded 6 August 2015

DAFF. 2014a. See main references.

da Silva et al. 2015. See main references.

Duffy, C. & Gordon, I. 2003. SSG Australia & Oceania Regional Workshop. *Carcharhinus brachyurus*. The IUCN Red List of Threatened Species <www.iucnredlist.org> Downloaded 6 August 2015

Dulvy, N.K., Pasolini, P., Notarbartolo di Sciara, G. Serena, F., Tinti, F., Ungaro, N., Mancusi, C. & Ellis, J.E. 2006. *Rostroraja alba*. The IUCN Red List of Threatened Species <http://www.iucnredlist.org/details/61408/0> Downloaded 22 September 2015

Fordham, S., Fowler, S.L., Coelho, R., Goldman, K.J. & Francis, M. 2006. *Squalus acanthias*. The IUCN Red List of Threatened Species <http://www.iucnredlist.org/details/39326/0> Downloaded 6 August 2015

Musick, J.A., Grubbs, R.D., Baum, J. & Cortés, E. 2009. *Carcharhinus obscurus*. The IUCN Red List of Threatened Species <http://www.iucnredlist.org/details/3852/0>Downloaded 6 August 2015

Peterson, S., Nel, D. Ryan, P. & Underhill, L. 2008. Chapter 4: Demersal longline fisheries and seabirds. In: Understand and mitigating vulnerable bycatch in the South African demersal trawl and longline fisheries. WWF South Africa Report Series – Marine/002. Cape Town.

Serena, F., Mancusi, C., Clò, S., Ellis, J. & Valenti, S.V. 2009. *Mustelus mustelus*. The IUCN Red List of Threatened Species http://www.iucnredlist.org/details/39358/0 Downloaded 6 August 2015

Simpfendorfer, C. & Burgess, G.H. 2009. *Carcharhinus leucas*. The IUCN Red List of Threatened Species < http://www.iucnredlist.org/details/39372/0> Downloaded 6 August 2015

Walker, T.I., Cavanagh, R.D., Stevens, J.D., Carlisle, A.B., Chiaramonte, G.E., Domingo, A., Ebert, D.A., Mancusi, C.M., Massa, A., McCord, M., Morey, G., Paul, L.J., Serena, F. & Vooren, C.M. 2006. *Galeorhinus galeus*. The IUCN Red List of Threatened Species < http://www.iucnredlist.org/details/39352/0> Downloaded 6 August 2015

Q8 Does the fishery generate discards?

Note to assessor: Only use the categories "low", "moderate" or "high" when no other information is available

… by weight	<5%	5-15%	15-30%	>30%	unknown
…referenced in a scientific report as:	low	moderate	high	very high	
High survival rate*					
Low** or unknown survival rate					**X**

** High survival rate: over 75% of each discarded species survive*
*** Low survival rate: less than 75% of discarded species survive*

Annotations

There are not data presently available to estimate the quantity and survival rate of any discards.

As the fishery has no scientific observer programme, there is no data available to accurately determine the quantity and survival of discards (DAFF 2014a). Although there are some similarities in terms of fishing method between the hake demersal longline and the shark demersal longline; there are also several distinct differences. The shark demersal longline operates within a different area, uses a different type of bait and uses wire tracers to specifically target sharks (DAFF 2014a, Tarr 2016). In general, demersal longlining is considered to be a relatively selective fishery that only targets specific species.

References

DAFF. 2014a. See main references.

Peterson, S., Nel, D. Ryan, P. & Underhill, L. 2008. Chapter 4: Demersal longline fisheries and seabirds. In: Understand and mitigating vulnerable bycatch in the South African demersal trawl and longline fisheries. WWF South Africa Report Series – Marine/002. Cape Town.

Tarr, R.J. Q. 2015. Recommendation of the Linefish Scientific Working Group for the sustainable management of demersal sharks in the demersal shark longline fishery for the 2015/2016 season. Scientific Working Group document – Linefish fisheries/2015/AUG/SWG/4.

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Department of Agriculture, Forestry and Fisheries. Cape Town.

Q9

Does the retained catch contain juveniles* or non-target species?

**Juveniles = individuals (target AND non-target species) which are smaller or younger than the length or age where 50% of the individuals of that specific stock are considered mature. Percentage of catch is by weight. Assessors should be conservative when looking at juveniles given low weight relative to adults.*

	NO - The retained catch contains no (or <5%) juveniles AND no (or <5%) non-target species *[selective catch method]*
	YES - The retained catch contains 5-30% juveniles AND no (or <5%) non-target species OR the landed catch contains 5-30% non-target species AND no (or <5%) juveniles
X	YES - The retained catch contains 5-30% juveniles AND 5-30% non-target species **OR there is not enough information for evaluation**
	YES - The retained catch contains >30% juveniles AND/OR non- target species *[non-selective catch method, e.g. trawling, dredging, FAD associated seine]*

Annotations

There is not enough information to determine the exact amount of bycatch or the amount of juveniles caught.

Due to the nature of the fishery, a number of shark species along with the target species are likely to be caught as bycatch (see Table 1 at Q7). However, as there is no scientific observer programme, it is difficult to accurately estimate the level of bycatch (DAFF 2014a). Current data are compiled from catch records that may not be completely accurate or reliable (da Silva 2015). In addition, the catch data does not given any indication of the proportion of juveniles landed which could have a significant effect on a vulnerable, threatened or endangered species.

References

DAFF. 2014a. See main references.
da Silva. 2015. See main references.

Q10

Does the intensity of the fishery result in significant negative ecosystem changes*, such as cascade effects, major food chain effects, or community changes? *[Ecosystem Effect]*

**Examples of significant ecosystem changes: Significantly increased abundance of species with a low trophic level caused by depletion of predators. OR Depletion of top predators as a result of the decrease of key prey species. OR Truncated size composition of the ecological community. OR Major changes in the species biodiversity of the ecological community. OR Changes in the genetic diversity of a stock that lead to changes of e.g. growth or reproduction of the species. OR Destruction of key biogenic/habitat-forming species.*

	NO - The fishery is not causing significant negative ecosystem changes
	Negative ecosystem changes caused by the fishery are unlikely OR the likelihood of impact cannot be determined because there is conflicting, inconclusive, or insufficient information
x	**YES - Significant negative ecosystem changes are likely** *[circumstantial evidence]*
	YES - The fishery is causing significant negative ecosystem changes *[direct evidence]*

Annotations

There is little information available on the ecosystem impacts due to a lack of observer data and scientific research. However, as the fishery targets chondrichthyans, many of which are considered to be key predators within their ecosystem it is likely that some ecosystem changes occur.

Across the world, there are indications of a drastic decline in catch rates of a number of

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elasmobranch species as fishing pressures have increased (Ferretti et al. 2010). As a general matter, research suggests that decreases in top predator populations can have ramifications for the functioning of pelagic ecosystems (Beddington, 1984; Baum & Myers, 2004). Large top predators structure aquatic ecosystems and may be essential for the maintenance and stability of food webs and can exert a profound influence on the structure and functioning of marine ecosystems (Stevens et al. 2000).

When top predators disappear from the ocean, their principal prey species can increase in abundance. As these species increase in number, they can in turn put more pressure on the species that they consume. A cascade of effects can occur through several layers of the food web as these species eat more of the smaller fish, crustaceans and plants at lower levels in the web.

Several studies have illustrated these cascade effects as a direct consequence of overfishing of top predator sharks. Along the coast of the United States from Florida to Maine, an increase in prey species (small sharks and rays) coincided with a decline in predator species (larger sharks) from 1970 – 2005 (Myers et al. 2007). Upon further investigation, a particular ray species, namely *Rhinoptera bonasus,* abundances increased dramatically resulting in a decline in its prey species namely, the scallop (*Agropecten irradians)* found along the coast of North Carolina (Myers et al. 2007). Although the link between the rays and scallops was confirmed, the link between the removal of larger sharks and the increase in its prey species (*Rhinoptera bonasus)* remains uncertain (Myers et al 2007). Anecdotal studies have also indicated that top predator removal can result in range, migration and habitat shifts of a number of different prey species (Ferretti et al. 2010).

Additionally, when top predators decline, their absence could affect the behaviour of their prey, which experts call “risk effects.” If top predators are present, their prey species move away from habitats where these predators hunt. When top predators disappear, their prey species may shift foraging and grazing patterns and feed on different species. Thus, even if the size of these principal prey populations remain the same, changes in the prey behaviour may have significant impacts across fish and other prey and plant communities in an ecosystem.

In South Africa, catch rates for larger sharks within the KwaZulu Natal shark net programme [1956 - 1976] showed a declining CPUE whilst catches of smaller sharks (mesopredators) reportedly increased followed by a decline in reported catches of bony fish (van der Elst, 1979). Van der Elst (1979) suggested that the increase in these mesopredators contributed to the decline of bony fish (prey) which make up a large portion of their diet. Further projections indicated that between 419000 - 2.8 million small sharks and ~ 5000 dolphins escaped large shark predation during 1956 - 1796 (van der Elst 1979; Dudley & Cliff 1993). However, subsequent studies indicated that increases in fishing pressure on these mesopredators have likely negated the earlier increases in populations resulting in an increase in rays and bony fish most likely due the decrease in predation and competition (Pradervand et al. 2007). As this fishery catches a number of shark species that are considered to be important predators within the ecosystem, it is likely to impact the ecosystem.

References

Baum, J. & Myers, R. A. 2004. Shifting baselines and the decline of pelagic sharks in the gulf of Mexico. Ecology letters 7: 135–145.

Beddington, J. R. 1984. The response of multispecies systems to perturbations. In: exploitation of marine communities. May, R. M. (ed). Springer-verlag, berlin. 209–225.

DAFF. 2014a. See main references.

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Heithaus, M. R., Frid, A., Wirsing, A. J. and Worm, B. 2008. Predicting ecological consequences of marine top predator declines. Trends in Ecology and Evolution 23(4):202–210.
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Stevens, J.D., Bonfil, R., Dulvy, N.K. & Walker, P. A. 2000. The effects of fishing on sharks, rays and chimaeras (chondrichthyans), and the implications for marine ecosystems. Ices journal of marine science 57: 476–494.
Myers, R. A. & Worm, B. 2003. Rapid worldwide depletion of predatory fish communities. Nature 423: 280–283.
van der Elst, R.P. (1979). A proliferation of small sharks in the shore-based Natal sport fishery. Environ. Biol. Fishes, 4, 349–362.

Q11

Is the fishing method destructive to particular benthic habitats or habitat forming species within the benthic habitat? *[Habitat Effect]*

Notes to assessor: Provide references for definition of habitat type.
In case the habitat types are mixed, scores are to be averaged.
In case the fishing grounds are known to include at least one sensitive habitat, score accordingly.

Habitat type / Capture method	Sand/ gravel / mud	Rocky	Biogenic reefs, sponge-beds, seagrass	Seamounts, cold water corals, hydrothermal vents
Pelagic (midwater) trawl, pelagic long-line, spear, harpoon, purse seine, midwater gillnet, pole & line, trolling, hook-and-line				
Hand-picking				
Hand raking				
Pots, traps				
Bottom long-line, bottom set gillnet	X	X		
Danish seine, demersal seine, fly-shooting				
Beam trawl/beam trawl rollers, demersal otter trawl				
Beam trawl/tickler chains or chain mats				
Dredge				
Explosives, chemicals & other illegal operations				

Annotations

Fishing method is not thought to cause any significant damage to the benthic environment, which covers mainly sandy/muddy habitats, apart from some localised damage when the lines are set.

The demersal longline fishery uses a nylon monofilament Lindgren Pitman spool system with weighted longlines averaging 1 0000 baited hooks and deployed at depths from around 50-100 m (da Silva et al. 2015). The fishery targets the inshore zone over sandy and rocky beds where the majority of benthic sharks are found (Da Silva et al. 2015). Due to the structure of the demersal longlines,

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damage to the substrate is thought to be minimal apart from some localised damage during the laying of the lines (Sink et al. 2012).

References

da Silva et al. 2015. See main references.

Sink, K., S. Holness, L. Harris, P. Majiedt, L. Atkinson, T. Robinson, S. Kirkman, L. Hutchings, R. Leslie, S. Lamberth, S. Kerwath, S. von der Heyden, A. Lombard, C. Attwood, G. Branch, T. Fairweather, S. Taljaard, S. Weerts, P. Cowley, A. Awad, B Halpern, H. Grantham, & T. Wolf, 2012. National Biodiversity Assessment 2011: Technical Report, Volume 4: Marine and Coastal Component, South African National Biodiversity Institute, Pretoria, pp.325.

CATEGORY 3: **MANAGEMENT**

Q12 Is there a management system* in place for the fishery under assessment?

**A management system may be anything ranging from fully regulated to completely voluntary and/or small scale.*

X	YES - A management system is in place	→ Proceed to Q13
	NO - A management system is not in place OR a management system is in place, but the details are not available	→ Do not continue with other questions in Category 3
	NO - A management system is not in place but there are indications that it would be urgently required	→ Do not continue with other questions in Category 3

Annotations

The shark demersal longline fishery is managed through a total allowable effort (TAE) limitation and permit conditions.

The fishery operates in shallow coastal waters from the Orange River on the West Coast to the Kei River on the East Coast (DAFF 2014, da Silva et al. 2015). Vessels are less than 30 m in length; they set baited and weighted longlines of up to 2 000 hooks (averaging 1 000 hooks), which are deployed at depths of 50 to 100m (da Silva et al. 2015). Fishing permits were first issued in 1991 pursuant to a TAE-management regime and around 30 were allowed each year until 1998. However, it became evident that rights were not being used as fishers switched to more lucrative targets. The TAE was decreased to 23 in 1998 and then to 11 in 2004 and finally 6 in 2008 which has remained unchanged since then (DAFF 2014, Da Silva et al. 2015). There is no formal scientific working group for sharks and it forms a part of the linefish working group (LSWG). Given the mobility of sharks, the diverse number of fisheries that impact the animals, and the shared life history characteristics as a group, it would substantially aid management of chondrichthyans for there to be a combined scientific and management working group solely focused on the management of chondrichthyans.

Shark species are subject to fishing pressure from a number of different fishing sectors including the linefish, recreational and subsistence sectors. A number of shark species are also caught in large quantities within the hake demersal trawl sector (DAFF 2014, da Silva et al. 2015). In respect to sharks, management is considered to be partly effective. Poor compliance within the non-commercial sectors and the lack of regulation for shark bycatch is a cause for concern. Although, management plans and actions are in development to address some of these concerns largely as a result of the National Plan of Action for sharks (DAFF 2013).

In 2013, the National Plan of Action for sharks (NPOA- sharks) was implemented in response to global concerns regarding declines in shark populations worldwide. South Africa contains nearly 15% of the world's shark species of which 27.1% are endemic to the region (DAFF 2013). It was therefore critical that an NPOA be established that promoted the recovery and sustainable management of shark resources (DAFF 2013). The NPOA-sharks highlighted key information regarding the status of chondrichthyans as well as information regarding research, monitoring, management and enforcement (DAFF 2013). The NPOA-sharks also highlighted and prioritized issues with the available information that needed to be addressed with specific actions, associated responsibilities and time frames in order to achieve effect conservation and management of all shark species (DAFF 2013). However, it appears that since its establishment, very little has been done to meet many of the requirements set out in the NPOA – sharks (pers. comm. C. da Saliva). A

co-ordinated implementation across all management platforms is required in order for this to work effectively.

In terms of the permit conditions (DAFF 2014a), other requirements include:

- Gear limitation: The use of stainless steel hooks is prohibited.
- All vessels must have a Vessel Monitoring System (VMS) on board.
- Area limitation: No fishing may take place east of a line drawn south of East London Harbour (27˚55' E).
- There is a combined bycatch limit of 2% for hake and kingklip.

References

DAFF. 2013. National Plan of Action for the conservation and Management of Sharks (NPOA – Sharks). Department of Agriculture, Forestry and Fisheries (DAFF). Cape Town.

DAFF. 2014a. See main references.

DAFF. 2014. See main references.

da Silva et al. 2015. See main references.

Q13 Are the established management measures for the fishery under assessment effective in maintaining the integrity of the habitat and ecosystem AND in maintaining the long-term productivity of all impacted species?

Procedure: Highlight the appropriate box for each issue. ***The points don´t go directly in the total assessment score****, but they are aggregated in the* ***"score" section*** *below.*

ISSUE	1. Relevance		2. Effectiveness				
	Is this issue relevant to the fishery under assessment?						
(Q no. relates to question above)	**No** *[Do not continue in this row]*	**Yes** *[Proceed to column 2]*	Fully effective	Largely effective	Partly effective	Marginally effective OR effectiveness unknown	Not effective
ETP species* *(Q7)*		**X**	100	75		25	0
Discard (*Q8)*		**X**	100	75	50	25	0
Retained bycatch *(Q9)*		**X**	100	75	50	25	0
Ecosystem effect** *(Q10)*		**X**	100	75	50	25	0
Habitat effect*** (*Q11)*		**X**	100	75	50	25	0
Monitoring/data availability****		**X**	100	75	50	25	0
Mixed fishery		**X**	100	75	50	25	0
IUU, misreporting		**X**	100	75	50	25	0
Compliance, enforcement		**X**	100	75	50	25	0
Transparency, participation		**X**	100	75	50	25	0
Others (*please specify*)			100	75	50	25	0

* *Endangered, threatened or protected OR overfished OR biologically highly vulnerable species*
** *Ecosystem effect: refer to definition given in Q10*
*** *Habitat effect = Impact on habitat and habitat forming animals, e.g. corals*
**** *Issue must be rated mandatorily*

SCORE: *Notes to Assessor: Determine the score by calculating the arithmetic mean (i.e. add the points from above and divide the sum by the number of relevant issues chosen. [Example: 4 issues chosen with 75+75+75+25=250 points. 250/4=62,5 Insert the result in the respective box below.*

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	SCORE 90-100: Management is effective
	SCORE 65-89: Management is largely effective
X	SCORE 40-64: Management is partly effective
	SCORE 15-39: Management is marginally effective OR there is insufficient information to a assess effectiveness
	SCORE 0-14: Management is not effective

Annotations

Final score is 475/10 =47.5. Management is considered to be partly effective. The direct targeting of vulnerable species and the uncertainties due to limited scientific data being available are causes for concern.

ETP (Endangered, Threatened and Protected Species):

- This fishery catches species that are listed as Vulnerable on the IUCN red list.
- Permit conditions stipulate that species such as bull sharks (*Carcharhinus leucas*), oceanic white tips (*Carcharhinus longimanus*) and sharks within the genus *Poroderma* or *Haploblepharus* may not be caught or used as bait.
- Turtle, seabird and linefish bycatch is a potential problem but is poorly understood due to the lack of an observer programme.
- There are permit conditions that should assist in reducing interactions with seabirds, but it is unknown how effective they are. The conditions are as follows:
    - Discarding of offal may only take place on the opposite of the vessel from where the lines are hauled and no dumping may take place during setting.
    - All sea birds and turtles caught must be released and hooks must be removed if possible.
    - Hooklines are required to sink beyond the reach of the birds as soon as possible after being placed in the water.
    - Vessel using autoline systems should add weights to hook or use an integrated weight hooklines (minimum 50g/m or attachment to non-IW longlines of 5kg weights at 50 - 60m intervals) when deploying the longlines.
    - Vessels using the Spanish longline method should release weights before tension. Weights of 8.5 kg spaced at intervals of 40 m or weights of 6kg spaced at 20 m are recommended.
    - All vessels are required to use bird scaring lines (tori lines)
    - The use of stainless steel hooks is prohibited.

Discards

- There is presently no reported data on discards from this fishery, which is a cause for concern. As noted elsewhere, there is presently no observer programme covering this fishery.

Retained bycatch

- The amount of bycatch is unknown due to the absence of an observer programme.
- Based on catch records only, several non –target species of sharks are also caught.
- Several endangered, threatened or vulnerable shark species are caught in the longlines which could have a significant effect on the population. There is a bycatch limit of 2% for hake and kingklip.

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Ecosystem Effects:

- The effect of the fishery on ecosystem is poorly understood.
- The fishery is not allowed to fish east of East London where the continental shelf is narrower and biodiversity is higher.

Habitat Effects:

- Damage to the surrounding benthic environment is minimal.
- Some localised damage may occur during the laying of the lines.
- More information is needed regarding the footprint of the fishery.

Monitoring/data availability:

- There is currently no observer programme in place for this fishery.
- There have not been any fishery-independent shark surveys undertaken since 2011.
- There is a paucity of data on life-history characteristics, movements and migrations, and key habitats for most South African sharks (DAFF 2014).
- All commercial vessels must have a Vessel Monitoring System (VMS) (DAFF 2014a).
- All catches must be recorded in a log book and all landings are monitored at the specified landing sites. In addition, the processing factory to which the catch is going to must also be listed.

Mixed Fishery:

- The permit conditions allow for the landing of multiple species for commercial sale. There are not, however, catch limits per species due to use of a TAE. There is not a good understanding, however, of whether the current fishing pressure is appropriate for some of these species.
- Stock assessments or other methods of monitoring trends of the species routinely landed are required to inform management of the fishery.

Illegal, Unreported and Unregulated (IUU) Fishing/Misreporting:

- All commercial vessels must have a Vessel Monitoring System (VMS) (DAFF, 2014).
- All catches must be recorded in a log book and all catches have to be declared and signed off on landing at the specified landing sites. In addition, the processing factory to which the catch is going to must also be listed.

Compliance and enforcement:

- All landings are monitored.
- Additional efforts in regards to compliance and enforcement are not well known.

Transparency and participation:

- There is no specific scientific working group for the demersal longline shark fishery; therefore, scientific recommendations regarding the management of the fishery fall under the Linefish Scientific Working Group, which meets infrequently.
- The permit conditions require clarification. The smooth hammerhead shark (*Sphyrna zygaena*) is identified as a species that cannot be targeted but that may be landed (Section 4.1.3). However, in Section 5.3, it states that oceanic sharks (including hammerheads) may not be caught or used as bait. These paragraphs are in contradiction and, thus, provide no guidance to fishers on whether these animals may be landed or not.

References

DAFF. 2013. See main references.
DAFF. 2014a. See main references.
DAFF. 2014. See main references
da Silva et al. 2015. See main references.

Q14 Is there an ecosystem-based management (EBM)* plan or approach in place?

** For the definition of EBM, please refer to the Guidance document.*

	YES - An EBM is implemented effectively
X	YES - An EBM is currently at the **state of implementation** OR singular measures aiming specifically at the integrity of the ecosystem are in place and effective
	NO - Steps have not been taken to implement an EBM

Annotations

Some steps have been taken towards implementing an EBM system.

South Africa has committed to implementing an Ecosystem Approach to Fisheries (EAF) management through the World Summit on Sustainable Development (WSSD) implementation plan (United Nations, 2002). DAFF had created a working group specifically dedicated to addressing EAF issues across the various commercial fishing sectors (*see* DAFF, 2013). This working group was recently disbanded, however. Although EAF issues are no longer addressed in a centralised forum, the scientific working groups responsible for given fisheries (e.g. Linefish Scientific Working Group) are charged with addressing EAF issues in the course of their sector-specific work. There have been ERAs conducted historically but there is not a formal DAFF programme (i.e. a holistic approach) at present to implement EAF activities recommended by the ERA. There are singular measures being implemented by DAFF in certain fisheries.

There is no dedicated working group (scientific or management) for the shark demersal longline fishery and it is therefore managed by the linefish working groups. As a result no formal ERA has been conducted for this fishery and little else has been done to move towards an EAF system. In 2013, the National Plan of Action (NPOA) for sharks was finalized which highlighted the need to effectively manage sharks across all fisheries. As noted above in response to Q12, there are concerns that the actions DAFF committed to undertaking in the NPOA have only partially been met and that greater efforts are required.

In August 2015, an EAF workshop was jointly held by the University of Cape Town's Marine Research Institute (MaRe), the Responsible Fisheries Alliance (RFA) and the WWF-SA. In that workshop, principal South African stakeholders discussed the state of EAF implementation in South Africa and the following key issues: bycatch, top predator interactions, spatial management (ecosystem & climate), benthic habitats & marine mining, and small scale fisheries. The stakeholders identified a handful of priority actions to pursue in the next 2 to 5 years to advance EAF management in South Africa.

References

DAFF. 2013. National Plan of Action for the Conservation and Management of Sharks (NPOA – Sharks). Department of Agriculture, Forestry and Fisheries, pp. 67.
Petersen, S.L., Kerwath, S., Paterson, B. & Okes, N. 2010. Ecological Risk Assessment for the South African Linefishery, in S. Petersen, B. Paterson, J. Basson, N. Moroff, J-P. Roux, J. Augustyn,

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and G. D'Ameida (eds.) Tracking the implementation of an Ecosystem Approach to Fisheries in Southern Africa, WWF South Africa Report Series – 2010/Marine/001.

United Nations (UN). 2002. Report of the World Summit on Sustainable Development: Johannesburg, South Africa, 26 August – 4 September 2002", A/CONF.199/20, retrieved from http://www.johannesburgsummit.org/html/documents/documents.html

FISHERY IMPROVEMENT MEASURES

The following questions do not count to the overall scoring. Data are needed for informational purposes only.

FIP

Is the fishery under assessment taking part in a Fishery Improvement Program (FIP)?

	YES - The fishery/a part of the fishery is taking part in a FIP	Indicate share of the fishery in FIP (e.g. as percentage or number of vessels)
X	NO - The fishery is not taking part in a FIP	

Annotations

The fishery is not taking part in a FIP.

References

MSC

Is the fishery under assessment applying for MSC certification?

	YES - The fishery/a part of the fishery is MSC certified	Indicate landings of the certified fishery as percentage of the total landings in the UoA
	The fishery/a part of the fishery is in the full assessment process for MSC certification	
X	NO - Efforts to apply for MSC-certification have not been taken OR a pre-assessment has been undertaken, but no further steps have been taken	

Annotations

This fishery has not taken steps to apply for Marine Stewardship Council (MSC) certification.

References

MSC: http://www.msc.org

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