Gulf of Carpentaria inshore fishery harvest strategy: 2027–2031

CONSULTATION DRAFT



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# What the harvest strategy is trying to achieve

This harvest strategy has been developed in line with the *Queensland harvest strategy policy* to manage harvest in the Queensland Gulf of Carpentaria inshore fishery (GOCIF). While some stocks of the GOCIF are healthy, others need rebuilding to achieve biomass targets. Further data is needed for some target and secondary species to inform how to meet those biomass targets, however they still require responsive management measures while this information is collected. To address a range of social, economic and ecological issues, this harvest strategy has been developed to allow modern and responsive management measures are in place to ensure the sustainable harvest of the region's fisheries resources. This harvest strategy will address a range of social, economic and ecological issues while maintaining catch shares amongst the commercial, recreational, charter and Indigenous fishing sectors.

The aim of this harvest strategy is to manage fishing mortality through setting sustainable catch limits at a level that allows the stock to achieve biomass targets. The decision rules are designed to set catch limits at levels appropriate for achieving the spawning biomass of 60% (for species that drive fishing behaviour in this fishery) and to maintain catch shares amongst sectors. For species where biomass estimates are not available, and those that are not driving fishing behaviour, precautionary catch limits and triggers have been designed. Other management tools (e.g. size limits, spawning closures etc.) may also be used to support the sustainable management of stocks under this harvest strategy.

# Fishery overview

![Diagram

Description automatically generated]()The GOCIF is a complex, multi-species, net and line fishery operating in all tidal waters in the Gulf of Carpentaria, out to the Queensland border with the Northern Territory and the Australian fishing zone. The GOCIF is a diverse fishery, with commercial, recreational, charter and Aboriginal and Torres Strait Islander fishers accessing the regions fishery resources. Product harvested from the fishery supplies domestic markets, with the majority of product sold in Queensland.

The commercial fishery comprises a diverse range of fishing operations that use net and line gear to target regionally important species. The fishery is separated into three main regions under the existing fishery symbols. These comprise of an inshore net component targeting barramundi and king threadfin, an offshore net component targeting mackerel and shark species, and an offshore line component targeting Spanish mackerel. The commercial net fishery has an annual closure and operates from 1 February – 7 October each year.

Recreational and charter fishers use line gear, cast nets, small seine nets, spears and spearguns. The recreational and charter components of the fishery target species for food and sport.

Fishing is also an important customary activity for Aboriginal peoples and Torres Strait Islanders. Traditional fishing satisfies a personal domestic or non-commercial communal need in accordance with the traditional laws and customs of the traditional owners of the area being fished.

# Stocks covered by the harvest strategy

As the GOCIF is a multi-species fishery, target, secondary and by-product species have been categorised into the following management tiers:

* Tier 1 – These are the key target species identified as driving fishing behaviour within the fishery. These species are subject to competitive total allowable commercial catch (TACC) limits, also known as Prescribed Commercial Catch limits. For the charter and recreational sectors, these species have in-possession and size limits.
* Tier 2 – These species are of high commercial and recreational importance, and are typically targeted and co-caught species within the fishery. These species are subject to a competitive TACC. For recreational fisheries, these species have in-possession and size limits.
* Tier 3 – All other species are monitored using catch triggers to ensure that increasing or shifting fishing pressure does not present an unacceptable level of risk. For recreational fisheries, some of these species will have in-possession and size limits, while all others are captured by the general in-possession limit.

Management tiers are an important component for multi-species fisheries, as it allows for further prioritisation to streamline management procedures and prioritise resourcing requirements among species.

The stock structure of tier 1 and 2 species range from those with broad distributions along the Queensland Gulf of Carpentaria, with some also extending into adjacent management jurisdictions (i.e. Spanish and grey mackerel are shared stocks harvested in Northern Territory waters). There are also several species within the fishery that may have complex and/or fine scale stock structure (i.e. barramundi and king threadfin). Table 1 outlines the fish stocks covered by this harvest strategy and their associated management tiers. Over time, species may transition between management tiers if fishing pressure shifts towards tier 2 or 3 species.

Table 1: Summary of fish stocks covered by this harvest strategy

| **Feature** | **Details** |
| --- | --- |
| **Tier 1** | * Barramundi (*Lates calcarifer*) * Grey mackerel (*Scomberomorus semifasciatus*) * Spanish mackerel (*Scomberomorus commerson*) |
| **Tier 2** | * King threadfin (*Polydactylus macrochir*) * Sharks and rays (complex) * Blue threadfin (*Eleutheronema tetradactylum*) * Black jewfish (*Protonibea diacanthus*) |
| **Tier 3** | All other species |

# Management units for the harvest strategy

The management unit for this harvest strategy is all tidal waters in Queensland west of longitude 142°31'49'' east.

# Summary of management information

A summary of the management arrangements for the GOCIF are set out in Table 2. Copies of fisheries legislation are available at [legislation.qld.gov.au](http://legislation.qld.gov.au), or visit [fisheries.qld.gov.au](http://www.fisheries.qld.gov.au) for the latest information on fishing rules.

Table 2: Summary of management arrangements for the GOCIF

| 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** | *Fisheries Act 1994*  Fisheries (General) Regulation 2019  Fisheries (Commercial Fisheries) Regulation 2019  Fisheries Declaration 2019 |
| **Other relevant legislation** | *Marine Parks Act 2004*  *Environment Protection and Biodiversity Conservation Act 1999* andEnvironment Protection and Biodiversity Conservation Regulations 2000 (Cwlth) |
| **Working group** | Gulf of Carpentaria inshore fishery working group  Terms of reference and communiques are available at [fisheries.qld.gov.au](http://www.daf.qld.gov.au/business-priorities/fisheries/sustainable/fishery-working-groups) |
| **Gear** | The following apparatus are permitted for use:   * commercial – set mesh gillnets, hook and line apparatus, haul (seine) nets, small mesh gillnets, cast nets, scoop nets * recreational – recreational hook and line apparatus plus cast, dip and seine nets, spearfishing (excluding hookah/SCUBA)   Refer to fisheries legislation for specific gear requirements and rules. |
| **Main management methods** | **All sectors:**   * gear restrictions * minimum legal-size limit * spatial and temporal closures   **Commercial only:**   * total allowable commercial catch (TACC) * limited entry and defined fishery areas * vessel and tender restrictions   **Recreational only:**   * in-possession limits * boat limits |
| **Fishing year** | 1 January – 31 December |
| **Stock status** | Stock status is assessed using the nationally agreed Status of Australian Fish Stocks (SAFS) classification framework (visit [fish.gov.au](https://fish.gov.au/)). The SAFS stock status for tier 1 and 2 species in 2023 was as follows\*:   * barramundi – sustainable * black jewfish – undefined * grey mackerel – sustainable * king threadfin – depleting * Spanish mackerel – depleting   All other species are listed as ‘undefined’ or are yet to be assessed under the SAFS.  \*Note: The classification system used as in the SAFS reporting is assessed against a 20% biomass sustainability criteria. Therefore, although a species may be classified as ‘sustainable’ under SAFS, this does not mean that the biomass is meeting the targets set out in this harvest strategy. For more specific species biomass estimates, consult the relevant stock assessment for that species. |
| **Accreditation under the *Environment Protection and Biodiversity Conservation Act 1999*** | Gulf of Carpentaria Inshore Fin Fish Fishery (net) - Part 13  Gulf of Carpentaria Line Fishery (line) - Part 13  Visit [environment.gov.au](http://www.environment.gov.au/marine/fisheries/qld/mud-crab) |

# Fishery objectives

The objective of the harvest strategy is to manage the fishery in accordance with the objectives of the *Fisheries Act 1994*.

Fishery objectives set out the direction and aspirations to be achieved in the long term. The primary objective of this fishery is to:

* Build and maintain the target species in the GOCIF to a target spawning biomass level that aims to maximise economic yield (B*mey*) for the fishery.

**In pursuing the primary objectives, the harvest strategy aims to:**

* minimise and mitigate any unacceptable ecological risks arising from fishing-related activities to ensure the protection and recovery of protected species
* maximise economic performance of the commercial and charter sectors
* monitor the social and economic benefits of the fishery to the community
* consider the potential for species-specific depletion
* identify and maintain appropriate sectoral allocations for particular GOCIF resources
* maintain access to traditional fishing for Aboriginal and Torres Strait Islander people and improve commercial and charter fishing opportunities

# Catch shares

This harvest strategy aims to maintain the existing catch shares between sectors. The resource allocation arrangements for tier 1 and 2 set out in Table 3 ensure that catch shares among sectors can be maintained in response to changes in the Total Allowable Catch (TAC).

Recreational harvest estimates are limited for many species in the Queensland Gulf of Carpentaria. For species without catch share estimates from quantitative stock assessments, or the state-wide recreational fishing survey, no catch share allocation has been defined. Future stock assessments and recreational fishing surveys will guide the establishment of catch shares for these species as they become available. If species are escalated to a higher level of management (e.g. move from tier 3 to tier 2), consideration will be given to the establishment of a catch share should suitable harvest estimates be available.

Future reviews of the TAC for species with allocated catch shares will consider the results from the latest state-wide recreational fishing survey, any other available information relating to recreational harvest, and validated commercial catch over the corresponding year. Table 3 outlines existing catch shares for all sectors based on available data up to 2020.

The traditional fishing rights of Aboriginal peoples and Torres Strait Islanders are protected under native title legislation and relate to harvest for domestic, communal and non-commercial purposes. Accordingly, traditional and customary fishing is recognised in Queensland and is not a defined allocation.

Aboriginal peoples and Torres Strait Islanders and their communities continue to express a desire for more economic opportunities through fishing, particularly in their own sea country. The *Aboriginal and Torres Strait Islander commercial fishing development policy* provides for an Indigenous fishing permit to be issued, on a case-by-case basis and in accordance with section 54 of the Fisheries (General) Regulation 2019, to provide opportunities to take part in fishing-related business. An amount of up to 10 tonnes of GOCIF species may be set aside as an Indigenous commercial allocation.

Table 3: Resource allocation arrangements for the GOCIF

| **Management unit** | **Tier** | **Commercial fishing** | **Recreational fishing(including charter)** |
| --- | --- | --- | --- |
| Barramundi **1** | 1 | 80% | 20% |
| Grey mackerel | 1 | - | - |
| Spanish mackerel **1** | 1 | 97% | 3% |
| King threadfin **1** | 2 | 92% | 8% |
| Sharks and rays **2** | 2 | 99% | 1% |
| Blue threadfin | 2 | X | X |
| Black jewfish | 2 | - | - |

1 Catch share established from more recent stock assessment.

2  Shark and ray harvest is assumed to be predominately commercial.

2 Catch share established from recreational harvest estimate from 2019-20 recreational fishing survey compared to 2019 commercial catch.

# Managing the performance of the fishery

## Performance indicators and reference points

Suitable performance indicators have been selected to describe fishery performance in relation to the objectives, with associated reference points identified to established acceptable performance. The primary performance indicator used to evaluate the status of GOCIF species is spawning stock biomass. Spawning stock biomass is assessed periodically and is compared to the associated reference points.

In addition to the primary performance indicators, this harvest strategy includes a rebuilding target reference point for king threadfin. This target aims to rebuild king threadfin stock biomass to a level that aims to achieve maximum sustainable yield (MSY) and, subsequently, pursues the long-term goal of achieving maximum economic yield (MEY).

The default biomass reference points identified in this harvest strategy are:

* a rebuilding target reference point for king threadfin of 40% of the spawning biomass (B40) being the relative biomass level this harvest strategy aims to achieve
* an overarching target reference point (B*targ*) of 60% of the spawning biomass being the relative biomass level the harvest strategy aims to achieve for tier 1 and some tier 2 species of the fishery – this is considered a proxy for the biomass achieving maximum economic yield (B*mey*)
* a limit reference point (B*lim*) of 20% of the spawning biomass (B20) being the biomass level that the harvest strategy aims to avoid – If there is evidence that a stock is more susceptible to fishery depletion due to conservative life history characteristics, a higher limit reference point (e.g. 30%) may be considered. If the stock is assessed to be below B*lim,* the risk to the stock is unacceptably high and the stock is defined as ‘overfished’.

If a stock assessment provides a direct estimate of B*msy*, B*mey* or B*lim*, these may be used to replace the respective proxy values of B40, B60 and B20.

As individual fish stocks in a multi-species fishery are likely to be different in their biological and economic characteristics, the biomass levels that support MEY may vary by species. The GOCIF is a multi-species fishery with high species co-catch and there are multiple species for which the distribution of stocks overlaps with adjacent management jurisdictions (i.e. Northern Territory). Due to these complexities, setting targets may be dependent on a variety of factors that will need to be prioritised to achieve the fishery objectives.

To avoid this, the strategy provides for a B*targ* level for tier 2 species of between 50% and 60% of unfished spawning biomass, where 60% may be impracticable. This approach is consistent with the Queensland harvest strategy policy, and the proposed biomass level of 50–60% (as a relative abundance proxy for MEY) is defined by Punt et al.[[1]](#footnote-2) Where the lower biomass target is used, consideration to the risk of stock biomass falling below B*lim*, as well as any impacts to fishing satisfaction of other sectors, must be considered.

In some circumstances, B*targ* may need to be set lower then 50–60% to account for cross jurisdictional management of a stock. If a further reduction in B*targ* is considered, all jurisdictions should agree to the appropriate biomass levels and ensure consistent management arrangements will be in place to achieve the set biomass target. In these circumstances, B*targ* must never be lower than B*msy* and detailed consideration to the risk of stock biomass falling below B*lim*, as well as any impacts to fishing satisfaction of other sectors, must be considered.

For tier 2 species with TACCs not based on biomass estimates from a stock assessment, trigger reference points are required to monitor and respond to changes in stock performance.

For tier 3 species, trigger reference points are used to monitor annual fishing mortality in relation to a historic reference period of 2012-2021.

A summary of the GOCIF’s performance indicators and reference points are provided in Table 4.

Table 4: Performance indicators and reference points for the Gulf of Carpentaria Inshore Fishery.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Species/Tier** | **Performance indicator** | **Type of reference point** | | |
| **Target (B*targ*)** | **Trigger** | **Limit (B*lim*)** |
| Tier 1 | Spawning stock biomass | 60% (B*mey*) | - | 20% |
| Tier 2 | Spawning stock biomass | 50% - 60% | - | 20% |
| King threadfin | Spawning stock biomass | 40% | - | 20% |
| Tier 2 (without stock assessment) | Catch rate | - | Increase/decrease in annual commercial catch rate | - |
| Tier 3 | 10-year reference period | - | 30t catch level | - |

## Application of decision rules

For tier 1 and tier 2 species with biomass estimates from stock assessments, the decision rules for setting TAC limits are based on a ‘hockey stick’ approach. This is where the TAC is set based on a linear relationship between B*lim*, where the level of fishing mortality (F) is equal to zero, and B*targ*, where the exploitation rate and TAC is set at the level to achieve MEY (Figure 1). The decision rule considers the current biomass level of the stock for determining the TAC to achieve the B*targ*.

Figure 1: showing the “hockey stick” rule, Blim is limit reference point, Bmey is the biomass at MEY, B0 is the unfished biomass at 100%, F is fishing mortality and Ftarg is the level of fishing mortality for Bmey

Figure 1: Showing the ‘hockey stick’ rule – B*lim* is limit reference point, B*mey* is the biomass at MEY, B0 is the unfished biomass at 100%, F is fishing mortality and F*targ* is the level of fishing mortality for B*mey*

The TAC is calculated by applying the rate of fishing mortality to achieve Btarg to the current spawning biomass level. As a result, the TAC represents the total catch from all sectors (including discards) that can be harvested over the following two years to move the biomass level towards the target level.

If the spawning biomass of a stock falls below Blim, targeted fishing of the stock must cease and a rebuilding strategy be developed with an objective to rebuild the spawning biomass above Blim within a biologically reasonable timeframe (e.g. based on mean generation times) and as informed by the *Queensland Harvest Strategy Policy*. If the fishery is unable to avoid catching the species while targeting other species, a low level of fishing mortality may be accepted through a nominal incidental catch limit, and additional management measures should be considered to support rebuilding.

For tier 2 species with TACCs not based on biomass estimates from a stock assessment, trigger reference points are required so annual stock performance is monitored and commercial harvest can be adjusted to pursue the harvest strategy objectives. An annual review of commercial harvest and catch rates over a two-year period will be used to ensure species may be subject to assessment and/or management needs if the current TACC’s are not meeting the objectives of the harvest strategy.

For tier 3 species, trigger reference points are used to monitor annual fishing mortality. An annual catch level of 30 tonnes per species has been determined as a default point at which increasing catches may present an increased risk to the sustainability of the species. Given this, catch triggers have been developed where species may be subject to assessment and/or management action if increases in fishing mortality are detected above the triggers. The triggers will be used to detect shifts in fishing effort by comparing annual catches against the average catch level from the reference period of 2012-2021. This reference period represents a stable period in the fishery, which includes weather events (such as cyclones, droughts and floods), fishing effort and number of licences, and has been evaluated for its use as a reference period using retrospective analysis. Due to the structural adjustment process undertaken in 2024, which resulted in the implementation of additional gillnet-free areas and a significant buyout of N3 symbols, further analysis will be used to determine appropriate catch levels for affected species.

The decision rules will also constrain all sectors to their allocated catch share. If new information on recreational or charter harvest indicate that the sectors harvest has increased outside of their allocated catch share for any TAC species, decision rules are triggered to constrain harvest to within this share. Adjustments to the recreational fishing limits may also be undertaken if changes are made to the TAC for a species.

# Management of target species

1. Decision rules for the commercial sector for tier 1 and tier 2 species with spawning biomass estimates

The below decision rules provide guidance to set the TACC for tier 1 and 2 species. The decision rules use the outputs of stock assessments and aim to achieve B*targ* at 60% of unfished spawning biomass as a proxy for MEY for tier 1 species, between 50% and 60% of unfished biomass as a proxy for MEY for tier 2 species and 40% of unfished biomass as a proxy for MEY for king threadfin.

* 1. If the biomass is at or above B*targ*, set the TACC at a level that maintains biomass at B*targ*.
  2. If biomass is below B*targ* and above B*lim*, the TACC should be set as inferred by the hockey stick approach, where fishing mortality is reduced to the rate that allows the biomass to increase effectively back to B*targ*.
  3. If the biomass is at or below B*lim*, there will be no targeted fishing permitted for that species, and a rebuilding strategy will be developed to increase the stock biomass to above B*lim* within a biologically reasonable timeframe and as informed by the *Queensland Harvest Strategy Policy*.
  4. If any new information becomes available indicating that the assessment and TACC-setting arrangements are not consistent with the sustainable management of the fishery, the decision rules must be reviewed and, if appropriate, the reference points or timeframes should be adjusted.

**Notwithstanding that:**

* 1. The rate of fishing mortality should not exceed that required to achieve B*targ*.
  2. The TAC should not exceed the level of fishing mortality required to maintain a stock at maximum sustainable yield (MSY) at equilibrium.
  3. While the hockey stick approach is the default harvest control rule, alternatives may be considered to better pursue the objectives of this harvest strategy.

AND

* 1. If a stock is shared with another jurisdiction (e.g. Northern Territory) and the current management arrangements in the other jurisdiction will limit the stock achieving B*targ*, a lower biomass target may be considered if all management jurisdictions agree on an appropriate biomass target that aims to achieve long-term sustainability of the stock, and the biomass target is above BMSY

1. Decision **rules for the commercial sector for tier 1 and 2 species with TACC’s based on the historic reference period**

The below decision rules have been designed for tier 1 and 2 species with TACC’s set based on the historic reference period. The decision rules use a trigger reference point to monitor nominal commercial catch rates and adjust commercial harvest accordingly, to ensure sustainable limits are maintained and assessment needs can be prioritised if required to pursue the objectives of the harvest strategy. These decision rules would not be applicable to a TACC informed by a stock assessment.

* 1. If the TACC is reached for two consecutive years, and the average annual catch rate of the two most recent years (total harvest/days fished) increases from the historic reference period, increase the TACC by 10% for the following season.
  2. If less than 50% of the TACC is reached for two consecutive years and the average annual catch rate of the two most recent years (total harvest/days fished) decreases from the historic reference period, review available information to determine if there is an unacceptable risk to the stock if ongoing catch levels continue.
  3. If the TACC is increased as a consequence of Decision Rule 2.1, review potential risk to the stock and initiate a monitoring and stock assessment program if appropriate.

**Notwithstanding that:**

* 1. The TACC should not increase more than 30% above the historic reference period without supporting biological research.

1. **Break-out rule for tier 2 species with TACC’s based on the historic reference period**

If a biomass estimate is available through a stock assessment for a tier 2 species that indicates a change in fishing mortality is required to achieve B*targ* or avoid B*lim*, then management action must be taken to achieve the fishery objectives.

1. Decision **rules for the recreational and charter sector for tier 1 and tier 2 species**

The below decision rules have been designed to maintain catch shares between sectors. If a new estimate of recreational or charter harvest indicate that either sector have increased their catch outside of their allocated catch share for any tier 1 or 2 species, then management action must be taken to return them within this share.

If a recreational harvest estimate is no more than 10% above the allocated recreational catch share, then no management action is required.

* 1. If an estimate of recreational harvest exceeds the catch share by greater than 10%, the recreational management controls will be reviewed to achieve the allocated recreational catch share.
  2. If the total allowable commercial catch increases, recreational output controls will be reviewed to maintain the allocated recreational catch share.

**Notwithstanding that:**

* 1. If a stock is below B*lim* and further modelling indicates that a recommended biological catch of zero be applied to achieve rebuilding to maximum economic yield, no targeted fishing for the species will be permitted for all sectors.

1. Decision **rules for managing the total commercial fishing mortality (retained and non-retained) of Gulf of Carpentaria Inshore Fishery species**

The harvest strategy contains the below rules to discourage non-retention (e.g. discarding, high grading) of species with a TACC. These rules provide guidance for additional management that may be required to account for excess levels of fishing mortality. Monitoring of non-retention will be progressed through a combination of fishery-dependent reporting and independent monitoring as required.

* 1. If the reported non-retained catch is determined to be at a level that increases the fishing mortality for a species above the amount that will allow the stock to rebuild to the target biomass levels, management changes must be implemented to reduce non-retention.
  2. If the reported total harvest (retained and non-retained) for any tier 1 or 2 species exceeds any TACC by less than 1%, then no additional management action is required.
  3. If the reported total harvest for any tier 1 or 2 species exceeds any TACC by between 1% and 5%, then the TACC for the following year may be reduced by the amount that the TACC was exceeded.
  4. If the reported total harvest for any tier 1 or 2 species exceeds any TACC by more than 5%, then the TACC for the following year may be reduced by two times the amount that the TACC was exceeded.

# Management of secondary and by-product species

1. Decision **rules for tier 3 species not managed under a TACC**

The secondary and by-product species in this fishery are classified as tier 3 species and do not have TAC limits. The below decision rules use a trigger reference point to monitor effort shift to ensure there is no unacceptable levels of fishing pressure for tier 3 species.

* 1. If the annual harvest of any species is less than 1.5 times the average historical reference period (2012–2021) or the annual catch of any species is less than 30 tonnes, then no management action is required.
  2. If the annual harvest of any species is greater than 1.5 times the average historical catch (reference period 2012–2021) and the annual catch of any species is more than 30 tonnes, an assessment will be undertaken to determine whether there is unacceptable risk to the stock if ongoing catch levels continue.
  3. If the annual harvest of any species exceeds greater than two times the average historical catch (reference period 2012–2021) and the annual catch of any species is more than 30 tonnes, then an assessment will be undertaken and a TACC for the species will be set at the average of the previous three years catch level.

1. **Break-out rule for tier 3 species**

If a biomass estimate is available through a stock assessment for a tier 3 species that indicates a reduction in fishing mortality is required to achieve B*targ* or avoid B*lim*, then management action must be taken to achieve the fishery objectives.

# Management of ecological risks from fishing

1. **Ecological risk decision rules**

A foundation of sustainable fisheries management is managing the impact of fishing activities on non-target species and the broader marine ecosystem. Ecological risk assessments (ERA) identify and measure the ecological risks of fishing activity and identify issues that must be further managed under harvest strategies. The decision rules below are in place to minimise and mitigate high ecological risks arising from fishing-related activities and ensure active commercial fishing effort does not increase above historic levels.

* 1. If an ERA identifies fishing impacts that result in an unacceptable level of risk to any ecological component, a review is triggered to investigate the reason for the increased risk and appropriate management action taken to reduce the risk to an acceptable level.

Level 2 ERAs were completed for the GOCIF in June 2021, highlighting a number of high risk protected species associated with interaction with netting apparatus used in this fishery. A *Protected species management strategy* for the Gulf of Carpentaria inshore fishery has been developed to manage these risks. The strategy includes rules for adjusting management to reduce the ecological risk from fishing, as well as mitigation measures to prevent or reduce interactions with protected species.

# Monitoring social and economic impacts

Where possible, sustainable catch limits are set based on achieving B*mey* (around 60% of unfished spawning biomass) to support the most economically efficient use of the resource, improve the fishing experience for all sectors and promote resilience to adverse environmental conditions (e.g. floods, cyclones and bleaching). The harvest strategy rules have been set up to maintain the key stocks to this target biomass level.

The objectives and performance indicators in Table 5 will be used to monitor the social and economic performance of this fishery. The management options outlined are intended to provide some guidance on the options that could reasonably be considered alongside the decision rules if fishery trends are of concern.

Table 5: Social and economic indicators for the GOCIF

| **Objective** | **Performance indicators** | **Management options** |
| --- | --- | --- |
| Maximise economic performance of the commercial sector | Potential indicators to monitor include:   * + - catch per unit effort (average per day/hour fished)     - costs, earnings and net financial and economic profit     - net economic returns, gross state product, gross value of production     - quota sale and lease price     - profit decomposition (using profit or lease price) to determine impacts of prices, costs and stock/catch rates on changes in profits | Consider regulatory and non-regulatory options  Adjust management as needed  Options include minimum quota holding and latent effort review |
| Monitor the broader social and economic benefits of the fishery to the community | Potential indicators to monitor include:   * + - fisher satisfaction (with their fishing experience – commercial and recreational)     - recreational fisher participation and economic information     - percentage of quota/licences that are owned (rather than leased)     - Gini coefficient of quota owner (measure of concentration)     - percentage of total costs/inputs purchased from local businesses/residents     - income generated (crew plus profit – gross value added)     - proportion of catch sold locally     - fish prices     - number of platforms / number of active licences / total capacity     - community satisfaction (with their fisheries and the way in which they are managed) | Consider regulatory and non-regulatory options  Adjust management as needed |
| Wildlife Trade Operation (WTO) accreditation under the *Environment Protection and Biodiversity Act 1999* | Number of conditions and recommendations met as required through the WTO accreditation process | Amend fisheries legislation and regulation as required to align with best practice to get |

# 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. GOCIF logbooks can be found at [business.qld.gov.au](https://www.business.qld.gov.au/). Charter operators also record catch information in compulsory logbooks, which is included as recreational harvest.

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-dependant 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 a quota-managed fishery, compulsory quota weights notices 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.

## Scientific assessment of stock

Fisheries Queensland conducts regular stock assessments on key species. Species with stock assessments relevant to the GOCIF are

* Barramundi
* King threadfin
* Spanish mackerel

For current, updated and new stock assessments visit [era.daf.qld.gov.au](https://era.daf.qld.gov.au/) and search by species name.

# Information and research priorities

Key information and research priorities have been identified in Table 6 to help meet the objectives of this harvest strategy. These will be updated as required.

Table 6: Information and research priorities for the GOCIF

| **Project description** | **Category** | **Explanation of need** | **Priority** |
| --- | --- | --- | --- |
| King threadfin | Research | Improved biological information – growth variability, migration, stock structure, spawning times, fecundity-at-length, post-release survival, selectivity. | High |
| Threatened, endangered and protected species interactions | Monitoring | Improved reporting of TEP interactions (i.e., catch and fate) including improved fisher knowledge on species identification, reporting requirements and release techniques that optimise survival. | High |
| Research | Improved information on fishery interactions with threatened, endangered, and protected species, and spatial information in the context of population estimates and critical habitats.  Examine ways to reduce the risk of interactions, improve post-release survival and identity Potential Biological Removal (PBR) limits. | High |
| Determine multi species MEY estimates | Research | Determine multi-species MEY estimates for setting appropriate biomass target reference points to pursue triple bottom line objectives | High |
| Development impacts – catchment and mine associated | Monitoring/ Research | Economic impacts and fishing displacement from mining industry (e.g. offshore loading facility Aurukun by Glencore)  Consequences of upstream development (land and water resource development) | High |
| Shark depredation | Research | Quantify impacts and rates of depredation on non-retained target species, bycatch and TEPS. | High |
| Environmental Drivers | Monitoring/ Research | Investigate how environmentally driven variation in growth, year-class strength and other fishery parameters are best incorporated into stock assessment | Medium |
| Research | Identify and quantify environmental factors influencing fishery harvest (King threadfin, Spanish mackerel, Grey mackerel). Identify environmental performance indicators and reference points. Increase understanding of environmental and cycles and climate events on the GoC ecosystem (food-chain processes that support fisheries productivity). | Medium |
| Historical data | Monitoring | Historical age and length data electronically available for inclusion in stock assessments. | Medium |
| Research | Quantify fishing development over time (including management changes, gear efficiencies and/or targeting leading to increased catchability) to inform stock assessment models. | Medium |

# Schedule of performance monitoring, assessment and review

## Annual performance monitoring and assessment

Fishery performance will be reviewed against this harvest strategy annually. This review will include convening the Gulf of Carpentaria inshore fishery working group to provide operational advice on the fishery’s performance.

The primary performance measure is spawning biomass, which will be used to review species TACC’s when available. In the intervening years, a review of standardised catch rate information will also inform fishery performance and if management action is required between scheduled stock assessments. If a stock assessment biomass estimate becomes available prior to the scheduled timeframe that indicates the TAC should be adjusted in order to meet the objectives of the fishery, then the TAC should be reviewed.

## Harvest strategy review

This harvest strategy will remain in place for a period of five years, after which time it will need to be fully reviewed in accordance with the *Fisheries Act 1994*.

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

* there is new information that substantially changes the status of the fishery, leading to improved estimates of indicators relative to reference points
* drivers external to management of the fishery increase the risk to fish stock/s
* a new recreational harvest estimate becomes available that suggests the defined sectorial catch shares may have been set incorrectly or may be unrepresentative
* it is clear the harvest strategy is not working effectively, and the intent of the *Queensland harvest strategy policy* is not being met.

For more information on the processes for amending harvest strategies, refer to the Queensland harvest strategy policy available at [publications.qld.gov.au](http://www.publications.qld.gov.au).

# Acronyms and definitions

| Acronym/term | Definition |
| --- | --- |
| **Biomass (B)** | Total weight of a population or of a component of a population, usually expressed as a ratio that indicates the biomass as a percentage of the unfished biomass (B0).  East coast Spanish mackerel is assessed in terms of spawning stock biomass, which is measured by spawning egg production. |
| **Unfished biomass (B0)** | Mean equilibrium virgin unfished biomass, meaning the average biomass level if fishing had not occurred. For east coast Spanish mackerel, this is currently taken to be the spawning stock biomass in 1911 and prior to the commencement of the commercial fishery. |
| **40% unfished biomass (B40)** | The biomass at 40% of unfished levels. Used by default as a proxy for the biomass at maximum sustainable yield (B*msy*) and as the interim target biomass reference point for rebuilding. |
| **Biomass at maximum sustainable yield (B*msy*)** | Biomass at maximum sustainable yield (MSY). Without a specific estimate, the default B*msy* is taken to be 40% of unfished biomass. |
| **Biomass at maximum economic yield (B*mey*)** | Biomass at maximum economic yield (MEY). Without a specific estimate, the default B*mey* is taken to be 60% of unfished biomass (B60). |
| **Biomass limit reference point (B*lim*)** | The point below which the risk to the stock is regarded as unacceptably high and urgent management action must be taken to rebuild the stock. The default limit reference point is 20% of unfished biomass (B20). |
| **Target biomass (B*targ*)** | The target reference point in terms of the stock’s biomass. |
| **Ecological risk assessment (ERA)** | An analysis of the best available information about fishery impacts on target species, non-target and protected species (e.g. dugongs, turtles, dolphins and protected fish) and the broader ecosystem.  ERAs identify and measure the ecological risks of fishing activity and identify issues that must be further managed under harvest strategies. |
| **Fishing mortality (F)** | Describes the part of the stock’s total mortality rate due to fishing, often expressed as a rate that indicates the percentage of the population caught in a year. |
| **Fishing mortality target (F*targ*)** | The fishing mortality that achieves the target biomass (B*targ*). |
| **Individual transferable quota** | A fully tradeable catch share allocated to individual fishers or companies that allows the holder to catch a portion of the total allowable commercial catch (TACC) each fishing season. Usually assigned a weight value in kilograms that will change as the TACC is set for each season. |
| **Maximum economic yield (MEY)** | The sustainable level of annual harvest that allows net economic returns to be maximised (the largest positive difference between total revenue and total costs of fishing, which equals the maximum profit). |
| **Maximum sustainable yield (MSY)** | The maximum annual harvest that can be removed from the stock over an indefinite period under prevailing environmental conditions. |
| **Spawning stock biomass** | An indicator of the status of the stock and its reproductive capacity. It can be defined as total egg production or the combined weight of all individuals in a fish stock (usually females only) that have reached sexual maturity and are capable of reproducing. |
| **Status of Australian Fish Stocks (SAFS)** | A series of assessments of the biological sustainability of a broad range of wild-caught fish stocks against a nationally agreed framework. Reports are published that determine whether the abundance of fish and the level of harvest from the stock can be considered sustainable. |
| **Total allowable catch (TAC)** | A harvest limit that is set as an output control on fishing for all sectors, specifying the total amount of fish that can be taken from a fishery each year. |
| **Total allowable commercial catch (TACC)** | The harvest limit set for the commercial fishing sector is usually achieved through setting TACC, but sometimes through input controls |
| **TMIN, 2TMIN** | Rebuilding timeframes specified relative to the minimum timeframe for rebuilding in the absence of fishing. |

1. Punt AE et al. 2014 ‘Selecting relative abundance proxies for BMSY and BMEY’, *ICES Journal of Marine science*, 71: 469–483 [↑](#footnote-ref-2)