

# Reef line fishery harvest strategy: 2020–2025

Business unit owner      Management and Reform

Endorsed by                Deputy Director-General (Fisheries and 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*

**Revision history**

Version no.	Approval date	Comments
1.0	October 2019	Draft harvest strategy for consultation
2.0	April 2020	Approval of final harvest strategy

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## What the harvest strategy is trying to achieve

This harvest strategy has been developed to manage all coral reef fin fish species of Queensland, as part of the reef line fishery. All coral reef fin fish stocks are considered sustainable (noting that many species are undefined), with the risk of fishing on sustainability considered low due to the existing management framework and marine park zoning. It is a multi-species fishery; however, coral trout (*Plectropomus* spp.) are the principal target species that drives fishing effort, and they are often caught without high harvest of other (non-target) species.

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 defined biomass targets. If biomass estimates are available for a species, decision rules are designed to set catch limits at levels appropriate for achieving and maintaining spawning biomass at 60%, and maintaining catch shares amongst commercial, recreational, charter and traditional fishing sectors. If biomass estimates are not available for a species, precautionary catch triggers have been designed to allow for controlled expansion of fishing, optimising economic yield while monitoring changes in catch and effort within historic catch levels.

## Fishery overview

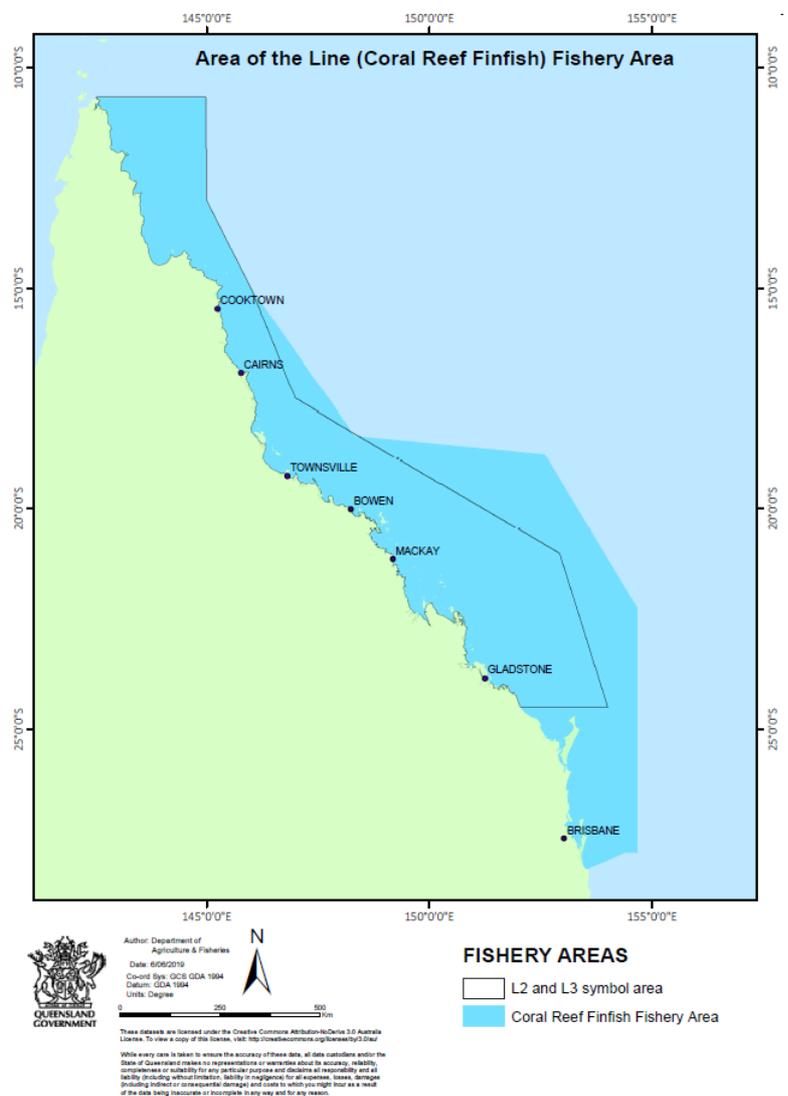
The reef line fishery is a line-only fishery targeting a range of bottom-dwelling reef fish. The commercial fishery operates predominantly within the Great Barrier Reef Marine Park, with a small amount of catch and effort reported from outside this area. Operators target high-value coral trout for live export, as well red throat emperor and a wide range of coral reef fin fish species sold domestically.

Commercial fishing operations generally consist of a number of smaller tender boats (dories) and a larger primary fishing vessel. However, there is a degree of variability within the fishery, which encompasses smaller operations undertaking single day trips through to larger vessels with multiple dories operating over a two-week period.

Recreational fishers access the fishery via private recreational vessels or as paying customers on offshore charter operations (both single and multi-day charters).

Recreational fishers target a wide range of coral reef fin fish species, with significant social interest in coral trout, emperor and tropical snapper species (which feature prominently in the statewide recreational fishing survey).

In addition to the recreational and commercial fishing sectors, the reef line fishery also includes traditional catch. Catch and effort in the Indigenous fishing sector remains the least understood of all sectors. However, it is assumed that this sector has comparatively low levels of effort, with fishing activities aligning closely with the recreational fishing sector.



## Fish stocks covered by the harvest strategy

Coral trout is the primary species group targeted. There are a number of species of coral trout regularly caught in the fishery, including common coral trout (*Plectropomus leopardus*), barcheek coral trout (*P. maculatus*) and blue-spotted coral trout (*P. laevis*), with the common coral trout making up the majority of commercial harvest. A genetic study of coral trout on the Great Barrier Reef found no spatial separation of stocks.

Red throat emperor (*Lethrinus miniatus*) is Queensland's second most important reef fish by commercial catch weight, and is also a popular target fish for recreational fishers. Research on the stock structure of red throat emperor concluded that there was no evidence for distinct genetic stocks on the Great Barrier Reef. Table 1 outlines the fish stocks covered by this harvest strategy.

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

Feature	Details
<b>Primary target species</b>	<p>Coral trout inclusive of:</p> <ul style="list-style-type: none"> <li>• common coral trout (<i>P. leopardus</i>)</li> <li>• barred-cheek coral trout (<i>P. maculatus</i>)</li> <li>• Chinese footballer (<i>P. laevis</i>)</li> <li>• highfin coral trout (<i>P. oligacanthus</i>)</li> <li>• passionfruit trout (<i>P. areolatus</i>)</li> <li>• coronation trout (<i>Variola. louti</i>)</li> </ul>
<b>Secondary species</b>	<p>Red throat emperor (<i>L. miniatus</i>)</p> <p>Other species:</p> <ul style="list-style-type: none"> <li>• red emperor (<i>L. sebae</i>)</li> <li>• stripey snapper (<i>L. carponatus</i>)</li> <li>• saddletail snapper (<i>L. malabaricus</i>)</li> <li>• crimson snapper (<i>L. erythropterus</i>)</li> <li>• goldband snapper (<i>P. multidentis</i> and <i>P. typus</i>)</li> <li>• spangled emperor (<i>L. nebulosus</i>)</li> </ul>
<p><b>Species biology</b></p> <p>≈ : approximately equal to            ~ : approximately</p>	<p><b>Coral trout species</b></p> <p>Longevity:</p> <ul style="list-style-type: none"> <li>• <i>P. leopardus</i> – 17 years, ≈650 mm fork length</li> <li>• <i>P. maculatus</i> – 13 years, 650 mm fork length</li> <li>• <i>P. laevis</i> – 16 years, ~1150 mm fork length</li> </ul> <p>All species are protogynous hermaphrodites (individuals are born female and later become male)</p> <p>Age at maturity and sex change vary:</p> <ul style="list-style-type: none"> <li>• <i>P. leopardus</i> – female ~280 mm fork length, male ~500 mm fork length (~4 years of age)</li> <li>• <i>P. maculatus</i> – female ~300 mm fork length, male ~ 440 mm fork length</li> <li>• <i>P. laevis</i> – female ~450 mm fork length, male ~870 mm fork length</li> </ul> <p><b>Red throat emperor</b></p> <ul style="list-style-type: none"> <li>• Longevity: 20 years, 650 mm total length</li> <li>• Age at 50% maturity: females 1.2 years, 280 mm fork length, 310 mm total length</li> </ul>

## Management units

Defining the fishery to which a harvest strategy will apply is a critical step in determining its scope. The management units for this harvest strategy are defined by the Fisheries (Commercial Fisheries) Regulation 2019.

Stocks:

- coral trout, including all seven species
- red throat emperor
- all other coral reef species (as defined by the Fisheries (General) Regulations 2019)

Fishing under the reef line fishery is permitted within the L1, L2, L3 and L8 fishery areas.

## Summary of management information

A summary of the management arrangements for the reef line fishery are set out Table 2. Fishers should consult the relevant fisheries legislation for the latest and detailed fishery rules.

**Table 2: Summary of management arrangements for the reef line fishery**

Feature	Details
<b>Commercial access</b>	Primary commercial fishing licence with one of the following fishery symbols: <ul style="list-style-type: none"> <li>• L1 – line fishing south of 24°30'S</li> <li>• L2 and L3 – line fishing north of 24°30'S in the Great Barrier Reef Marine Park</li> <li>• L8 – multi-hook deep-line in waters greater than 200 m</li> <li>• quota/access symbols – RQ</li> </ul>
<b>Relevant fisheries legislation</b>	<ul style="list-style-type: none"> <li>• <i>Fisheries Act 1994</i></li> <li>• Fisheries (General) Regulation 2019</li> <li>• Fisheries (Commercial Fisheries) Regulation 2019</li> <li>• Fisheries Declaration 2019</li> <li>• Fisheries Quota Declaration 2019</li> </ul>
<b>Other relevant legislation</b>	<ul style="list-style-type: none"> <li>• <i>Great Barrier Reef Marine Park Act 1975</i></li> <li>• Great Barrier Reef Marine Park Regulations 2019</li> <li>• <i>Environment Protection and Biodiversity Conservation Act 1999</i></li> <li>• <i>Marine Parks Act 2004</i></li> </ul>
<b>Working group</b>	Reef line fishery working group (terms of reference and meeting communiques are available at <a href="http://fisheries.qld.gov.au">fisheries.qld.gov.au</a> )
<b>Gear</b>	The following apparatus are permitted for use: <ul style="list-style-type: none"> <li>• hook and line apparatus</li> <li>• recreational fishers may use hook and line, rods and reels, and spearfishing gear (excluding hookah/scuba)</li> </ul>
<b>Main management methods</b>	Spawning closures, minimum and maximum size limits, no-take species, gear restrictions  <b>Commercial only:</b> Limited access through commercial fishing boat licences, species-specific individual transferable quotas (ITQ) for coral trout and red throat emperor, combined/basket ITQ for other species, vessel and tender restrictions <b>Recreational only:</b> In-possession and size limits, and a total possession limit of 20
<b>Fishing year</b>	Quota season: 1 July – 30 June

Feature	Details
<b>Stock status</b>	Status of Australian fish stocks reports (visit <a href="http://fish.gov.au">fish.gov.au</a> ): <ul style="list-style-type: none"> <li>• coral trout listed as ‘sustainable’ (2018)</li> <li>• red throat emperor listed as ‘sustainable’ (2018)</li> <li>• all other species are listed as ‘undefined’ (2018)</li> </ul>
<b>Accreditation under the Environment Protection and Biodiversity Conservation Act 1999</b>	Part 13: Accredited (expires 6 March 2020) Part 13A: Accredited (expires 6 March 2020) Visit <a href="http://environment.gov.au">environment.gov.au</a>

## Fishery objectives

Fishery objectives set out the direction and aspirations to achieve in the long term. The primary objective for the reef line fishery is to:

- maintain all species in the reef line fishery at, or returned to, a target spawning biomass level that aims to maximise economic yield (MEY) for the fishery, while
  - ensuring no unacceptable risk from fishing to species in the other species quota group
  - maintaining sectoral allocations for all coral reef fin fish species
  - minimising and mitigating high ecological risks arising from fishing-related activities
  - maximising profitability for the commercial and charter sector
  - monitoring the social and economic benefits of the fishery to the community.

## Catch shares

This harvest strategy aims to maintain the existing catch shares between sectors. The resource allocation arrangements (as at 2018) are set out in Table 3 (overleaf) to ensure that catch shares among sectors are maintained in response to changes in the total allowable catch (TAC). Catch shares for secondary and byproduct species will be established once a species is assessed as requiring a stock assessment to inform setting a TAC .

These indicative resource allocation arrangements may be updated if new information becomes available from the 2019 statewide recreational fishing survey that indicates the defined sectoral proportions are no longer consistent with effective management of the fishery. An update of the resource-sharing arrangements would be undertaken in this instance to ensure that catch shares are based on the most recent and reliable information for all sectors. After 2021, only approved resource reallocations would adjust the catch shares within this harvest strategy.

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 not a defined allocation.

Aboriginal peoples and Torres Strait Islanders desire more economic opportunities through fishing, particularly in their own sea country. In line with the *Aboriginal and Torres Strait Islander commercial fishing development policy*, up to 5 tonnes will be set aside to provide access through an Indigenous fishing permit, issued in accordance with section 54 of the Fisheries (General) Regulation 2019, to provide opportunities for communities to take part in fishing-related business.

**Table 3: Resource allocation arrangements for the reef line fishery**

Species	Commercial fishing*	Recreational fishing** (including charter)
Coral trout	80%	20%
Red throat emperor	60%	40%
Indigenous commercial fishing development	5 tonnes	

\* The commercial catch share for coral trout is informed by the 2019 coral trout stock assessment, and for red throat emperor it is informed by the 10-year average of catch reported in the quota monitoring system.

\*\* Recreational catch share is informed by the statewide recreation fishing survey (2010–2013).

## Managing performance of the fishery

### Biomass-based performance indicators and reference points for target species

Key indicators measure the health of the fishery. The indicators relate to the objectives and use reference points to establish acceptable performance (Table 4 overleaf). The indicators measure the relative amount of fish biomass of key stock(s) against target and other reference points. The default biomass reference points identified in this harvest strategy are as follows:

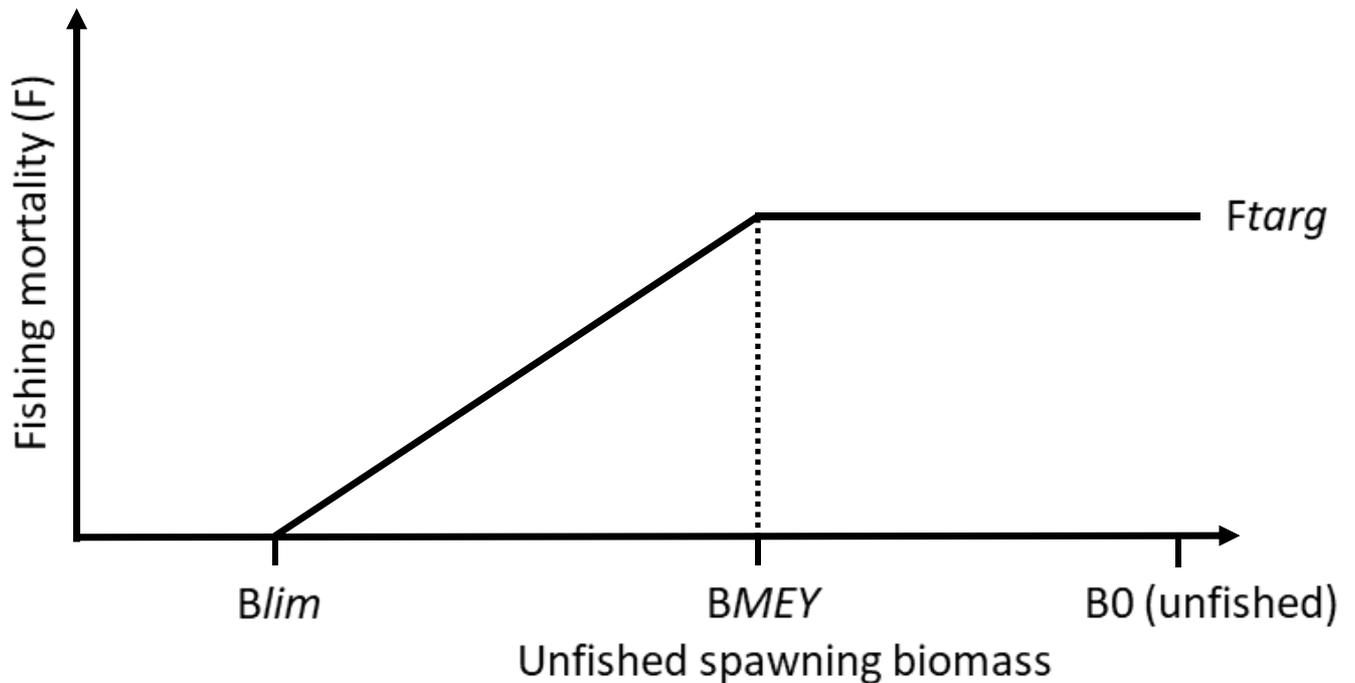
- A target reference point (*B<sub>targ</sub>*) of 60% of the unexploited spawning biomass (for key target species) is the relative biomass level the harvest strategy aims to achieve. This is also considered a proxy measure of *B<sub>mey</sub>* (biomass at maximum economic yield) for the purposes of this harvest strategy.
- A limit reference point (*B<sub>lim</sub>*) of 20% of the unexploited spawning biomass is the level that the harvest strategy aims to avoid. If the stock is assessed to be below *B<sub>lim</sub>*, the risk to the stock is unacceptably high and the stock is defined as ‘depleted’.

For key stocks, performance indicators and sustainable harvests for all sectors will be estimated from a stock assessment. The aim is to measure the capability of the stock to attain the target biomass level (*B<sub>targ</sub>* 60%), and at which point the harvest strategy will be considered as meeting its fishery objectives.

The decision rules for setting a sustainable harvest are based on a ‘hockey stick’ approach (see Figure 1 overleaf)—the TAC is set based on a linear relationship between *B<sub>lim</sub>* where the level of fishing mortality (F) is equal to zero, and *B<sub>targ</sub>* where the exploitation rate and TAC is set at the level to achieve maximise economic yield).

The decision rules takes into account the current biomass level of the stock for determining the TAC to achieve *B<sub>targ</sub>*. The recommended TAC is calculated by applying the rate of fishing mortality to achieve *B<sub>targ</sub>* to the current spawning biomass level. As a result, the recommended TAC represents the total catch from all sectors (including discards) that can be harvested in the next two years, to move the current biomass level towards the target level.

If the spawning biomass falls below the limit reference point (*Blim* 20%), there will be no more targeted fishing of the stock until a rebuilding strategy is developed to increase the spawning biomass above the limit within one generation (a generation is defined as the average age of full maturity for the fish species). The rebuilding timeframe of one generation takes into account the productivity and life span of the fish species.



**Figure 1: The ‘hockey stick’ rule—*Blim* is the limit reference point, *Bmey* is the biomass at maximise economic yield, *B0* is the unfished biomass, *F* is fishing mortality and *Ftarg* is the level of fishing mortality for *Bmey***

To meet the objectives of the fishery, the harvest strategy will also constrain all sectors within their allocated catch share.

Should a new estimate of recreational harvest or catch from charter fishing logbooks indicate that a sector has increased their catch share outside of the allocated proportion for any TAC species, an adjustment will be made to constrain harvest within this catch share. Adjustments to recreational fishing limits may be undertaken if large changes are made to the TAC for a species.

## Performance indicators and reference points for secondary and byproduct species

If the primary performance indicator (biomass) is not available for secondary target species (e.g. those in the ‘other species’ quota grouping), trigger reference points will manage levels of fishing mortality:

- if the annual commercial harvest exceeds 20 tonnes for an individual species and
- if the annual commercial harvest has increased to 1.5 or 2 times above historical average levels (from the defined reference years).

An annual catch level of 20 tonnes per species has been determined as the point at which increasing harvests may present an increased risk to the sustainability of any given species. Given this, a catch trigger is used to detect species that may be subjected to increased targeting. The trigger aims to detect shifts in fishing effort by comparing annual harvests against the average catch level from the reference period of 2011–2015. This reference period represents a stable period of commercial operation—including weather events such as cyclones, fishing effort and number of licences—and has been evaluated using retrospective analysis.

**Table 4: Performance indicators and reference points for the reef line fishery**

Species	Performance indicator	Type of reference point	Reference level
Coral trout	Biomass	Target ( <i>B<sub>targ</sub></i> )	60% spawning biomass
Coral trout	Biomass	Limit reference point ( <i>B<sub>lim</sub></i> )	20% spawning biomass
Coral trout	Change in commercial harvest	Maximum change per year	200 tonnes
All species	Maximum level of fishing mortality by all sectors	Target reference point	F60
All species	Change in recreational in possession limit	Maximum change	±2 fish
Red throat emperor and other species (when available)	Biomass	Target ( <i>B<sub>targ</sub></i> )	60% spawning biomass
Red throat emperor and other species (when available)	Biomass	Limit reference point ( <i>B<sub>lim</sub></i> )	20% spawning biomass
Red throat emperor and other species	Logbook catch	Average catch 2011–2015 Reference period	1.5 x reference period
Red throat emperor and other species	Logbook catch	Total allowable commercial catch	2 x reference period

## Management of target species

### Commercial decision rules for target species

The decision rules provide guidance to set the total allowable commercial catch (TACC) based on estimates of biomass available. The decision rules for coral trout use the outputs of the stock assessment and aim to achieve a target biomass (*B<sub>targ</sub>*) of 60% (see Appendix A: Decision rules for coral trout). To minimise large changes to the TACC in any given year, there is a maximum change buffer of 200 tonnes. If the projected TACC change is greater than 200 tonnes (e.g. a 263 tonne decrease), this would result in a maximum 200 tonne reduction in the next season followed by the remainder amount of 63 tonnes the following season. The TACC is set biannually in year 1, year 3 and year 5 of the harvest strategy.

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- 1.1 If the biomass is at or above *B<sub>targ</sub>*, set the TACC at a level that maintains biomass at *B<sub>targ</sub>*.
- 1.2 If biomass is below *B<sub>targ</sub>* and above *B<sub>lim</sub>*, the TACC should be set as inferred by the 'hockey stick' approach (fishing mortality is reduced to the rate that allows the biomass to increase effectively back to *B<sub>targ</sub>*).
- 1.3 If biomass is below *B<sub>lim</sub>*, there will be no further targeted fishing for that species, and a rebuilding strategy will be developed to increase the stock biomass to above *B<sub>lim</sub>* within one generation.
- 1.4 If any new information becomes available indicating that the assessment and TACC-setting arrangements are not consistent with the sustainable management of the fishery, decision rules must be reviewed and, if appropriate, the reference points or timeframes should be adjusted.

#### Notwithstanding that:

- 1.5 The rate of fishing mortality should not exceed that required to achieve *B<sub>targ</sub>* (i.e. F60).
  - 1.6 The TAC should not exceed the level of fishing mortality required to maintain a stock at maximum sustainable yield.
  - 1.7 The new TACC must not change by more than 200 tonnes in any given year unless the spawning biomass is below 20%.
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### Decision rules for secondary and byproduct species

The following decision rules are designed to ensure that fishing does not result in unacceptable levels of fishing pressure on secondary and byproduct species without biomass estimates. The harvest strategy also includes rules to allow TAC adjustment to red throat emperor if an updated biomass estimate becomes available (see Appendix B: Decision rules for secondary species).

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- 2.1 If the commercial annual harvest of any species is less than 1.5 times the average reference period catch (2011–2015) or the annual harvest is less than 20 tonnes, no management action is required.
- 2.2 If the commercial annual harvest of any species is greater than 1.5 times the average reference period catch (2011–2015) and the annual harvest is more than 20 tonnes, a stock assessment is required to inform the appropriate catch levels for this species.
- 2.3 If the annual harvest of any species is greater than 2 times the average reference period catch (2011–2015) and the annual catch is more than 20 tonnes, an interim competitive TACC will be set at 2 times the reference period catch level and a stock assessment will be undertaken.

#### Break-out rules

- 2.4 If a stock assessment becomes available for a secondary target species that indicates a reduction in fishing mortality is required to achieve *B<sub>targ</sub>* (60%) or *B<sub>lim</sub>* (20%) reference points, management action will be undertaken to rebuild the stock (i.e. set the TAC for red throat emperor).
  - 2.5 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 harvest control rules must be reviewed and, if appropriate, the reference points must be adjusted.
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## Decision rules for recreational and charter sector management

To ensure the recreational fishing sector is not increasing their catch share at the expense of the commercial sector, the harvest strategy has been designed to include decision rules for maintaining catch shares between sectors. These decision rules only apply once a TACC is in place and catch shares have been formalised. Should a new estimate of recreational harvest or catch from charter fishing logbooks indicate that the recreational sector has increased their catch share outside of the formalised proportion for any TAC species, adjustments will be made to constrain them within this share. Adjustments to the recreational fishing limits may also be undertaken if large changes are made to the TAC for a species.

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- 3.1 If a recreational harvest estimate for coral trout is no more than 5%, or for all other coral reef fin fish species no more than 10%, above the allocated recreational catch proportion, no management action is required.
  - 3.2 If a recreational harvest estimate exceeds the catch share by greater than 5% for coral trout or 10% for all other coral reef fin fish species, the recreational in-possession limit will be decreased to return catch to allocated proportions.
  - 3.3 If a stock assessment recommends an increase in the TACC to a level that would increase the commercial catch share for coral trout by 5%, and for all other coral reef fin fish species by 10% or more, the recreational in-possession limit will be increased to return catch shares to allocated proportions if necessary.

### Notwithstanding that:

- 3.4 A recreational in-possession limit must not be increased or decreased by more than two fish in any given year, and if the TACC is equal to zero the species will be no take for all sectors.

### Review triggers

A review will be undertaken to understand whether further assessment or management is needed if:

- 3.5 the recreational harvest estimate for a species is greater than 50 tonnes and has increased by greater than 30% from the previous estimate  
**or**
- 3.6 the retained charter catch for a species is greater than 20 tonnes and has increased by greater than 30% from the previous calendar year.

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## Minimising ecological risks

The foundation of sustainable fisheries management is managing the impact of fishing activities on non-target species and the broader marine ecosystem. Ecological risk assessments identify and measure the ecological risks of fishing activity and identify issues that must be further managed under harvest strategies. The below decision rules are in place to minimise and mitigate high ecological risks arising from fishing-related activities.

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- 4.1 If an ecological risk assessment identifies fishing impacts that are considered to generate an undesirable level of risk to any secondary or byproduct species populations (i.e. high risk), a review is triggered to investigate the reason for the increased risk. Appropriate management action should be taken to reduce the risk to an acceptable level.

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A whole-of-fishery level 1 ecological risk assessment for the reef line fishery was completed in 2019 (visit [era.daf.qld.gov.au](http://era.daf.qld.gov.au)) and identified two ecological components/sub-components at higher risk—target and byproduct species (other species category) and protected teleosts (species of conservation interest only). These components have been progressed to a species-specific level 2 ecological risk assessment, which is due for completion in 2020. The *Ecological risk assessment guideline* is available at [fisheries.qld.gov.au](http://fisheries.qld.gov.au).

Future risk assessments will be undertaken periodically to reassess any current issues or new issues that may arise. Risk assessments can be undertaken more frequently if there are significant changes identified in fishery operations, management activities or controls that are likely to result in a change to previously assessed risk levels.

## Monitoring social and economic performance

The *Queensland Sustainable Fisheries Strategy: 2017–2027* outlines the target to set sustainable catch limits based on achieving maximum economic benefits of the resource, which corresponds to around 60% of unfished biomass. This is to support the most economically efficient use of the resource, improve the fishing experience for all sectors (e.g. recreational fishing satisfaction) and promote a resilient system that can bounce back from other adverse environmental conditions (e.g. floods, cyclones and bleaching). The harvest strategy rules have been set up to maintain the stock to this target biomass level.

The objectives listed in Table 5 support 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 if fishery trends are of concern.

**Table 5: Social and economic indicators for the reef line fishery**

Objective	Performance indicators	Management options
Maximising profitability for the commercial and charter sector	Potential indicators to monitor include: <ul style="list-style-type: none"> <li>• catch per unit effort (average per day)</li> <li>• costs, earnings and net financial and economic profit</li> <li>• quota sale and lease price</li> </ul>	Consider regulatory and non-regulatory options Adjust management as needed Options include minimum quota holding and latent effort review
Monitoring the broader social and economic benefits of the fishery to the community	Potential indicators to monitor include: <ul style="list-style-type: none"> <li>• fisher satisfaction (with their fishing experience—commercial and recreational)</li> <li>• percentage of quota/licences that are owned (rather than leased)</li> <li>• income generated (crew plus profit—gross value added)</li> <li>• proportion of catch sold locally</li> <li>• fish prices</li> <li>• number of platforms / number of active licenses / total capacity</li> </ul>	Consider regulatory and non-regulatory options Adjust management as needed

## Monitoring and assessment

The catch and effort data required to inform harvesting of coral reef fin fish species is obtained through commercial logbook returns. For the reef line fishery logbook, visit [business.qld.gov.au](http://business.qld.gov.au).

As the reef line fishery is a quota-managed fishery, real-time reporting and catch disposal records are also required to provide an accurate record of catch. All boats in the fishery are required to have a vessel tracking unit installed and operational on all primary and tender vessels to verify fishing effort reported in commercial fishing logbooks.

Commercial catch rates are standardised to account for a range of potential influencing variables. The current catch rate standardisation considers fishing years, regions and months, as well as the main effects of fishing effort of individual vessels. The standardised commercial catch rates are based on the performance over the quota year.

The data collected via boat ramp surveys and the statewide recreational fishing survey helps provide important information on recreational fishing. Charter operators also record catch information in logbooks, which are included as recreational harvest.

Fisheries Queensland has committed to collecting biological information on seven key coral reef fin fish species to address the emerging knowledge requirements:

- common coral trout (from 1 July 2019)
- red throat emperor (from 1 July 2019)
- crimson snapper (2017)
- saddletail snapper (2017)
- stripey snapper (2017)
- red emperor (2017)
- spangled emperor (2017).

Biological information collected includes length, age and sex of fish being retained. Biological sampling of coral reef fin fish is separated into distinct regions along Queensland's east coast to account for any substantial variations in the population characteristics of the species over the whole region.

The coral trout stock assessment uses an age-structured model with a yearly time step based on financial years. Data on the abundance of coral trout within green zones is estimated using data from the Australian Institute of Marine Science Underwater Visual Surveys. The stock model (or core model) has been developed for management advice and setting the TAC in line with the decision rules. It is expected that the same assessment model and assumptions are used in future assessments under the harvest strategy, unless new information becomes available to suggest a change is required.

## 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 reef line fishery**

Project description	Explanation of need	Priority
Red throat emperor stock assessment	An update to the 2006 red throat emperor stock assessment is required to inform an appropriate TAC for the fishery.	High
Coral trout and red throat emperor monitoring	Length and age data is needed to improve the stock assessments. Previous assessments included recommendations to include length, sex and age information.	High

## Schedule of performance assessment and review

### Schedule of assessment

The fishery's performance will be reviewed against this harvest strategy annually. This review will include convening the reef line working group in February/March to provide operational advice on the fishery's performance and any matters that may need to be addressed. In addition to estimates of spawning biomass, performance will be measured through ecological risk assessments and catch and effort data. If a biomass estimate becomes available prior to the scheduled timeframe that indicates the TAC should be adjusted to meet the objectives of the fishery, the TAC for that year should be reviewed.

**Table 7: Anticipated performance schedule for the reef line fishery**

	Year 1 (2020)	Year 2 (2021)	Year 3 (2022)	Year 4 (2023)	Year 5 (2024)
<b>Monitoring and assessment activity</b>	Coral trout stock assessment Catch and effort monitoring	Red throat emperor stock assessment Catch and effort monitoring	Coral trout stock assessment Catch and effort monitoring	Catch and effort monitoring	Coral trout and red throat emperor stock assessments Catch and effort monitoring
<b>Management action</b>	Review management and adjust TACs if required	Monitor catch levels and adjust TACs if required	Review management and adjust TACs if required	Review catch and effort data	Review harvest strategy, assessment and TACC decision Monitor catch levels

The above schedule outlines the expected timeframes that assessment information will be available to inform management action. There may be instances where an assessment needs to be available prior to the scheduled date or is delayed. Any change to the schedule should be considered by the working group and a decision made by the chief executive based on the below conditions:

- If during the period between scheduled stock assessments the chief executive is concerned that a performance indicator (e.g. stock status, length frequency distributions, standardised commercial catch rates, total harvest, age distributions etc.) suggests that the stock is not performing in a way that will achieve the target biomass level, the chief executive may decide that a stock assessment will be undertaken before the scheduled timeframe.
- If the chief executive is satisfied that; (1) indicators for the stock suggests that it is achieving, or rebuilding to, target biomass levels, and that there is a low ecological risk to the stock under the current management arrangement (i.e. TAC levels); (2) or if resourcing requirements prohibit the ability for an assessment to be delivered in the scheduled timeframe, the chief executive may decide that a scheduled stock assessment will be delayed.

## Schedule of review

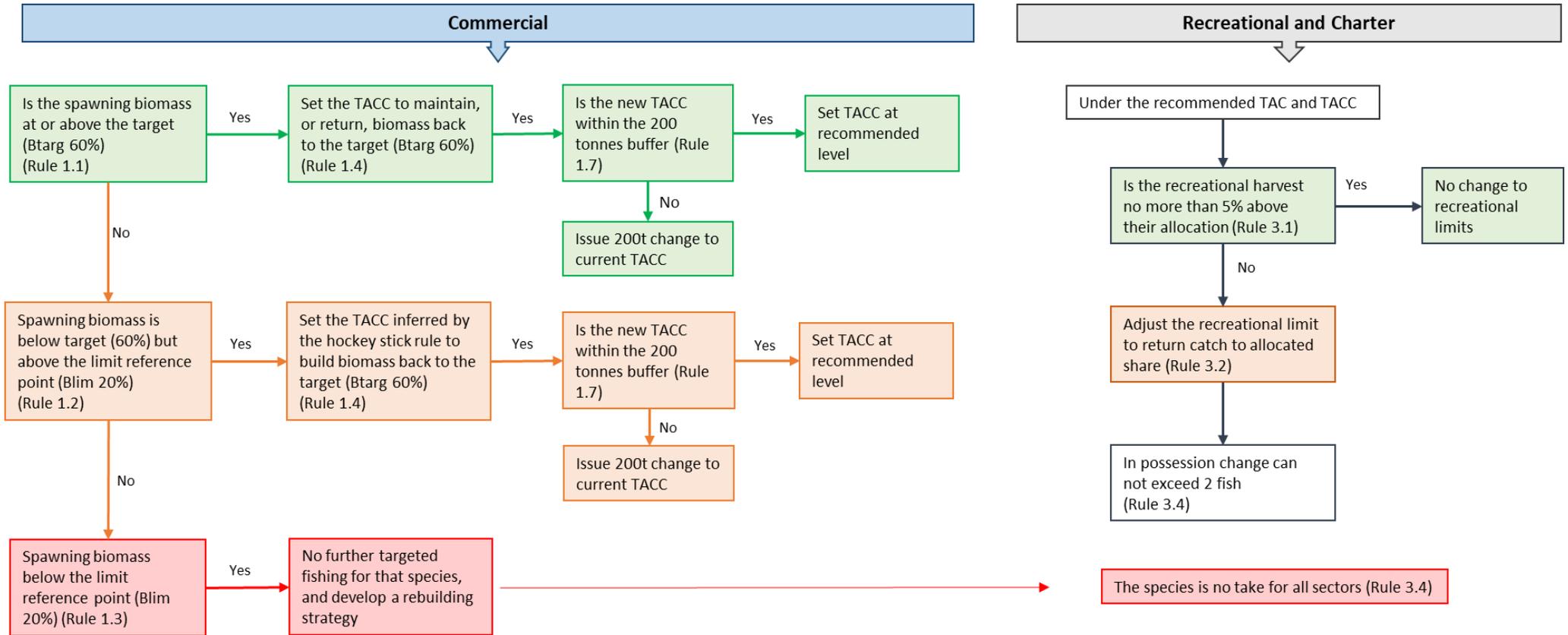
This harvest strategy will remain in place for a period of five years, after which time it will need to be fully reviewed in accordance with the *Fisheries Act 1994*.

While harvest strategies provide certainty and transparency in terms of management decisions in response to fishery information, there also needs to be flexibility to allow new information or changing circumstances to be considered. Consequently, the harvest strategy may be subject to further review and amendment as appropriate within the five-year period if the following circumstances arise:

- there is new information that substantially changes the status of a 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 sector catch shares may have been set incorrectly or may be unrepresentative
- or
- 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://publications.qld.gov.au).

# Appendix A: Decision rules for coral trout



## Appendix B: Decision rules for secondary species

