Expert Scientific Advice to Inform the CITES Non-Detriment Findings for Graceful Sharks (*Carcharhinus amblyrhynchoides*)

Report for the Department of Climate Change, Energy, the Environment and Water

Authors: Colin Simpfendorfer and Cassandra Rigby

Table of Contents

Purpose of this document

This document provides expert scientific advice to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) – acting as Australia's CITES Scientific Authority – to form the basis for making a Non-Detriment finding (NDF) that the export will not be detrimental to, or contribute to trade which is detrimental to, the survival or recovery of this species. This expert scientific advice was developed using the CITES electronic Non-Detriment finding (e-NDF) tool for sharks and rays.

This document is not an NDF. Any conclusions reached or recommendations made in this document will be considered by DCCEEW when the associated NDF is made. However, the final conclusions and recommendations included in the associated NDF may differ from the recommendations included in this document based on further review of relevant information.

Step 1: Preliminary Considerations

a) CITES Party	Australia
b) Management Authority (name, address, contact details)	Department of Climate Change, Energy, the Environment and Water Wildlife Trade Regulation Section John Gorton Building King Edward Terrace Parkes, ACT 2600 Australia wildlife.communications@dcceew.gov.au
c) Scientific Authority (name, address, contact details)	Department of Climate Change, Energy, the Environment and Water Sustainable Fisheries Section John Gorton Building King Edward Terrace Parkes, ACT 2600 Australia sustainablefisheries@dcceew.gov.au

1.1a) Is the specimen subject to CITES controls?

a) Species	*Carcharhinus amblyrhynchoides* (Graceful Shark)
b) Will species be exported?	Yes
Comments/ Source(s) of information	This species is occasionally caught and retained by fishers in northern Australia, especially in inshore gillnet fisheries operating in Queensland, the Northern Territory, and Western Australia
c) In what form is the product?	Mixed
Comments/ Source(s) of information	Fins and meat (Simpfendorfer et al. 2021). The majority of product exported is likely to be fins with meat likely to be rarely exported.
d) Is the fishery domestic or high seas, or both?	Domestic
Is the fishery artisanal, large scale, or both?	Large scale
Comments/ Source(s) of information	The Graceful Shark is caught incidentally in commercial fisheries in northern Australia, particularly in inshore gillnet and longline fisheries targeting finfish, and trawl fisheries targeting prawns, and is retained as a byproduct in some fisheries (Kyne et al. 2021).
f) Source of identification	Identified by expert immediately prior to export (morphology, DNA)
Comments/ Source(s) of information	The species will likely be identified when landed with fins attached, but if fins or meat are exported, the level of identification of the exported product may vary among state, Northern Territory, and Commonwealth jurisdictions.
How likely is the product to be correctly identified:	Likely
Question 1.1(a): Is the specimen subject to CITES controls?	Yes

.1b) From which stock will the specimen be taken/was the specimen taken?

a) Ocean Basin	Pacific and Indian Oceans
Comments/ Source(s) of information	The species occurs in northern Australian waters that include both the Pacific and Indian Ocean basins.
b) Is this a shared stock (i.e. occurring in more than one EEZ and/or the high seas)?	No
Comments/ Source(s) of information	Nothing is known of its population structure. Movement information from mark-recapture indicates that Graceful Shark mostly remains within a 10–100 km range (Stevens et al. 2000, https://rossdwyer.shinyapps.io/sharkray_mpa/). Thus, movement is not of sufficient scale to warrant consideration of regional threats or fishing mortality outside Australian waters and thus, for the purposes of this NDF, it is not considered a shared stock.
c) If the stock occurs in more than one EEZ, which other Parties share this stock? (If unknown, type "Unknown")	The species occurs in multiple countries from Somalia to Papua New Guinea but the stock in Australia is not considered shared in terms of shared fishing mortality and threat impacts.
Comments/ Source(s) of information	Stevens et al. 2000, https://rossdwyer.shinyapps.io/sharkray_mpa/
d) If a high seas stock, which other Parties fish this stock? (If unknown, type "Unknown")	Not applicable as this is a coastal species
Comments/ Source(s) of information	The species occurs in continental shelf waters throughout its range at depths of 0–75 m (Weigmann 2016, Ebert et al. 2021).
e) Which, if any, RFB(s) cover(s) the range of this stock? (If unknown, type "Unknown")	Not applicable
Comments/ Source(s) of information	The species occurs in continental shelf waters and appears to have relatively limited movement and thus, is not highly migratory and not managed under the remit of the Western and Central Pacific Fisheries Commission (WCPFC) or the Indian Ocean Tuna Commission (IOTC).
f) Are all Parties listed above (which fish or share the stock concerned) members of the relevant RFB(s)?	Not applicable
Source(s) of information	

g) Are there geographical management gaps? If so, list in comments	No
Source(s) of information	All Australia commercial fisheries that interact with these species are regulated by management plans implemented by state, territory, or commonwealth governments.
h) How reliable is the information on origin?	Somewhat reliable
Comments/ Source(s) of information	With all fisheries managed, with limited entry provisions, and the requirement for most fisheries to report catches and provide catch disposal records the information on origin is somewhat reliable. However, there is no traceability system used to track products back to their origin.
Question 1.1(b): Can origin and stock be *confidently* identified?	Yes

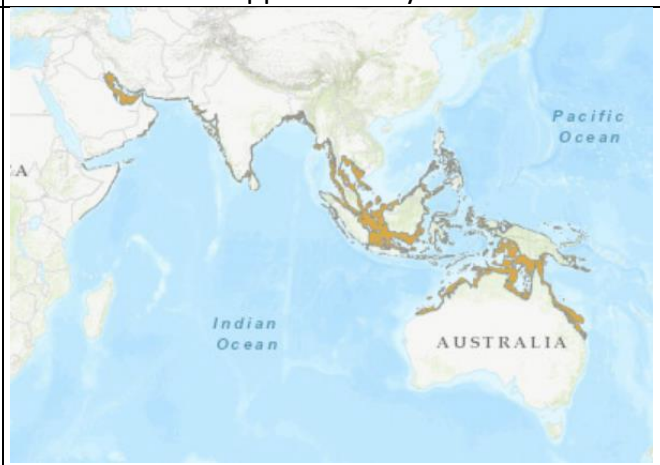
1.2) Was (will) the specimen (be) legally obtained and is export allowed?

a) Strictly protected under wildlife legislation, a regional biodiversity Agreement, or (for a CMS Party) listed in CMS Appendix I?	No
Comments/ Source(s) of information	There are currently no strict protections of this species in Australian waters.
b) Sourced from illegal fishing activities (e.g. in contravention of finning regulations, or where a TAC is zero or exceeded)?	No
Comments/ Source(s) of information	There is some IUU fishing in northern Australia, mostly from Indonesian vessels. However, it is currently believed that this effort is currently low given significant border controls that are currently in place. Illegal fishing by Australian operators is believed to be low, and many fishers are required to operate Vessel Monitoring Systems to monitor movements and ensure fishing only occurs in areas permitted.
c) Taken from a no-take marine protected area or during a closed season?	No
Comments/ Source(s) of information	No-take marine protected areas in Australia are well enforced, including by on-water and aerial patrols.
d) Taken in contravention of RFB recommendations, if any?	No
Comments/ Source(s) of information	
e) Listed as a species whose export is prohibited?	No
Comments/ Source(s) of information	There is no national prohibition on the export of these species. However, export of product is permitted only from fisheries that have a Wildlife Trade Operation (WTO) approval issued by the Minister for the Environment and Water or their delegate. At present, several fisheries that take Graceful Shark in northern Australia do not have WTO approval, including the Queensland East Coast Inshore Fishery and the Gulf of Carpentaria Inshore Fishery, and the Western Australian North Coast Shark Fishery. Some of these fisheries continue to operate to provide product to the domestic market, but legally cannot export product.

f) Of concern for any other reason?	No
Comments/ Source(s) of information	
Question 1.2: Were specimens legally obtained?	Yes

1.3) What does the available management information tell us?

1.3a) Global information

a) Reported global catch	No global catch data of this species is reported to FAO.
Comments/ Source(s) of information	FAO Capture Production database: https://www.fao.org/fishery/statistics-query/en/capture/capture_quantity.
b) Species distribution	The Graceful Shark occurs across the Indo-Pacific Ocean from Somalia to Papua New Guinea. In Australia, it occurs across northern waters from Townsville (Queensland) to Eighty Mile Beach (Western Australia) (Last and Stevens 2009, Simpfendorfer et al. 2021, Kyne et al. 2021). The first map from the Red List assessment (Simpfendorfer et al. 2021) outlines the global range while the second range map from the Action Plan for Australian Sharks and Rays 2021 more accurately depicts the Australian range. On the Australian east coast, Townsville is the southernmost occurrence though records south of approximately Princess Charlotte Bay are rare (C. Simpfendorfer pers. comm. 2023).
	 Source: Red List assessment (Simpfendorfer et al. 2021)

	 Source: The Action Plan for Australian Sharks and Rays 2021 (Kyne et al. 2021)
Comments/ Source(s) of information	Last and Stevens 2009, Simpfendorfer et al. 2021, Kyne et al. 2021
c) Known stocks/populations	There is no information on population or stock structure for this species. Movement information from mark-recapture indicates that it mostly remains within a 10–100 km range (Stevens et al. 2000, https://rossdwyer.shinyapps.io/sharkray_mpa/).
Comments/ Source(s) of information	Stevens et al. 2000, https://rossdwyer.shinyapps.io/sharkray_mpa/
d) Main catching countries	This species is caught in most countries throughout it range, though records are sparse (Simpfendorfer et al. 2021). This species is often confused with the Blacktip Shark (*C. limbatus*), and the Australian Blacktip Shark (*C. tilstoni*) with which it is genetically and morphologically similar (Morgan et al. 2011) and it has also been mistaken for the Pigeye Shark (*C. amboinensis*) (Tillett et al. 2012). These identification issues lead to difficulties in accurate catch records and also may partly explain why the Graceful Shark is rarely reported (Simpfendorfer et al. 2021). It has been reported as caught in low numbers across the Arabian Seas Region (Moore et al. 2012, Jabado et al. 2015, Simpfendorfer et al. 2021). India reported higher catches of ~110 t in 2003–2004 (Raje et al. 2007), with no species-specific catch data available from elsewhere outside of Australia (Simpfendorfer et al. 2021).

Comments/ Source(s) of information	Raje et al. 2007, Moore et al. 2012, Jabado et al. 2015, Simpfendorfer et al. 2021
e) Main gear types by which the species is taken	In Australia, the species is targeted and caught incidentally by gillnet and longline fisheries (Simpfendorfer and Rigby 2023). There are very occasional trawl catches but these are negligible.
Comments/ Source(s) of information	Simpfendorfer and Rigby 2023
f) Global conservation status	IUCN Red List global status: Vulnerable. Assessed in 2020.
Comments/ Source(s) of information	Simpfendorfer et al. 2021.
g) Multilateral environmental agreements	The species was adopted for listing on CITES Appendix II on 25 November 2022 with a 12-month delay and thus the listing enters into force on 25 November 2023 (https://cites.org/eng/notif/index; No. 2023/005). Two range Parties have a CITES Reservation for the Carcharhinidae (which includes the Graceful Shark). The species is not listed on any other multilateral environmental agreements.
Comments/ Source(s) of information	https://cites.org/eng/notif/index; https://www.cms.int/sharks/en/species.

1.3b) Stock/context-specific information

a) Stock assessments	No formal stock assessment. In Australian waters, a national Red List assessment lists the species as Least Concern as it is caught in small numbers and has significant areas of refuge (Kyne et al. 2021). The Australian Shark Report Card lists the species as Sustainable based on low catches and well managed fisheries (Simpfendorfer and Rigby 2023). Ecological risk assessments (ERA) of the Queensland East Coast (ECIF) Inshore Fishery (Large Mesh Net sector) and Queensland Gulf of Carpentaria (GoCIF) Inshore Fishery both assessed Graceful Shark as Moderate-Precautionary High Risk (Pidd et al. 2021, Walton et al. 2021). However, all 'Blacktip Sharks' were aggregated (that is, *C. tilstoni, C. limbatus*, *C. sorrah* and Graceful Shark) and of the non-teleost catch, were one of the largest proportional catch of the ECIF Large Mesh Net sector and the largest proportional catch of the GoCIF; the first two species accounted for a high proportion of the 'Blacktip Shark' catch and *C. amblyrhynchoide*s a minor proportion (Pidd et al. 2021, Walton et al. 2021). In addition, on the east coast, *C. amblyrhynchoide*s has a more northerly range than *C. tilstoni* and *C. limbatus* where gillnet effort tends to be lower (Pidd et al. 2021). In the ECIF, the combined catch of *C. tilstoni and C. amblyrhynchoide*s was below the conservative MSY limit, and thus the Precautionary High Risk likely overestimates the risk for *C. amblyrhynchoide*s (Pidd et al. 2021). Finally, many of the attributes for *C. amblyrhynchoide*s were unknown and thus, given a precautionary high risk rating in both ERAs. The species was not included in an ERA for the Northern Territory Offshore Net and Line Fishery.
Comments/ Source(s) of information	Kyne et al. 2021, Pidd et al. 2021, Walton et al. 2021, Simpfendorfer and Rigby 2023
b) Main management bodies	In Australian waters: Queensland: Department of Agriculture and Fisheries Northern Territory: Department of Industry, Tourism and Trade (Fisheries Division) Western Australia: Department of Primary Industries and Regional Development Commonwealth: Australian Fisheries Management Authority No gaps in management in Australia.
Comments/ Source(s) of information	
c) Cooperative management arrangements	Not applicable - no shared stocks.
Comments/ Source(s) of information	
d) Non-membership of RFBs	Not Applicable

Comments/ Source(s) of information	
e) Nature of harvest	In Australia, the species is targeted and caught incidentally in gillnet and longline fisheries with very occasional and negligible incidental trawl fishery catch. Fishing effort varies across the Australian fisheries in which they are caught, with the highest effort in the Queensland East Coast and Gulf of Carpentaria Inshore Fisheries and the Northern Territory Offshore Net and Line Fishery.
Comments/ Source(s) of information	Pidd et al. 2021, Walton et al. 2021, https://nt.gov.au/marine/commercial-fishing.
f) Fishery types	In Australia, the Graceful Shark was previously caught in limited numbers in the Taiwanese surface gillnet fishery that targeted sharks in northern Australia from 1974–1986 (Stevens and McLoughlin 1991, Harry et al. 2011). It is currently caught and retained as both target and byproduct in the Queensland East Coast (ECIF) Inshore Fishery and possibly also in the Gulf of Carpentaria (GoCIF) Inshore Fishery (Harry et al. 2011, Pidd et al. 2021, Walton et al. 2021). The ECIF uses net (gillnet (large and small mesh), seine net, tunnel nets, cast nets) and hook and line gear to target finfish and sharks while the GoCIF uses solely gillnet to target finfish and sharks (Department of Agriculture and Fisheries 2019). It has not been reported from the Queensland East Coast Trawl Fishery and it may be caught very occasionally by trawl gear targeting prawns in the Commonwealth Northern Prawn Fishery species as it was reported as a discard in one assessment of this fishery (Griffiths et al. 2007) but has not been reported in other NPF bycatch studies and ERAs (Stobutzki et al. 2000, Zhou and Griffiths 2008). The species is caught in the Northern Territory (NT) Offshore Net and Line Fishery that uses pelagic gillnets and demersal and pelagic longlines to target Grey Mackerel and shark (mainly *C. tilstoni* and *C. limbatus*) with other sharks, including Graceful Shark, retained as byproduct (NT Government 2020). It is also likely caught in the NT Barramundi Fishery that uses gillnets to target barramundi and king threadfin salmon. The Graceful Shark is incidentally caught in the Kimberley Gillnet and Barramundi Managed Fishery (KGBMF) that uses gillnets in the rivers and tidal creeks of the Kimberley region to target barramundi and threadfin salmon (McAuley et al. 2005). Across most of the species range, fishing effort is limited and the species would receive considerable refuge from fishing; for example, more than 90% of the area within the 200 m isobath in Western Australian northern waters may have never been trawled due to a combination of spatial trawl closures and marine parks, and considerable areas of the Northern Territory are closed to trawling (Gaughan and Santoro 2021, Kyne et al. 2021).

Comments/ Source(s) of information	Stevens and McLoughlin 1991, Stobutzki et al. 2000, McAuley et al. 2005, Griffiths et al. 2007, Zhou and Griffiths 2008, Harry et al. 2011, Gaughan and Santoro 2021, Kyne et al. 2021, NT Government 2020, Pidd et al. 2021, Walton et al. 2021
g) Management units	In Australian waters: Queensland: Department of Agriculture and Fisheries Northern Territory: Department of Industry, Tourism and Trade (Fisheries Division) Western Australia: Department of Primary Industries and Regional Development New South Wales: Department of Primary Industries Commonwealth: Australian Fisheries Management Authority No gaps in management in Australia.
Comments/ Source(s) of information	
h) Products in trade	The species is not commonly in trade from Australia, in part because it is infrequently caught and may not be retained in some fisheries that catch it. The species accounted for 0.08% of fins sampled from Hong Kong and was not observed from mainland China's main fin hub (Cardeñosa et al. 2020). It may also be included in the Blacktip Shark complex which accounted for 4.1–4.7% and 2.2% of the Hong Kong and China market, respectively (Fields et al. 2018, Cardeñosa et al. 2020). Meat is likely to be less commonly exported than fins. Fins retained in fisheries that have Wildlife Trade Operation approval in place are likely to be exported.
Comments/ Source(s) of information	Fields et al. 2018, Cardeñosa et al. 2020

1.3c) Data and data sharing

a) Reported national catch(es)	In Australia, commercial Graceful Shark catch levels are difficult to ascertain due to its similarities to *C. limbatus*, *C. tilstoni,* and *C. amboinensis* (Morgan et al. 2011, Tillett et al. 2012). However, there are some fishery estimates available in addition to observer and fishery independent surveys. Across the Australian range, catches of this species are low with rare catches on the east coast and low but more frequent catches in the Northern Territory and Western Australia. Total catch in Australia was estimated as 9.7 tonne whole live weight of Graceful Shark in 2017–2018 with a total fin weight of 290 kg; this was extrapolated from estimates of fin values (Section 1.3cd) and thus is a rough estimate of catches. The Graceful Shark is a small component of the Queensland East Coast Inshore Fishery (ECIF) where it comprises 0.3% of the elasmobranch catch by number (Harry et al. 2011). Estimates of catch of this species are confounded by the inclusion of this species within the 'Blacktip Shark' complex (see 1.3ba) but have been estimated in the Large Mesh Net sector of the ECIF as a historical average (20 years) of 5.9 t (0–11.4 t) with catch from 2017–2019 estimated at 12.5 t total and an average of 6.2 t (Pidd et al. 2021). In the Queensland Gulf of Carpentaria Inshore Fishery (GoCIF), species-specific catch data for *C. amblyrhynchoides* from 2017–2019 was zero catch over that period which may be partly due to the logbook system only being updated in January 2018 to include *C. amblyrhynchoides* (Walton et al. 2021). The updates to logbook systems in both fisheries should improve catch data. Fishery independent gillnet survey data within Port Musgrave, Gulf of Carpentaria found Graceful Shark dominated the *Carcharhinus* spp. catches and occurred in slightly higher proportion to *C. tilstoni/limbatus* (Peverell et al. 2009) which may be due to the surveys occurring in Graceful Shark preferred habitat of inshore mangrove lined waters (Simpfendorfer and Rigby 2023). In the Northern Territory, Graceful Shark previously accounted for 2.7% and 0.6% of gillnet and longline catches, respectively by weight (Lyle and Timms 1984, Lyle and Griffin, 1987). It was estimated to account for 0.1% of the shark catch in gillnet observer surveys from 2001–2002 (Rose et al. 2007). It is currently still a small component of the catch being absent in most catches and when it is present accounting for <1% of the total catch (M. Usher and G. Johnson pers. comm. 2023). This is likely due to the offshore nature of the fishery and the inshore nature of the species.

	In Western Australia, a total reconstructed catch estimate of 25.4 t of Graceful Shark was caught since 1975, with a further estimated 1.6 t from historic Taiwanese catches, minor catches from trawl and line, and the majority from the Kimberley Gillnet and Barramundi Managed Fishery (KGBMF) (Braccini et al. 2021). From 2001–2004 estimated observed catches of *C. amblyrhynchoides* ranged from 3.8–7.1 t annually and it is one of the main elasmobranch species caught (McAuley et al. 2005) and from 1990–2020 catches of this species are estimated to have declined to approximately 0.3 t annually in 2020 (M. Braccini pers. comm. 2023 following the methodology described in Braccini et al. 2021).
Comments/ Source(s) of information	McAuley et al. 2005, Rose et al. 2007, Peverell et al. 2009, Harry et al. 2011, Morgan et al. 2011, Tillett et al. 2012, Braccini et al. 2021, Pidd et al. 2021, Walton et al. 2021, Simpfendorfer and Rigby 2023
b) Are catch and/or trade data available from other States fishing this stock?	Catch of this species in Australian waters is considered to come from stock that is not shared with other nations (see section 1.1b). As such there is no additional information on catches and trade of these stocks. However, this species is captured in fisheries throughout its range, albeit with limited catches and is retained for the fins and meat that may be exported.
Comments/ Source(s) of information	
c) Reported catches by other States	Catch of this species in Australian waters is considered to come from stock that is not shared with other nations (see section 1.1b). As such reported catches from other States are not relevant to this Non-Detriment Finding for the Australian stock of this species. However, the species is captured in fisheries throughout its range, with information on inferred catches of the species across the Indo-West Pacific detailed in the Red List assessment (Simpfendorfer et al. 2021).
Comments/ Source(s) of information	Simpfendorfer et al. 2021
d) Catch trends and values	The low level of catches and taxonomic confusion means there is very little species-specific catch and catch rate trend data outside of Australia. The available catch and trend data for Australia is detailed in section 1.3ca. Outside of Australia, it is suspected the population has undergone a reduction of 30–49% over the past three generation lengths (33 years) based on fishing pressure, moderate productivity, and declines in similar sized carcharhinids (Simpfendorfer et al. 2021). The Blacktip Shark complex (which likely includes Graceful Shark) fins were the most traded shark group in Australia in 2017–2018 (N. Manahan, Atlantis Fisheries Consulting Group, pers. comm. 2022).

Comments/ Source(s) of information	Simpfendorfer et al. 2021
e) Have RFBs and/or other States fishing this stock been consulted during or contributed data during this process?	No, but this NDF will be made public in order to enable other range states to make informed decisions for the management of the species' populations as a whole.
Comments/ Source(s) of information	

Step 2: Biological and conservation concerns

2.1) What is the level of intrinsic biological vulnerability of the species?

a) Median age at maturity	5-15 years
Comments/ Source(s) of information	The age at maturity is estimated as 7 years (S. Kanno, James Cook University, pers. comm. 2023).
b) Median size at maturity	40-200 cm TL
Comments/ Source(s) of information	In Australia, males mature at 108 cm total length (TL) and females mature at approximately 115 cm TL (Stevens and McLoughlin 1991, Last and Stevens 2009).
c) Maximum age/longevity in an unfished population	10-25 years
Comments/ Source(s) of information	The maximum age is estimated as 18 years (S. Kanno, James Cook University, pers. comm. 2023).
d) Maximum size	100-300 cm TL
Comments/ Source(s) of information	In Australia, the maximum observed size is 136 cm total length (TL) for females and 118 cm TL for males which was from the Kimberley region (A. Harry pers. comm. 2023). Previous work had also found a similar maximum size of 135 cm total length from an area from Cape Londonderry (Western Australia) to northeast Gulf of Carpentaria (Queensland) (Stevens and McLoughlin 1991). These Australian maximum sizes are smaller than those reported globally which are 182 cm TL, and possibly 243 cm TL (Ebert et al. 2021).
e) Natural mortality rate (M)	under 0.17
Comments/ Source(s) of information	Mortality is unknown and the best available estimate is from the sister species, the Australian Blacktip Shark, which has an estimated 'M' of 0.09–0.13 (Harry et al. 2019). The Graceful Shark is genetically and morphologically similar to both the Blacktip Shark (*C. limbatus*) and the Australian Blacktip Shark (Morgan et al. 2011, Tillett et al. 2012); however, it is most similar in total length to the Australian Blacktip Shark and thus, where biological proxies are needed, those from the Australian Blacktip Shark are used.
f) Maximum annual pup production (per mature female)	2-15
Comments/ Source(s) of information	Litter size is 1–9 (average 3) pups and reproductive periodicity is annual (Stevens and McLoughlin 1991, Ebert et al. 2021).

g) Intrinsic rate of population increase (r)	0.15-0.35
Comments/ Source(s) of information	The intrinsic rate of population increase is unknown and the best available estimate is from the sister species, the Australian Blacktip Shark, which has a 'r' of 0.17–0.20 year-1 (Harry et al. 2019).
h) Geographic distribution of stock	Ocean basin, unrestricted, limited fragmentation
Comments/ Source(s) of information	The species has a wide and mostly continuous range across its distribution (Ebert et al. 2021).
i) Current stock size relative to historic abundance	over 50% baseline abundance
Comments/ Source(s) of information	In Australian waters, the species is considered to not be overfished (Simpfendorfer and Rigby 2023) and is relatively uncommon in Australia (Kyne et al. 2021). It is assessed as Least Concern in Australia, indicating <20% decline over the past three generation lengths (33 years) due to low catches and significant areas of refuge from fishing pressure (Kyne et al. 2021). Thus, it is most likely that the current stock size of the species is >50% of historic abundance in Australia.
j) Behavioural factors	Some behavioral factors to increase risk to stock
Comments/ Source(s) of information	The species is demersal and pelagic in mid-water from close inshore and is common in mangrove habitats (Simpfendorfer et al. 2021, Simpfendorfer and Rigby 2023). Thus, it is susceptible to capture in inshore gillnets in particular.
k) Trophic level	High
Comments/ Source(s) of information	The trophic level is estimated as 4.2–4.5 (Salini et al. 1992, Cortés 1999).
Overall biological vulnerability:	Medium level of vulnerability

2.2) What is the severity and geographic extent of the conservation concern?
Conservation or stock assessment status:

Has a Fisheries stock assessment been conducted?	Yes
If yes, what is the Fisheries stock assessment status?	The stock is not overfished AND overfishing is not taking place
Comments/ Source(s) of information	Although a formal stock assessment has not been conducted, in Australia, the species has a national assessment aligned to the Status of Australian Fish Stocks process. This assessment is contained within the Report Card on Australian Sharks (Simpfendorfer et al. 2019) and the Report Card on Australian Sharks and Rays (Simpfendorfer and Rigby 2023). The species is assessed through this process as Sustainable, meaning it is not Overfished, and Overfishing is not occurring. These assessments are supported by national Red List assessment that show this species is Least Concern.
Has a National Redlist Assessment been conducted?	Yes
If yes, what is the National Redlist Assessment?	The species, population, or stock has been assessed and is not threatened (LC or equivalent)
Comments/ Source(s) of information	Least Concern (Kyne et al. 2021).
What is the Regional IUCN Redlist Assessment?	The species, population, or stock has been assessed and is moderately threatened (NT, VU or equivalent)
Comments/ Source(s) of information	Vulnerable in United Arab Emirates. Assessed in 2019. https://www.iucnredlist.org/species/40797/68611625.
What is the Global IUCN Redlist Assessment?	The species, population, or stock has been assessed and is moderately threatened (NT, VU or equivalent)
Comments/ Source(s) of information	Vulnerable. Assessed in 2020. https://www.iucnredlist.org/species/40797/68611625.
What are the population trends?	Area of distribution and/or population density is stable or increasing
Comments/ Source(s) of information	The population trend is suspected to be stable in Australia based on catches being low across all fisheries which are well managed and that the species has significant refuge from fishing pressure across areas of its range as fishing pressure is low or absent (Kyne et al. 2021).

What is the geographic extent/scope of conservation concern?	Identified threats affect only one or a few local stocks of the species, but other stocks are not affected
Comments/ Source(s) of information	In Australia, the fishing pressure is limited in many parts of its range and absent in other parts of its range (Kyne et al. 2021, Simpfendorfer and Rigby 2023).
Overall geographic conservation concern:	Low level of concern

Step 3: Pressure on the Species

3.1) What is the severity of trade pressure on the stock of the species concerned?

a (i) Magnitude of legal trade	Low
ii) What is the level of confidence in the answer?	High
Comments/ Source(s) of information	In Australia, this species interacts with mainly low effort fisheries. There are trip limits for some commercial fisheries, and small retention limits for recreational fishers. It makes up only a small proportion of the overall catch in most fisheries (e.g., <1% in the Queensland East Coast Inshore Fishery and Northern Territory fisheries) with the largest catches of approximately 0.3 t annually in Western Australia. As such the magnitude of trade is small.
b (i) Magnitude of illegal trade	Low
ii) What is the level of confidence in the answer?	High
Comments/ Source(s) of information	The species is known to occur in the fin trade in Hong Kong but only in very small volumes (<0.08% of all fin trade species) (Cardeñosa et al. 2020). However, until its CITES listing comes into force November 2023, there is no restriction on the trade of this species and so little evidence of evidence of illegal trade. In Australia, the Australian Fisheries Management Authority has a compliance program that includes: fisheries officers undertaking regular land and sea patrols, and port inspections, and Vessel Monitoring Systems (VMS) on all vessels, all of which lessen the risk of illegal trade. Western Australia and the Northern Territory also conduct at-sea patrols and port inspections, and Western Australia also has aerial surveillance which all contribute to reducing the risk of illegal trade. There is relatively good documentation of domestic and international trade.
Overall trade pressure:	Low
Overall level of confidence:	High

3.2) What is the severity of fishing pressure on the stock of the species concerned?

a (i) Fishing mortality (retained catch)	Low
ii) What is the level of confidence in the answer?	High
Comments/ Source(s) of information	The severity of fishing mortality for the species is low. The species interacts with low effort fisheries. There are trip limits for some commercial gillnet fisheries, and small retention limits for recreational fishers. It makes up only a small proportion of the overall catch in most fisheries (e.g., <1% in the Queensland East Coast Inshore Fishery and Northern Territory fisheries) with the largest catches of approximately 0.3 t annually in Western Australia.
b (i) Discard mortality	Medium
ii) What is the level of confidence in the answer?	Low
Comments/ Source(s) of information	The level of retention across different fisheries is uncertain. Post-capture mortality for *C. amblyrhynchoides* was inferred from other carcharhinids in Western Australian as 61%, 27%, and 67% for gillnets, longline, and trawl respectively (Braccini et al. 2021). If catches increase in the future, research would be beneficial to better understand the levels of discard mortality.
c (i) Size/age/sex selectivity	Medium
ii) What is the level of confidence in the answer?	Medium
Comments/ Source(s) of information	For capture in gillnets, Lemke and Simpfendorfer (2023) provided size selectivity data for the sister species, *C. tilstoni,* that demonstrated a relatively broad selectivity pattern with mesh sizes from 4.5-8 inches capturing mainly juveniles to sub-adults.
d (i) Magnitude of illegal, unreported and unregulated (IUU) fishing	Low
ii) What is the level of confidence in the answer?	High

Comments/ Source(s) of information	Most IUU fishing occurs in northern Australia for sharks and rays, mostly by Indonesian fishers. Marshall (2009) reported that Graceful Sharks made up 0.3% of fins seized from Indonesian vessels caught illegally fishing in Australia from 2006–2009 and no catch of Graceful Sharks by Taiwanese vessels caught illegally fishing in northern Australia in the same period. However, levels of IUU catch since about 2009 have been relatively low. IUU fishing in northern Australia is typically conducted by small-scale fishers from neighboring countries. Marshall's results suggest that they are unlikely to catch significant levels of Graceful Sharks. These fishers target shark, ray, reef fish, and sedentary species such as sea cucumbers. Most of these fishers operate close to Australia's maritime border and recently, these fishers have rarely come near to the Australian mainland (Department of Agriculture 2014). Australia has a National Plan of Action to Prevent, Deter and Eliminate IUU Fishing (https://www.afma.gov.au/fisheries-management/international-fisheries-management/iuu-fishing).
Overall severity of fishing mortality:	Low
Overall level of confidence:	Medium

Step 4: Existing Management Measures

4.1) Are existing management measures appropriately designed and implemented to mitigate pressures affecting the stock?

Pressure - Magnitude of Legal Trade	
Existing management measure	Issuance of CITES permits
Is it a Sub-national/National, or Regional/International measure?	Sub National/National
Is the measure generic, species-specific or both?	Generic
Relevant monitoring, control, and surveillance (MSC) measure(s)	Australia issues CITES permits for all exports of listed species. Permits are used by authorities to monitor exports. However, there is little checking of shark products (mostly fins) that are exported without a permit to ensure compliance with CITES rules.
Overall assessment of compliance regime	Moderate (some relevant compliance measures in place)
Are relevant data collected and analysed to inform management decisions?	Some relevant data are collected AND analysed to inform management
Is management consistent with expert advice?	Consistent
Is the management measure effective at addressing the pressure?	Partially

Pressure - Magnitude of Legal Trade	
Existing management measure	Commonwealth Northern Prawn Fishery - Marine Stewardship Council certification
Is it a Sub-national/National, or Regional/International measure?	Sub National/National
Is the measure generic, species-specific or both?	Generic
Relevant monitoring, control, and surveillance (MSC) measure(s)	Marine Stewardship Council certification issued October 2019 (https://fisheries.msc.org/en/fisheries/australia-northern-prawn/). The Australian Fisheries Management Authority has a compliance program that includes: logbook reporting, Fisheries Officers undertaking regular land and sea patrols, and port inspections, VMS on all NPF vessels, and analytical tools for a risk-based compliance approach (MRAG 2017).
Overall assessment of compliance regime	Good (comprehensive relevant compliance measures in place)
Are relevant data collected and analysed to inform management decisions?	Comprehensive data collected AND analysed to inform management
Is management consistent with expert advice?	Consistent
Is the management measure effective at addressing the pressure?	Yes

Pressure - Magnitude of Legal Trade	
Existing management measure	Wildlife Trade Operation approval
Is it a Sub-national/National, or Regional/International measure?	Sub National/National
Is the measure generic, species-specific or both?	Generic
Relevant monitoring, control, and surveillance (MSC) measure(s)	All Australian fisheries that export CITES-listed species require WTO approval to demonstrate compliance with Ecologically Sustainable Development principles. Fisheries are normally assessed every 3 years, with conditions placed on fisheries where changes or improvements are required. Fisheries that lack WTO approvals do not meet the requirement for issuance of a CITES permit. In some instances, WTO approvals have been revoked or not renewed for fisheries, including those that take Graceful Shark. At present, there is no clear method of compliance to ensure product from fisheries without WTO approval is not exported. Consideration should be given to the need to develop such a method.
Overall assessment of compliance regime	Moderate (some relevant compliance measures in place)
Are relevant data collected and analysed to inform management decisions?	Comprehensive data collected AND analysed to inform management
Is management consistent with expert advice?	Consistent
Is the management measure effective at addressing the pressure?	Partially

Pressure - Magnitude of Illegal Trade	
Existing management measure	Issuance of CITES permits
Is it a Sub-national/National, or Regional/International measure?	Sub National/National
Is the measure generic, species-specific or both?	Generic
Relevant monitoring, control, and surveillance (MSC) measure(s)	CITES Permits to be issued for all CITES listed species exported.
Overall assessment of compliance regime	Moderate (some relevant compliance measures in place)
Are relevant data collected and analysed to inform management decisions?	Some relevant data are collected AND analysed to inform management
Is management consistent with expert advice?	Consistent
Is the management measure effective at addressing the pressure?	Partially

Pressure - Magnitude of Illegal Trade	
Existing management measure	Fins naturally attached
Is it a Sub-national/National, or Regional/International measure?	Sub National/National
Is the measure generic, species-specific or both?	Generic
Relevant monitoring, control, and surveillance (MSC) measure(s)	In all fisheries in which Graceful Shark can be retained, there are fins naturally attached rules in place which prohibit the practice of shark finning. All Australian jurisdictions now have fins naturally attached regulations which require trunks to be landed with fins attached. There are some exceptions in place for these rules. In the Northern Territory Offshore Net and Line Fishery a fisher may request a permit to process at sea (fillets and fins). To be granted this permit the fisher must provide 100% observer coverage (human or camera). In Queensland, fins naturally attached applies to all east coast fisheries however, fisheries in the Gulf of Carpentaria are exempt. These rules are enforced by the managing jurisdiction using prior reporting of landings and port inspections of vessels and landings.
Overall assessment of compliance regime	Good (comprehensive relevant compliance measures in place)
Are relevant data collected and analysed to inform management decisions?	Comprehensive data collected AND analysed to inform management
Is management consistent with expert advice?	Consistent
Is the management measure effective at addressing the pressure?	Yes

Pressure - Fishing mortality (retained catch)	
Existing management measure	Bycatch reduction devices mandated in most of the Australian trawl fisheries that interact with this species
Is it a Sub-national/National, or Regional/International measure?	Sub National/National
Is the measure generic, species-specific or both?	Generic
Relevant monitoring, control, and surveillance (MSC) measure(s)	BRDs are inspected by Fisheries Officers that conduct at-sea patrols (which include boardings) and port inspections to ensure compliance with standards.
Overall assessment of compliance regime	Good (comprehensive relevant compliance measures in place)
Are relevant data collected and analysed to inform management decisions?	Some relevant data are collected AND analysed to inform management
Is management consistent with expert advice?	Consistent
Is the management measure effective at addressing the pressure?	Partially

Pressure - Fishing mortality (retained catch)	
Existing management measure	Licensing system of vessels in all Australian fisheries
Is it a Sub-national/National, or Regional/International measure?	Sub National/National
Is the measure generic, species-specific or both?	Generic
Relevant monitoring, control, and surveillance (MSC) measure(s)	Vessel lists maintained and at sea and port inspections by Fisheries Officers.
Overall assessment of compliance regime	Good (comprehensive relevant compliance measures in place)
Are relevant data collected and analysed to inform management decisions?	Comprehensive data collected AND analysed to inform management
Is management consistent with expert advice?	Consistent
Is the management measure effective at addressing the pressure?	Yes

Pressure - Fishing mortality (retained catch)	
Existing management measure	Commonwealth Northern Prawn Fishery seasonal closures
Is it a Sub-national/National, or Regional/International measure?	Sub National/National
Is the measure generic, species-specific or both?	Generic
Relevant monitoring, control, and surveillance (MSC) measure(s)	Strictly enforced by prohibition of vessels fishing outside of designated fishing season. The Australian Fisheries Management Authority has a compliance program that includes: logbook reporting, Fisheries Officers undertaking regular land and sea patrols, and port inspections, VMS on all NPF vessels, and analytical tools for a risk-based compliance approach (MRAG 2017).
Overall assessment of compliance regime	Good (comprehensive relevant compliance measures in place)
Are relevant data collected and analysed to inform management decisions?	Comprehensive data collected AND analysed to inform management
Is management consistent with expert advice?	Consistent
Is the management measure effective at addressing the pressure?	Yes

Pressure - Fishing mortality (retained catch)	
Existing management measure	Western Australia - Permanent area closures - combination spatial trawl closures and marine parks
Is it a Sub-national/National, or Regional/International measure?	Sub National/National
Is the measure generic, species-specific or both?	Generic
Relevant monitoring, control, and surveillance (MSC) measure(s)	Fisheries Officers conduct at-sea patrols (that include boardings) and port inspections.
Overall assessment of compliance regime	Good (comprehensive relevant compliance measures in place)
Are relevant data collected and analysed to inform management decisions?	Comprehensive data collected AND analysed to inform management
Is management consistent with expert advice?	Consistent
Is the management measure effective at addressing the pressure?	Yes

Pressure - Fishing mortality (retained catch)	
Existing management measure	Marine Parks
Is it a Sub-national/National, or Regional/International measure?	Sub National/National
Is the measure generic, species-specific or both?	Generic
Relevant monitoring, control, and surveillance (MSC) measure(s)	There are a number of commonwealth and state/territory managed Marine Protected Areas (MPAs) within the range of this species. This includes no-take areas, and multiple-use marine parks that contain a range of zones from open access to no-take and sanctuary zones. This includes large scale MPAs such as the Great Barrier Reef Marine Park. There are regular patrols, both on-water and aerial to ensure compliance with zoning plans. Some commercial vessels are required to carry a Vessel Monitoring System to monitor fishing locations relative to marine park boundaries. Fisheries Officers conduct at-sea patrols (that include boardings) and port inspections.
Overall assessment of compliance regime	Good (comprehensive relevant compliance measures in place)
Are relevant data collected and analysed to inform management decisions?	Comprehensive data collected AND analysed to inform management
Is management consistent with expert advice?	Consistent
Is the management measure effective at addressing the pressure?	Yes

Pressure - Fishing mortality (retained catch)	
Existing management measure	Gear controls
Is it a Sub-national/National, or Regional/International measure?	Sub National/National
Is the measure generic, species-specific or both?	Generic
Relevant monitoring, control, and surveillance (MSC) measure(s)	All fisheries that encounter this species have gear controls in place that limit the amount of gear, characteristics that control size selectivity (e.g. mesh size, hook size), etc. The controls ensure constraints on overall fishing effort, the size of species caught, etc.
Overall assessment of compliance regime	Good (comprehensive relevant compliance measures in place)
Are relevant data collected and analysed to inform management decisions?	Some relevant data are collected AND analysed to inform management
Is management consistent with expert advice?	Consistent
Is the management measure effective at addressing the pressure?	Yes

Pressure - Fishing mortality (retained catch)	
Existing management measure	Total Allowable Catch in the Northern Territory Offshore Net and Line Fishery
Is it a Sub-national/National, or Regional/International measure?	Sub National/National
Is the measure generic, species-specific or both?	Generic
Relevant monitoring, control, and surveillance (MSC) measure(s)	A current annual Total Allowable Commercial Catch (TACC) of 246 t is set for the "Combined Shark Species" group. The TACC is allocated as catch shares to individual operators in an ITQ system. Catch may only be offloaded at designated ports and with prior notice to enable inspection by enforcement staff. Catch disposal records are required and quota holdings carefully monitored. https://industry.nt.gov.au/_data/assets/pdf_file/0017/620432/mgt-arranagements-offshore-net-line-fishery.pdf
Overall assessment of compliance regime	Good (comprehensive relevant compliance measures in place)
Are relevant data collected and analysed to inform management decisions?	Comprehensive data collected AND analysed to inform management
Is management consistent with expert advice?	Consistent
Is the management measure effective at addressing the pressure?	Yes

Pressure - Fishing mortality (retained catch)	
Existing management measure	Total Allowable Catch for sharks and rays on Queensland East Coast
Is it a Sub-national/National, or Regional/International measure?	Sub National/National
Is the measure generic, species-specific or both?	Both
Relevant monitoring, control, and surveillance (MSC) measure(s)	Total Allowable Commercial Catch (TACC) levels for Sharks and Rays are set for five regions along the Queensland east coast. From north to south these are: 8,924 kg (region 1), 48,276 kg (region 2,) 137,033 kg (region 3), 55,583 kg (region 4), and 150,184 kg (region 5). The total TACC on the east coast is 400 t. This TACC limit includes all *Carcharhinus* species and thus, includes Graceful Shark. Recreational shark catches and discards are not accounted for in the TACC. Fishers are required to report catches, provide catch disposal records, and prior report catches before landing to enable inspection by enforcement staff. The proportion of the TACC caught each year is carefully monitored through the data provided and fishing restricted if it is reached.
Overall assessment of compliance regime	Good (comprehensive relevant compliance measures in place)
Are relevant data collected and analysed to inform management decisions?	Comprehensive data collected AND analysed to inform management
Is management consistent with expert advice?	Consistent
Is the management measure effective at addressing the pressure?	Yes

Pressure - Fishing mortality (retained catch)	
Existing management measure	Catch limits (commercial) in the Queensland Gulf of Carpentaria Inshore Fishery
Is it a Sub-national/National, or Regional/International measure?	Sub National/National
Is the measure generic, species-specific or both?	Generic
Relevant monitoring, control, and surveillance (MSC) measure(s)	There is no Total Allowable Commercial Catch (TACC) for sharks in Gulf of Carpentaria Inshore Fishery, except for hammerhead species. However, a new harvest strategy is in development for the fishery that may include TACCs for sharks. Fisheries are required to report catches, provide catch disposal records, and prior report catches before landing to enable inspection by enforcement staff.
Overall assessment of compliance regime	Moderate (some relevant compliance measures in place)
Are relevant data collected and analysed to inform management decisions?	Comprehensive data collected AND analysed to inform management
Is management consistent with expert advice?	Expert advice partially implemented
Is the management measure effective at addressing the pressure?	Partially

Pressure - Fishing mortality (retained catch)	
Existing management measure	No retention of sharks and rays in otter trawl fisheries
Is it a Sub-national/National, or Regional/International measure?	Sub National/National
Is the measure generic, species-specific or both?	Generic
Relevant monitoring, control, and surveillance (MSC) measure(s)	Most otter trawl fisheries targeting prawns in northern Australia prohibit the retention of sharks and rays ensuring that they are quickly returned to the water. This includes the Commonwealth Northern Prawn Fishery in which the occasional Graceful Shark is caught. On board observers regularly report on compliance with this measure. Inspections of vessels and offloaded catches in ports is used to ensure compliance with these measures.
Overall assessment of compliance regime	Good (comprehensive relevant compliance measures in place)
Are relevant data collected and analysed to inform management decisions?	Comprehensive data collected AND analysed to inform management
Is management consistent with expert advice?	Consistent
Is the management measure effective at addressing the pressure?	Partially

Pressure - Fishing mortality (retained catch)	
Existing management measure	Seasonal closures
Is it a Sub-national/National, or Regional/International measure?	Sub National/National
Is the measure generic, species-specific or both?	Generic
Relevant monitoring, control, and surveillance (MSC) measure(s)	Some fisheries that encounter this species have seasonal closures in place for spawning of teleost species (mostly barramundi, *Lates calcarifer*). These closures last several weeks and are normally implemented during summer periods.
Overall assessment of compliance regime	Good (comprehensive relevant compliance measures in place)
Are relevant data collected and analysed to inform management decisions?	Comprehensive data collected AND analysed to inform management
Is management consistent with expert advice?	Consistent
Is the management measure effective at addressing the pressure?	Partially

Pressure - Fishing mortality (retained catch)	
Existing management measure	No target shark fishing in northern Western Australia
Is it a Sub-national/National, or Regional/International measure?	Sub National/National
Is the measure generic, species-specific or both?	Generic
Relevant monitoring, control, and surveillance (MSC) measure(s)	Currently there are no fisheries that target sharks operating in northern Western Australia where this species occurs. There are provisions for two state and one jointly managed (Western Australia and the Commonwealth) fisheries, but none currently have a Wildlife Trade Operation (WTO) approval, and there has been no effort in these fisheries for many years. If these fisheries were to be revived the suitable conditions on a WTO approval to ensure adequate management of this species would be required.
Overall assessment of compliance regime	Moderate (some relevant compliance measures in place)
Are relevant data collected and analysed to inform management decisions?	Some relevant data are collected AND analysed to inform management
Is management consistent with expert advice?	Consistent
Is the management measure effective at addressing the pressure?	Yes

Pressure - Fishing mortality (retained catch)	
Existing management measure	Recreational possession limit
Is it a Sub-national/National, or Regional/International measure?	Sub National/National
Is the measure generic, species-specific or both?	Generic
Relevant monitoring, control, and surveillance (MSC) measure(s)	In Queensland, the recreational possession limit is a combined limit of 1 shark per person/2 sharks per boat. The size limit is 150 cm max or interdorsal length 60 cm max (https://www.qld.gov.au/recreation/activities/boating-fishing/rec-fishing/rules/limits-tidal#sharks). In the Northern Territory, the recreational possession limit at any one time is three sharks. In Western Australia, recreational fishers in the southern half of the state are limited to three sharks smaller than 700 mm total length. In the northern half of the state the daily bag limit is three sharks with no size limit.
Overall assessment of compliance regime	Moderate (some relevant compliance measures in place)
Are relevant data collected and analysed to inform management decisions?	Some relevant data are collected AND analysed to inform management
Is management consistent with expert advice?	Consistent
Is the management measure effective at addressing the pressure?	Yes

Pressure - Discard mortality	
Existing management measure	Bycatch reduction devices mandated in most of the Australian trawl fisheries that interact with this species
Is it a Sub-national/National, or Regional/International measure?	Sub National/National
Is the measure generic, species-specific or both?	Generic
Relevant monitoring, control, and surveillance (MSC) measure(s)	Bycatch reduction devices (BRDs), especially Turtle Excluder Devices (TEDs), are fitted in the otter trawl fisheries in which this species is caught. There is evidence that TEDs can reduce the catch of larger sharks and rays. It is unknown how effective TEDs are in reducing the catch (and discarding) of this species. BRDs are inspected by Fisheries Officers that conduct at-sea patrols (which include boardings) and port inspections to ensure compliance with standards.
Overall assessment of compliance regime	Good (comprehensive relevant compliance measures in place)
Are relevant data collected and analysed to inform management decisions?	Some relevant data are collected AND analysed to inform management
Is management consistent with expert advice?	Consistent
Is the management measure effective at addressing the pressure?	Partially

Pressure - Discard mortality	
Existing management measure	Commonwealth Northern Prawn Fishery seasonal closures
Is it a Sub-national/National, or Regional/International measure?	Sub National/National
Is the measure generic, species-specific or both?	Generic
Relevant monitoring, control, and surveillance (MSC) measure(s)	Fisheries Officers conduct at-sea patrols (that include boardings) and port inspections.
Overall assessment of compliance regime	Good (comprehensive relevant compliance measures in place)
Are relevant data collected and analysed to inform management decisions?	Comprehensive data collected AND analysed to inform management
Is management consistent with expert advice?	Consistent
Is the management measure effective at addressing the pressure?	Yes

Pressure - Discard mortality	
Existing management measure	Western Australia - Permanent area closures - combination spatial trawl closures and marine parks
Is it a Sub-national/National, or Regional/International measure?	Sub National/National
Is the measure generic, species-specific or both?	Generic
Relevant monitoring, control, and surveillance (MSC) measure(s)	Fisheries Officers conduct at-sea patrols (that include boardings) and port inspections.
Overall assessment of compliance regime	Good (comprehensive relevant compliance measures in place)
Are relevant data collected and analysed to inform management decisions?	Comprehensive data collected AND analysed to inform management
Is management consistent with expert advice?	Consistent
Is the management measure effective at addressing the pressure?	Yes

Pressure - Discard mortality	
Existing management measure	Marine Parks
Is it a Sub-national/National, or Regional/International measure?	Sub National/National
Is the measure generic, species-specific or both?	Generic
Relevant monitoring, control, and surveillance (MSC) measure(s)	There are a number of commonwealth and state/territory managed Marine Protected Areas (MPAs) within the range of this species. This includes no-take areas, and multiple-use marine parks that contain a range of zones from open access to no-take and sanctuary zones. This includes large scale MPAs such as the Great Barrier Reef Marine Park. There are regular patrols, both on-water and aerial to ensure compliance with zoning plans. Some commercial vessels are required to carry a Vessel Monitoring System to monitor fishing locations relative to marine park boundaries.
Overall assessment of compliance regime	Good (comprehensive relevant compliance measures in place)
Are relevant data collected and analysed to inform management decisions?	Comprehensive data collected AND analysed to inform management
Is management consistent with expert advice?	Consistent
Is the management measure effective at addressing the pressure?	Yes

Pressure - Size/age/sex selectivity	
Existing management measure	Bycatch reduction devices mandated in most of the Australian trawl fisheries that interact with this species
Is it a Sub-national/National, or Regional/International measure?	Sub National/National
Is the measure generic, species-specific or both?	Generic
Relevant monitoring, control, and surveillance (MSC) measure(s)	BRDs are inspected by Fisheries Officers that conduct at-sea patrols (which include boardings) and port inspections to ensure compliance with standards.
Overall assessment of compliance regime	Good (comprehensive relevant compliance measures in place)
Are relevant data collected and analysed to inform management decisions?	Some relevant data are collected AND analysed to inform management
Is management consistent with expert advice?	Consistent
Is the management measure effective at addressing the pressure?	Partially

Pressure - Size/age/sex selectivity	
Existing management measure	Gear controls
Is it a Sub-national/National, or Regional/International measure?	Sub National/National
Is the measure generic, species-specific or both?	Generic
Relevant monitoring, control, and surveillance (MSC) measure(s)	All fisheries that encounter this species have gear controls in place that limit the amount of gear, characteristics that control size selectivity (e.g. mesh size, hook size), etc. The controls ensure constraints on overall fishing effort, the size of species caught, and often limits the age classes of individuals taken. There are regular port and at-sea inspections of gear to ensure compliance with regulations.
Overall assessment of compliance regime	Good (comprehensive relevant compliance measures in place)
Are relevant data collected and analysed to inform management decisions?	Some relevant data are collected AND analysed to inform management
Is management consistent with expert advice?	Consistent
Is the management measure effective at addressing the pressure?	Partially

Pressure - Magnitude of IUU fishing	
Existing management measure	Licensing system of vessels in all Australian fisheries
Is it a Sub-national/National, or Regional/International measure?	Sub National/National
Is the measure generic, species-specific or both?	Generic
Relevant monitoring, control, and surveillance (MSC) measure(s)	Vessel lists maintained and at sea and port inspections by Fisheries Officers.
Overall assessment of compliance regime	Good (comprehensive relevant compliance measures in place)
Are relevant data collected and analysed to inform management decisions?	Comprehensive data collected AND analysed to inform management
Is management consistent with expert advice?	Consistent
Is the management measure effective at addressing the pressure?	Yes

Pressure - Magnitude of IUU fishing	
Existing management measure	Fins naturally attached
Is it a Sub-national/National, or Regional/International measure?	Sub National/National
Is the measure generic, species-specific or both?	Generic
Relevant monitoring, control, and surveillance (MSC) measure(s)	In all fisheries in which Graceful Shark can be retained, there are fins naturally attached rules in place which prohibit the practice of shark finning. All Australian jurisdictions now have fins naturally attached regulations which require trunks to be landed with fins attached. There are some exceptions in place for these rules. In the Northern Territory Offshore Net and Line Fishery a fisher may request a permit to process at sea (fillets and fins). To be granted this permit the fisher must provide 100% observer coverage (human or camera). In Queensland, fins naturally attached applies to all east coast fisheries however, fisheries in the Gulf of Carpentaria are exempt. These rules are enforced by the managing jurisdiction using prior reporting of landings and port inspections of vessels and landings.
Overall assessment of compliance regime	Good (comprehensive relevant compliance measures in place)
Are relevant data collected and analysed to inform management decisions?	Some relevant data are collected AND analysed to inform management
Is management consistent with expert advice?	Consistent
Is the management measure effective at addressing the pressure?	Yes

Pressure - Magnitude of IUU fishing	
Existing management measure	Vessel Monitoring System
Is it a Sub-national/National, or Regional/International measure?	Sub National/National
Is the measure generic, species-specific or both?	Generic
Relevant monitoring, control, and surveillance (MSC) measure(s)	Some fisheries that catch this species (e.g. Northern Territory Offshore Net and Line Fishery, Northern Prawn Fishery) are required to use approved Vessel Monitoring Systems (VMS) that informs on the location of fishery operations and ensures no fishing occurs in closed areas, or during closure periods.
Overall assessment of compliance regime	Moderate (some relevant compliance measures in place)
Are relevant data collected and analysed to inform management decisions?	Some relevant data are collected AND analysed to inform management
Is management consistent with expert advice?	Consistent
Is the management measure effective at addressing the pressure?	Partially

Step 5: Non-Detriment Finding and related advice

5.0	Non-Detriment Finding and related advice	
5.1	Based on the outcomes of the previous sections, is it possible to make a positive NDF (with or without associated conditions)?	
	STEP 1: Can/should an NDF be made?	
	Section 1.1(a): Is the specimen subject to CITES controls?	Yes
	Section 1.1(b): Can origin and stock be confidently identified?	Yes
	Section 1.2: Were specimens legally obtained?	Yes
	STEP 2: Intrinsic biological vulnerability and conservation concern	
	Section 2.1: Intrinsic biological vulnerability:	Medium level of vulnerability
	Section 2.2: Conservation concern:	Low level of concern

	STEP 3: Pressure on species			STEP 4: Existing management measures
	Pressure	Level of severity (Questions 3.1 and 3.2)	Level of confidence (Questions 3.1 and 3.2)	Are the management measures effective at addressing the concerns/ pressures/impacts identified?
	Trade pressures:			
a)	Magnitude of legal trade	Low level of risk	High level of confidence	Yes
b)	Magnitude of illegal trade	Low level of risk	High level of confidence	Yes
	Fishing pressures:			
a)	Fishing mortality (retained catch)	Low level of risk	High level of confidence	Yes
b)	Discard mortality	Medium level of risk	Low level of confidence	Yes
c)	Size/age/ sex selectivity	Medium level of risk	Medium level of confidence	Yes
d)	Magnitude of illegal, unreported and unregulated (IUU) fishing	Low level of risk	High level of confidence	Yes

Automated Recommendation: 0 to 2 - Not recommended 2.1 to 5 - Not recommended unless mitigation measures applied 5.1 to 8 - Possible with conditions 8.1 to 10 - Recommended	8.4	Recommended
Based on the above information, can a positive NDF be made?	Yes, without conditions	Go to Section 6 and list recommendations for measures to improve monitoring/management under reasoning/comments below
Enter any reasoning/comments:		
Carcharhinus a*mblyrhynchoides* (Graceful Shark) occurs across tropical Australia and is assessed within Australia as Sustainable through a national assessment aligned to the Status of Australian Fish Stocks process. This assessment is supported by the national Red List assessment that shows this species is Least Concern. The species is targeted and incidentally caught in mainly gillnet fisheries, to a lesser extent in longline fisheries, and with negligible catches in trawl fisheries. The species is caught in low numbers with a suspected stable population, the fisheries in which the species is taken are well managed and low effort, and the species has significant refuge from fishing pressure across parts of it range where there is no fishing. Management measures are effective at mitigating risks to the species in Australian waters. Any export of this species from Australian waters is considered to be non-detrimental to the survival of the species.		
NDF expiry (recommended validity: 1 or 2 years):	5 years	

[1]

[1] This is an automated recommendation based on the information included in the eNDF tool, and is not a binding outcome. The department will consider all of the Scientific Advice provided in this document, however the inclusion of conditions in NDFs, or Wildlife Trade Operation approvals may differ from those suggested in this report.

Step 6: Automated recommendations

6.1) Recommendations ordered based on severity of pressure

Recommendation	Fisheries monitoring (fisheries-dependent data)
Is this recommendation applicable?	Yes
Aims, objectives, implementation, relevant compliance measures, and other notes/comments	The aim is to improve the information on catch levels of this species across Australian fisheries in which it is caught by collecting data on catch at the species level. This is implemented currently in all fisheries using logbooks that fishers are required to complete and provide to management agencies. However, not all fisheries collect this data at species level, and reporting processes that do not collect species-specific data should move to include the ability to record each of these species. The collection of specific-specific data will enable the monitoring of catch levels at a national level and ensure they stay within sustainable bounds. Where catches of the species increase significantly (>20%) over two consecutive years, or >50% over one year, the reasons for the increases and the impact on the species should be investigated and the NDF updated if necessary.
Potential lead agencies	Australian Fisheries Management Authority, the Northern Territory Government, and the Western Australian Department of Primary Industries and Regional Development.
Timeframe	Suggested 1- 5 years
Recommendation	Monitoring of domestic and international trade volumes and characteristics
Is this recommendation applicable?	Yes
Aims, objectives, implementation, relevant compliance measures, and other notes/comments	The domestic and Australian international trade should be monitored for any trade in products (likely fins and meat) from these species using CITES permits and this level compared to catches reported from fisheries.
Potential lead agencies	Australian Fisheries Management Authority, the Northern Territory Government, the Western Australian Department of Primary Industries and Regional Development, the Queensland Department of Agriculture and Fisheries, and Australian CITES Authorities (international trade).
Timeframe	Suggested 1- 5 years

6.2) Additional measures (user defined)

Additional measure	Wildlife Trade Operation approval
Aims, objectives, implementation, relevant compliance measures, and other notes/comments	All Australian fisheries that export CITES-listed species require Wildlife Trade Operation (WTO) approval to demonstrate compliance with Ecologically Sustainable Development principles. Fisheries are normally assessed every 3 years, with conditions placed on fisheries where changes or improvements are required. Fisheries that lack WTO approvals do not meet the requirement for issuance of a CITES permit. At present, there is no clear method of compliance to ensure product from fisheries without WTO approval is not exported. Consideration should be given to the need to develop such a method.
Potential lead agencies	Department of Climate Change, Energy, the Environment and Water.
Timeframe	1-5 years

References

Braccini, M., Kangas, M., Jaiteh, V., and Newman, S. 2021. Quantifying the unreported and unaccounted domestic and foreign commercial catch of sharks and rays in Western Australia. Ambio 50(7), 1337-1350. doi: 10.1007/s13280-020-01495-6

Cardeñosa, D., Fields, A.T., Babcock, E.A., Shea, S.K.H., Feldheim, K.A., and Chapman, D.D. 2020. Species composition of the largest shark fin retail-market in mainland China. *Scientific Reports* 10(1), 12914. doi: 10.1038/s41598-020-69555-1

Cortés, E., 1999. Standardized diet compositions and trophic levels of sharks. *ICES Journal of Marine Science* 56:707–717.

Department of Agriculture and Fisheries 2019. Scoping Study - East Coast Inshore Fin Fish Fishery (ECIFFF). Department of Agriculture and Fisheries, Queensland Government. Brisbane, Australia. http://era.daf.qld.gov.au/id/eprint/6968/.

Department of Agriculture. 2014. *Australia's Second National Plan of Action to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing*. Available at agriculture.gov.au.

Ebert, D.A., Dando, M. and Fowler, S.F. 2021. *Sharks of the World. A complete guide.* Princeton University Press, New Jersey.

Fields, A. T., Fischer, G. A., Shea, S. K. H., Zhang, H., Abercrombie, D. L., Feldheim, K. A., Babcock, E. A., & Chapman, D. D. 2018. Species composition of the international shark fin trade assessed through a retail-market survey in Hong Kong. *Conservation Biology*, 32(2), 376-389. https://doi.org/10.1111/cobi.13043

Gaughan, D.J. and Santoro, K. (eds). 2021. *Status Reports of the Fisheries and Aquatic Resources of Western Australia 2019/20: The State of the Fisheries*. Department of Primary Industries and Regional Development, Western Australia.

Griffiths, S., Kenyon, R., Bulman, C., Dowdney, J., Williams, A., Sporcic, M. and

Fuller, M. 2007. Ecological Risk Assessment for the Effects of Fishing: Report for the

Northern Prawn Fishery. Report for the Australian Fisheries Management Authority, Canberra.

Harry, A. V., Tobin, A. J., Simpfendorfer, C. A., Welch, D. J., Mapleston, A., White, J., Williams, A. J. and Stapley, J. 2011. Evaluating catch and mitigating risk in a multispecies, tropical, inshore shark fishery within the Great Barrier Reef World Heritage Area. Marine and Freshwater Research, 62(6), 710-721. https://doi.org/doi:10.1071/MF10155.

Harry, A.V., Tobin, A.J. and Simpfendorfer, C.A. 2013. Age, growth and reproductive biology of the spot-tail shark, *Carcharhinus sorrah,* and the Australian blacktip shark, *C. tilstoni,* from the Great Barrier Reef World Heritage Area, north-eastern Australia. *Marine and Freshwater Research* 64: 277–293.

Harry, A.V., Butcher, P.A., Macbeth, W.G., Morgan, J.A.T., Taylor, S.M., and Geraghty, P.T. 2019. Life history of the common blacktip shark, *Carcharhinus limbatus*, from central eastern Australia and comparative demography of a cryptic shark complex. *Marine and Freshwater Research* 70(6), 834–848. doi: https://doi.org/10.1071/MF18141

Jabado, R.W., Al Ghais, S.M., Hamza, W., Henderson, A.C., Spaet, J.L.Y., Shivji, M.S. and Hanner, R.H. 2015. The trade in sharks and their products in the United Arab Emirates. *Biological Conservation* 181: 190–198.

Kyne, P. M., Heupel, M. R., White, W. T., and Simpfendorfer, C. A. 2021. *The Action Plan for Australian Sharks and Rays 2021.* National Environmental Sciences Programme Marine Biodiversity Hub.

Last, P.R. and Stevens, J.D. 2009. *Sharks and Rays of Australia. Second Edition*. CSIRO Publishing, Collingwood, Australia.

Lemke, L.R. and Simpfendorfer, C.A. 2023. Gillnet size selectivity of shark and ray species from Queensland, Australia. Fisheries Management and Ecology. https://doi.org/https://doi.org/10.1111/fme.12620

Lyle, J.M. and Griffin, P.J. 1987. Evaluation of the suitability of longlining for shark in northern Australian waters. Northern Territory Department of Primary Industry and Fisheries, Fishery Report.

Lyle, J.M. and Timms, G.J. 1984. North Australia's multispecies shark fishery. Exploratory fishing survey of shark and other pelagic fish resources found in Northern Territory inshore waters. Northern Territory Department of Primary Production, Fishery Report.

McAuley, R., Lenanton, R., Chidlow, J., Allison, R., and Heist, E. 2005. Biology and stock assessment of the thicksin (sandbar) shark, *Carcharhinus plumbeus*, in Western Australia and further refinement of the dusky shark, *Carcharhinus obscurus*, stock assessment. Final FRDC Report-Project 2000/134. Department of Fisheries, Western Australia.

Moore, A.B.M., McCarthy, I.D., Carvalho, G.R. and Peirce, R. 2012. Species, sex, size and male maturity composition of previously unreported elasmobranch landings in Kuwait, Qatar and Abu Dhabi Emirate. *Journal of Fish Biology* 80: 1619–1642.

Morgan, J.A.T., Welch, D.J., Harry, A.V., Street, R., Broderick, D. and Ovenden, J.R. 2011. A mitochondrial species identification assay for Australian blacktip sharks (*Carcharhinus tilstoni*, *C. limbatus* and Graceful Shark) using real-time PCR and high-resolution melt analysis. *Molecular Ecology Resources* 11: 813–819.

MRAG 2017. First MSC Re-assessment. Northern Prawn Fishery. Final Report and Determination. Prepared for NPF Industry Pty Ltd.

NT Government. 2020. Northern Territory Offshore Net and Line Fishery. Ecological Risk Assessment 2020. NT Government. https://nt.gov.au/__data/assets/pdf_file/0011/975584/nt-offshore-net-and-line-fishery-ecological-risk-assessment-2020.pdf

Peverell, S.C., Vickers, M.J., Gribble, N.A. and Seymour, J.E. 2009. Fisheries and aquatic values of Port Musgrave, North Queensland. Queensland Government.

Pidd, A., Jacobsen, I., Walton, L. and Lawson, A. 2021. L*evel 2 Ecological risk assessment. East Coast Inshore Fishery - Large mesh nets target and byproduct species.* Queensland Government.

Raje, S.G., Sivakami, S., Mohanraj, G., Manojkumar, P.P., Raju, A. and Joshi, K.K. 2007. *An atlas on the elasmobranch fishery resources of India.* CMFRI Special Publication 95.

Rose, C., Gribble, N. and Stapley, J. 2007 Northern Australian sharks and rays: the sustainability of target and bycatch fisheries, Phase 1. FRCD Project 2001/077.

Salini, J.P., S.J. Blaber and D.T. Brewer, 1992. Diets of sharks from estuaries and adjacent waters of the north-eastern Gulf of Carpentaria, Australia. Australian Journal of Marine and Freshwater Research 43(1):87–96

Simpfendorfer, C. A., Chin, A., Kyne, P. M., Rigby, C. L., Sherman, C. S., & White, W. T. 2019. A Report Card for Australia's Sharks. https://www.frdc.com.au/project/2013-009.

Simpfendorfer, C.A. and Rigby, C.L. 2023. Developing a stock status report for rays and sharks. The Shark and Ray Report Card. Draft.

Simpfendorfer, C., Bin Ali, A., Bineesh, K.K., Derrick, D., Dharmadi, Fahmi, Fernando, D., Haque, A.B., Krajangdara, T., Maung, A., Seyha, L., Tanay, D., Utzurrum, J.A.T., Vo, V.Q. & Yuneni, R.R. 2021. *Carcharhinus amblyrhynchoides. The IUCN Red List of Threatened Species* 2021: e.T40797A68611625. https://dx.doi.org/10.2305/IUCN.UK.2021-2.RLTS.T40797A68611625.en.

Stevens, J.D. and McLoughlin, K.J. 1991. Distribution, size and sex composition, reproductive biology and diet of sharks from northern Australia. *Australian Journal of Marine and Freshwater Research* 42: 151–199.

Stevens, J.D., West, G.J. and McLoughlin, K.J. 2000. Movements, recapture patterns, and factors affecting the return rate of carcharhinid and other sharks tagged off northern Australia. *Marine and Freshwater Research* 51, 127–141.

Stobutzki, I., Blaber, S., Brewer, D., Fry, G., Heales, D., Miller, M., Milton, D., Salini, J., van der Velde, T., Wassenberg, T., Jones, P., wang, Y.-G., Dredge, M., Courtney, T., Chilcott, K., and Eayrs, S. 2000. Ecological sustainability of bycatch and biodiversity in prawn trawl fisheries. Project FRDC 96/257. Fisheries Research Development Corporation.

Tillett, B.J., Field, I.C., Bradshaw, C.J.A., Johnson, G., Buckworth, R.C., Meekan, M.G. and Ovenden, J.R. 2012. Accuracy of species identification by fisheries observers in a north Australian shark fishery. *Fisheries Research* 127: 109–115.

Walton, L., Jacobsen, I., Pidd, A. and Lawson, A. 2021. Gulf of Carpentaria Inshore Fishery *Level 2 Ecological risk assessment. Target and byproduct species.* Queensland Government.

Weigmann, S. 2016. Annotated checklist of the living sharks, batoids and chimaeras (Chondrichthyes) of the world, with a focus on biogeographical diversity. *Journal of Fish Biology* 88(3), 837–1037. doi: 10.1111/jfb.12874

Zhou, S.J. and Griffiths, S.P. 2008. Sustainability Assessment for Fishing Effects (SAFE): A new quantitative ecological risk assessment method and its application to elasmobranch bycatch in an Australian trawl fishery. Fisheries Research, 91(1), 56–68.