



Gulf of Carpentaria Hammerhead Harvest Strategy 2021

Business area owner Management & Reform

Endorsed by Deputy Director-General (Fisheries & Forestry) in accordance with delegated powers under Part 2, Division 1 (Harvest Strategies) of the *Fisheries Act 1994*

Approved by Minister responsible for fisheries in accordance with section 16 of the *Fisheries Act 1994*

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What the harvest strategy is trying to achieve

This harvest strategy has been developed in consideration of the 2018 'Conservation Dependent' listing of scalloped hammerhead shark (*Sphyrna lewini*) and current reassessment of this listing by the Threatened Species Scientific Committee under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). This harvest strategy aims to provide additional management and assessment measures to ensure the sustainable management of hammerhead shark (*Sphyrna spp.*) in Queensland's Gulf of Carpentaria Inshore Fishery (GCIF) and Gulf of Carpentaria Line Fishery (GCLF).

The aim of this harvest strategy is to manage fishing mortality through setting of sustainable catch limits based on the best available scientific information to ensure the sustainable management of all hammerhead shark species, in particular the scalloped hammerhead shark.

Fishery overview

The GCIF is a multi-species, net-only fishery that consists of all Queensland tidal waters west of longitude 142° 09' E (the northern tip of Cape York). Main species targeted in the fishery include barramundi, king and blue threadfin, shark (including hammerhead shark), estuary cod and grey mackerel. Shark and ray, including hammerhead shark, are predominantly targeted by commercial net fishers in offshore waters. Incidental catches are also taken in nearshore waters, rivers and creeks. Sharks and rays are considered susceptible to fishing pressure from this fishery due to slow growth rates and low levels of recruitment.

The GCLF is a small, line-only fishery that predominantly targets Spanish mackerel with the remainder of the catch consisting of various pelagic and demersal fin fish species. The fishery area includes all Queensland tidal waters in the Gulf of Carpentaria south of 10° 48' S. While sharks are able to be retained in this fishery, most are caught incidentally when targeting Spanish mackerel and typically comprise less than 3.5% of total catch.

Recreational and charter fishing occurs in both of these fisheries, with previous statewide recreational fishing surveys identifying mullet, javelin, barramundi, threadfins and tropical snappers as some of the more popular species. GCLF and GCIF species are also harvested by Aboriginal and Torres Strait Islander peoples, although this sector is anticipated to have comparatively low levels of fishing effort.

Scalloped, great and smooth hammerhead sharks were added to Appendix II of the *Convention on International Trade of Endangered Species of Wild Fauna and Flora* (CITES) in 2014, recognising the need for ongoing management to support stock recovery. Further, scalloped hammerhead was listed as 'Conservation Dependent' under the EPBC Act in 2018 in recognition of global declines in scalloped hammerhead stocks and their vulnerable life history traits.

A fish species may be listed as Conservation Dependent if it is the 'focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so its chances of long-term survival in nature are maximised'.

Stocks covered by the harvest strategy

All hammerhead shark species (*Sphyrna spp.*).

Management units for the harvest strategy

The management unit for this harvest strategy is the area of Queensland tidal waters in the Gulf of Carpentaria west of longitude 142° 09' E (the northern tip of Cape York).

Summary of management information

A summary of management arrangements for the GCIF and GCLF are set out in Table 1. Fishers may access copies of fisheries legislation at legislation.qld.gov.au or visit fisheries.qld.gov.au for the latest information on fishing rules.

Table 1: Summary of management arrangements for GCIF and GCLF.

Feature	Details
Commercial access	Primary commercial fishing licence with one or more of the following fishery symbols: N3, N11, N12, N13, L4
Relevant fisheries legislation	<p><i>Fisheries Act 1994</i></p> <p>Fisheries (General) Regulation 2019</p> <p>Fisheries (Commercial Fisheries) Regulation 2019</p> <p>Fisheries Declaration 2019</p> <p>Fisheries Quota Declaration 2019</p>
Other relevant legislation	<p><i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cwlth)</p> <p><i>Nature Conservation Act 1992</i> and Nature Conservation (Animals) Regulation 2020</p>
Working group	<p>Gulf of Carpentaria inshore fishery working group.</p> <p>Terms of reference and communiques are available at fisheries.qld.gov.au</p>
Gear	<p>The following apparatus are permitted for use:</p> <ul style="list-style-type: none"> • commercial – set mesh gillnets, small mesh gillnets, cast nets, hook and line apparatus <p>Refer to fisheries legislation for specific gear requirements and rules</p>
Main management methods	<p>Commercial</p> <p>One of the primary management measures used is to restrict access by limiting the number of symbols that are available for use, as well as restricting the number and types of nets that can be used under each of those symbols.</p> <p>Primary management method for hammerhead shark is a competitive Total Allowable Commercial Catch (TACC) limit, otherwise known as a prescribed commercial catch.</p> <p>Other management methods used include:</p> <ul style="list-style-type: none"> • Spatial and temporal closures • Vessel restrictions • Gear restrictions
Fishing year	1 July – 30 June
Stock status	<p>Scalloped hammerhead shark is listed as ‘Conservation Dependent’ under the EPBC Act.</p> <p>Scalloped, great and smooth hammerhead sharks are listed on Appendix II to the CITES. The listing came into effect on 14 September 2014.</p>
Accreditation under the EPBC Act	<p>Approved wildlife trade operation part 13 and 13A (expires 18 March 2022)</p> <p>Visit environment.gov.au</p>

Fishery objectives

The objective of the harvest strategy is to manage the take of all hammerhead shark species in the Gulf of Carpentaria at levels that will not be detrimental to the survival of the species in the wild.

Catch shares

Hammerhead shark are no take species for the recreational and charter sectors in Queensland.

Sharks, including hammerhead sharks, are significant as totemic symbols and as food resources to some Aboriginal and Torres Strait Islander Peoples. Hammerhead sharks are identified as a totem for many of the Torres Strait Island clans or families across the islands. Noting this however, traditional take by Aboriginal and Torres Strait Islander Peoples is estimated to be low.

As such, no formal catch shares are established under this harvest strategy.

Managing the performance of the fishery

The performance indicator for hammerhead shark in the GCIF and GCLF is that Queensland harvest levels for three hammerhead shark species do not exceed levels considered to be detrimental to the survival of the species.

A non-detriment finding assessment was undertaken by the Australian CITES Scientific Authority for the three CITES listed species of hammerhead in September 2014. The assessment found that Australian harvest and export levels for these hammerhead shark species would not be detrimental to the survival of the species provided harvest levels from Australian fisheries remained within the following limits:

- scalloped hammerhead shark (*Sphyrna lewini*) 200 tonnes per year
- great hammerhead shark (*Sphyrna mokarran*) 100 tonnes per year
- smooth hammerhead shark (*Sphyrna zygaena*) 70 tonnes per year.

In 2017 the Federal Department of the Environment undertook a review of the assessment, including an analysis of relevant available information on these species and decided that the precautionary harvest levels set in the 2014 non-detriment finding will remain in place until additional information becomes available.

Management of target species

Queensland currently sets a total annual catch limit of 150 t that applies to all hammerhead shark species, which is split into three TACCs across the East Coast Inshore Fishery, GCIF and GCLF. This total annual catch limit is consistent with Queensland's share of harvest levels set in the 2014 non-detriment finding for scalloped hammerhead.

A TACC of 50 t for all hammerhead shark species has been set for the QLD component of the Gulf of Carpentaria. Management triggers are in place for when 75 per cent of the TACC (37.5 t) has been caught to restrict the number of hammerhead shark that commercial fishers can take on a trip to slow mortality of the species.

If 100 per cent of the TACC has been caught in the Gulf of Carpentaria, hammerhead shark becomes a no take species to commercial fishers.

1.0 Decision rules for hammerhead shark

The decision rules provide guidance to set the TACC for hammerhead shark in the Gulf of Carpentaria.

- 1.1 Set the hammerhead shark TACC in line with Queensland's share of the most recent non-detriment finding harvest level for scalloped hammerhead.
 - 1.2 If any new information becomes available indicating that the non-detriment finding assessment and TACC-setting arrangements are not consistent with the sustainable management of the fishery, decision rules must be reviewed and, if appropriate, the TACCs should be adjusted.
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Data collection, validation and assessment

Fishery-dependent information

Commercial catch and effort data are obtained from compulsory logbook returns and real-time landing reports. Catch and effort data is used to determine the standardised commercial catch rate for key species. Commercial catch rates are standardised according to gear, season and location along with a range of other potential influencing variables. GCIF and GCLF logbooks can be found at business.qld.gov.au.

Fishers are also required to report any interactions with protected species in a mandatory threatened, endangered and protected animal logbook.

Monitoring of non-retained catch will be progressed through a combination of self-reporting and independent monitoring.

Fishery-dependent data (independent validation)

All commercial fishing vessels are required to have vessel tracking systems installed and active on their vessels. Vessel tracking data is used to verify effort information reported in commercial fishing logbooks. As hammerhead shark is managed under competitive quota, compulsory quota unload reports provide an accurate record of the catch. Queensland Boating and Fisheries Patrol undertake routine and intelligence-based at-sea and landing (unload) inspections to check compliance and validate reported information.

Surveys of recreational fishers at boat ramps and the statewide recreational fishing and keen angler logbook program data help provide important information on recreational harvest.

Fisheries Queensland conducts biological monitoring on a range of important species. Sampling focuses on collecting length, sex and age data. Collecting this information from commercial catches, as well as similar information from the recreational sector, helps Fisheries Queensland develop a clear picture of the whole fishery for each species.

Fisheries Queensland undertakes additional research into the catch of shark in Queensland's net fisheries to understand how sharks interact with fisheries and their capture as key target, byproduct and bycatch species. This work will estimate species assemblages, fate and abundance of sharks and aims to reconstruct shark catch; map the spatial and temporal distribution of shark catch; and refine species assemblages and model parameters for shark stock assessments.

Scientific assessment of hammerhead stocks

The most recent stock assessment (Saunders et.al unpublished) suggested that there was limited evidence to indicate that scalloped hammerhead stocks are significantly depleted within Australia. For both the northern and eastern stocks there were no simulations where the 2019 biomass was below the limit reference point (20% of unfished levels).

For the northern stock most of the simulations (0.97) fell between the target and trigger reference points (40-60% of unfished levels) while most of the simulations (0.79) were above the target reference point of 60% for the eastern stock. These levels of depletion are lower than has been previously reported for this species and are likely caused by the fact that neither of these stocks had high catches that were sustained for extended periods and/or have experienced significant recovery periods, where relatively low harvests have occurred.

The Maximum Sustainable Yield (MSY) was also estimated from the assessments for the northern (310 t) and eastern (160 t) stocks. Given that the current national Total Allowable Catch (TAC, 200 t) for scalloped hammerhead is well below these estimates, the current TAC is likely to be below the levels required to cause stock declines. However, these results must be interpreted in the context of the data limited approaches used. The analyses undertaken rely on accurately reported catch and an abundance time series that aligns with the biomass of scalloped hammerhead.

Catches and discards have been poorly reported for this species, so all potential sources of harvest had to be reconstructed and abundance time series had to be generated from fisheries where scalloped hammerhead is not the target species. Consequently, there is a degree of uncertainty in the results that are presented.

Sensitivities in the assessments for the most uncertain catch time series were evaluated for each stock as well as an investigation of the likelihood that scalloped hammerhead are significantly depleted as has been reported in previous studies. Despite these uncertainties, there is no evidence from the available data and/or modelling results that indicate a substantial level of stock depletion, with current biomass estimates for all stocks assessed as being above 'overfished' reference points. Additionally, neither Australian stock was estimated to be below EPBC listing criteria of having undergone a 30-50% decline from pristine levels.

To refine estimates of the depletion levels of scalloped hammerhead, there needs to be a significant scientific program undertaken to better understand the links between Australian stocks and adjacent international stocks, collect stock specific biological and abundance data, and improve reporting of catch and discard data for all fisheries that interact with this species. Additionally, Australian populations of scalloped hammerhead require appropriate management frameworks and harvest strategies that recognise the biomass levels identified in this study and which have appropriate controls that ensure future harvests of this species do not cause stocks to become overfished.

Information and research priorities

Key information and research priorities have been identified in Table 2 to help meet the objectives of this harvest strategy. These will be updated as required.

Table 2: Information and research priorities for the GCIF and GCLF

Species	Need	Priority
Scalloped hammerhead	<ul style="list-style-type: none"> Stock structure and biology research 	High
	<ul style="list-style-type: none"> Estimates of overall fishery discard rates and post-release mortality 	High
	<ul style="list-style-type: none"> Independent data collection and validation in fisheries that interact with hammerhead 	High
	<ul style="list-style-type: none"> Investigate alternative indices of abundance (incl. fishery dependent and independent sources) such as close kin mark recapture, 	Medium

Species	Need	Priority
	baited remote underwater video or standardised surveys using multiple gears	
	<ul style="list-style-type: none"> Improved stock assessment (in line with peer reviewer comments) 	Medium
	<ul style="list-style-type: none"> Develop best practice catch handling advice to optimise post-release survival 	Medium

Schedule of performance monitoring, assessment and review

Harvest strategy review

The GCIF and GCLF are currently being considered for fishery reform in line with the *Sustainable Fisheries Strategy 2017-2027*, including the development of broader Gulf of Carpentaria fisheries harvest strategies. This Gulf of Carpentaria hammerhead harvest strategy will remain in place until broader harvest strategies are developed and implemented.

The harvest strategy may also be subject to further review and amendment as appropriate within this period if any of the following circumstances arise:

- If there is new information that substantially changes the status of a fishery, leading to improved estimates of biomass
- If drivers external to management of the fishery increase the risk to fish stock/s
- It is clear the strategy is not working effectively, and the intent of the harvest strategy policy is not being met.

For more information on the processes for amending harvest strategies, refer to the [Queensland harvest strategy policy](#).