



# Queensland sea cucumber fishery harvest strategy: 2021–2026

Business area owner Management & Reform

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Enquiries and feedback regarding this document can be made as follows:

Email: [info@daf.qld.gov.au](mailto:info@daf.qld.gov.au)

Telephone: 13 25 23 (Queensland callers only)  
(07) 3404 6999 (outside Queensland)

Monday, Tuesday, Wednesday and Friday: 8 am to 5 pm, Thursday: 9 am to 5 pm

Post: Department of Agriculture and Fisheries GPO Box 46 BRISBANE QLD 4001 AUSTRALIA

Website: [daf.qld.gov.au](http://daf.qld.gov.au)

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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 the sea cucumber resources of Queensland. The sustainability risk to sea cucumbers from harvesting is considered low. In addition to the substantial protection provided by marine park zoning, the hand-harvesting methods used in the Queensland sea cucumber fishery (QSCF) has minimal bycatch and negligible impacts on the broader ecosystem.

Management is currently risk-based and designed to ensure harvesting remains sustainable by monitoring harvesting trends. The harvest strategy provides for moving to assessment-based decision-making through clear fishery objectives, performance indicators, triggers for management action, and appropriate management responses based on the status of Queensland's sea cucumber stocks.

Primary management methods for the QSCF are individual transferable quotas (ITQ) for commercial fishing and in-possession limits for recreational fishing. The decision rules are designed to set catch at levels appropriate for achieving the 60% biomass target set for sea cucumber species, as well as to maintain catch shares between sectors. 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.

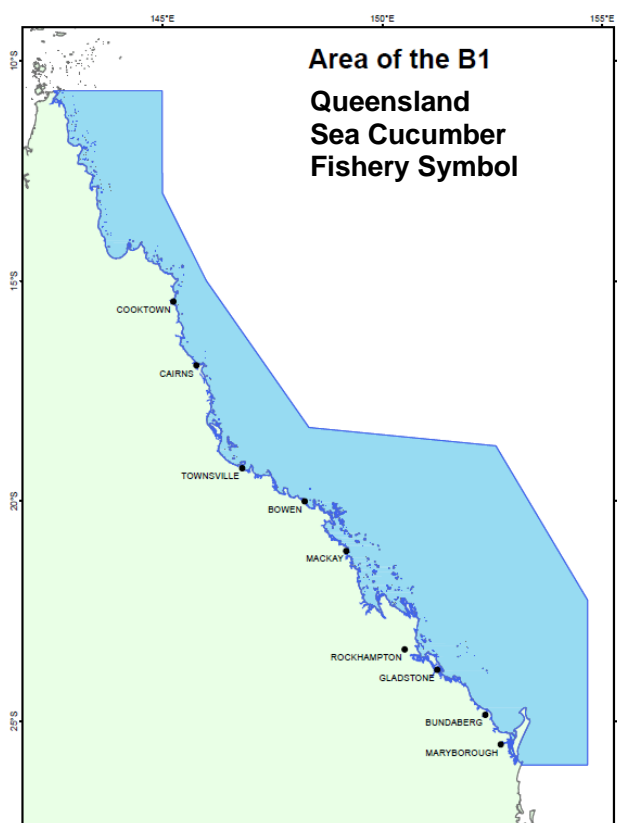
## Fishery overview

The QSCF is a commercial harvest fishery operating predominately within an area that encompasses the Great Barrier Reef Marine Park and Marion and Saumarez reefs. Of the fishery area, 37% is permanently closed to fishing. The fishery is based on the collection of a defined list of sea cucumber species from the family Holothuridae.

The fishery is well positioned to be one of the few sustainably managed sea cucumber fisheries in the world. The commercial sector consists of a small number of quota holders targeting high and medium value sea cucumber species, including white teatfish (*Holothuria fuscogilva*), black teatfish (*Holothuria whitmaei*) and burrowing blackfish (*Actinopyga spinea*). The majority of harvested product is processed via boiling, drying or individual quick freezing and is exported.

The recreational take of sea cucumber is prohibited south of Bowen, with black teatfish and white teatfish being no-take species throughout Queensland waters. Due to the high value of sea cucumber and increasing pressure from domestic markets, black-marketing is a risk for this fishery.

Fishing is also an important customary activity for Aboriginal peoples and Torres Strait Islanders. Traditional fishing may support personal domestic or non-commercial communal needs in accordance with the particular laws and customs of the sea area being fished.



## Stocks covered by the harvest strategy

Sea cucumber is defined in the Fisheries (General) Regulation 2019 as all species in the families Holothuriidae and Stichopodidae, and are significant members of the benthic community. Sea cucumber behaviour and biology have important effects on physico-chemical processes such as bioturbation and bioremediation in coral reef ecosystems. The management of this fishery considers the importance of sea cucumbers in marine ecosystems in order to safeguard their ecological roles. Fish stocks covered by this harvest strategy are outlined in Table 1.

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

Feature	Details
<b>Target species (Tier 1)</b>	Black teatfish ( <i>Holothuria whitmaei</i> ) White teatfish ( <i>Holothuria fuscogilva</i> ) Burrowing blackfish ( <i>Actinopyga spinea</i> )
<b>Other species (Tier 2)</b>	Prickly redfish ( <i>Thelenota ananas</i> ) Blackfish ( <i>Actinopyga palauensis</i> ) Curryfish ( <i>Stichopus vastus</i> and <i>S. herrmanni</i> ) Sandfish ( <i>Holothuria scabra</i> ) Golden sandfish ( <i>Holothuria scabra</i> and <i>H. lessoni</i> ) Surf redfish ( <i>Actinopyga mauritiana</i> ) Deep water redfish ( <i>Actinopyga echinites</i> formerly <i>Sebastes mentella</i> ) Stonefish ( <i>Actinopyga lecanora</i> ) Tigerfish Leopardfish ( <i>Bohadschia argus</i> ) Greenfish ( <i>Stichopus chloronotus</i> ) Brown sandfish ( <i>Bohadschia vitiensis</i> ) Amberfish ( <i>Thelenota anax</i> ) Flowerfish ( <i>Holothuria arenicola</i> ) Lollyfish ( <i>Holothuria atra</i> ) Snakefish ( <i>Holothuria coluber</i> ) Pinkfish ( <i>Holothuria edulis</i> ) Elephant trunkfish ( <i>Holothuria fuscopunctata</i> )
<b>Biology</b>	Detailed scientific information on the distribution, stock structure and ecology of Queensland's harvested holothurian species is limited – estimates of biological characteristics for Tier 1 species are:  <i>H. fuscogilva</i> : age of maturity = ~4 years, maximum length/age = 570 mm/~12 years  <i>H. whitmaei</i> : age of maturity = ~4 years, maximum length/age = 560 mm/~5-10 years  <i>A. spinea</i> : age of maturity = ~3 years, maximum length/age = 380 mm/~6 years

## Management units for the harvest strategy

The management units for this harvest strategy are as defined by the Fisheries (Commercial Fisheries) Regulation 2019. The two management areas are:

- sea cucumber management area A (commercial fishery area) – all tidal waters east of longitude 142°31'49" east between latitude 10°41' south and latitude 26° south
- sea cucumber management area B (other area) – all Queensland waters.

The QSCF commercial fishery area is managed under a rotational harvest arrangement (RHA). Reefs are divided into 158 zones – 52 (year 1 and year 3) and 54 (year 2) zones are made available per annum and a maximum of 18 days diving allowed per zone, per annum. Refer to Appendix 1 for details about the RHA zones.

## Summary of management information

A summary of the management arrangements for the QSCF are set out in Table 2 below. Fishers may access copies of fisheries legislation at [legislation.qld.gov.au](http://legislation.qld.gov.au) or visit [fisheries.qld.gov.au](http://fisheries.qld.gov.au) for the latest information on fishing rules.

**Table 2: Summary of QSCF management arrangements**

Feature	Details
<b>Commercial access</b>	Primary commercial fishing licence with a B1 fishery symbol
<b>Relevant fisheries legislation</b>	<i>Fisheries Act 1994</i> Fisheries (General) Regulation 2019 Fisheries (Commercial Fisheries) Regulations 2019 Fisheries Declaration 2019 Fisheries Quota Declaration 2019
<b>Other relevant legislation</b>	<i>Great Barrier Reef Marine Park Act 1975</i> and Great Barrier Reef Marine Park Regulations 2019 (Cwlth) <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Cwlth) <i>Marine Parks Act 2004</i> (Qld)
<b>Working group</b>	Sea cucumber fishery working group Terms of reference and 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>• <b>commercial</b> – hand collection using underwater breathing apparatus</li> <li>• <b>recreational</b> – hand collection only (excluding hookah/scuba)</li> </ul> Refer to <a href="http://fisheries.qld.gov.au">fisheries legislation</a> for specific gear requirements and rules

Feature	Details
<b>Main management methods</b>	<p><b>Commercial</b></p> <ul style="list-style-type: none"> <li>• Limited access</li> <li>• Species-specific ITQs for black teatfish and white teatfish</li> <li>• Combined ITQ for other species</li> <li>• Vessel and tender restrictions</li> <li>• Number of divers ‘to take’ restrictions</li> <li>• Rotational harvest arrangement</li> </ul> <p><b>Recreational</b></p> <ul style="list-style-type: none"> <li>• In-possession limit of 5 and boat limit of 10 for all species</li> <li>• No-take of black teatfish and white teatfish</li> <li>• Closed waters south of Bowen and in the Gulf of Carpentaria</li> </ul>
<b>Fishing year</b>	1 July – 30 June
<b>Stock status</b>	<p>Stock status is assessed using the nationally agreed <a href="#">Status of Australian Fish Stocks</a> (SAFS) classification framework – white teatfish are listed as ‘sustainable’ (SAFS 2018) and burrowing blackfish listed as ‘sustainable’ (SAFS 2017)</p> <p>*Note: The classification system used as part of the SAFS reporting is assessed against a 20% biomass sustainability criteria. Therefore, although a species may be classified as ‘sustainable’ in SAFS, this does not mean that the biomass is meeting the targets set out in the <i>Queensland Sustainable Fisheries Strategy: 2017–2027</i>. For more species specific biomass estimates, consult the relevant stock assessment for that species.</p>
<b>Accreditation under the Environment Protection and Biodiversity Conservation Act 1999</b>	<p>Part 13: Accredited (expires 2025)</p> <p>Part 13A: Accredited (expires 2025)</p> <p>Visit <a href="http://environment.gov.au">environment.gov.au</a></p>

## Fishery objectives

The objective of the harvest strategy is to manage the fishery in accordance with the objectives of the *Fisheries Act 1994* and the *Queensland Sustainable Fisheries Strategy: 2017–2027*.

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

- maintain all sea cucumber species at, or returned to, a target exploitable biomass level that aims to maximise economic yield (MEY) for the fishery.

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

- minimise and mitigate any unacceptable ecological risks arising from fishing-related activities
- maximise economic performance of the commercial harvest sector
- monitor the broader 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 set out in Table 3 ensure that catch shares among sectors are maintained in response to changes in the total allowable catch (TAC).

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*, case-by-case access through an Indigenous fishing permit, issued in accordance with section 54 of the Fisheries (General) Regulation 2019, may provide opportunities to take part in fishing-related business.

**Table 3: Resource allocation arrangements for the QSCF**

Fishery	Commercial fishing*	Recreational fishing (including charter)
Sea cucumber	99%	1%

\*Commercial catch information collected through commercial logbook requirements.

## Measuring the performance of the fishery

Key indicators measure the health of the fishery. The indicators relate to the objectives and use reference points to establish acceptable performance. The indicators measure the relative amount of fish biomass of tier 1 stocks against target and other reference points. The default biomass reference points identified in this harvest strategy are:

- a target reference point (*B<sub>targ</sub>*) of 60% of the exploitable unfished biomass = being the relative biomass level the harvest strategy aims to achieve for tier 1 species and some tier 2 species within the fishery – this is also considered a proxy for achieving *B<sub>mey</sub>*
- a limit reference point of 20% of the exploitable biomass (*B<sub>lim</sub>*) 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<sub>lim</sub>*, the risk to the stock is unacceptably high and the stock is defined as 'depleted'.

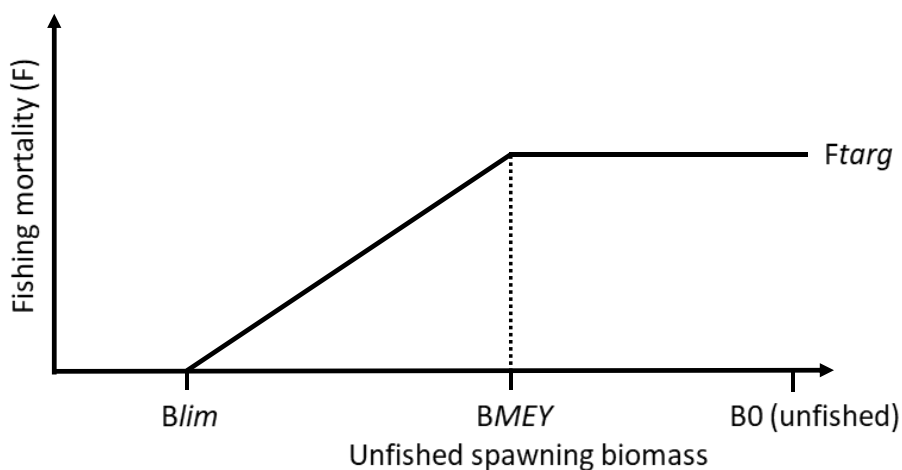


For tier 1 stocks, performance indicators and sustainable harvests for all sectors will be estimated using a stock assessment. The aim is to measure the capability for the stock to attain the target biomass level ( $B_{targ}$  60%), and at which point the harvest strategy will be considered as meeting its fishery objectives.

The decision rules for setting a sustainable harvest in the harvest strategy 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 rules take into account the current biomass level of the stock for determining the TAC to achieve the  $B_{targ}$ .

The recommended TAC is calculated by applying the rate of fishing mortality to achieve  $B_{targ}$  to the current exploitable biomass level. As a result, the recommended TAC represents the total catch that can be harvested in the following years to move the current biomass level towards the target level. A discount factor may also be included to account for uncertainty and to reduce the risk of a fishery not achieving its objectives.

If the spawning biomass of a stock falls below  $B_{lim}$ , targeted fishing of the stock must cease and a rebuilding strategy be developed to rebuild the spawning biomass above  $B_{lim}$  within a biologically reasonable timeframe (e.g. based on mean generation time) and as informed by the *Queensland Harvest Strategy Policy*



**Figure 1: Showing the 'hockey stick' rule –  $B_{lim}$  is limit reference point,  $B_{mey}$  is the biomass at MEY,  $B_0$  is the unfished biomass at 100%,  $F$  is fishing mortality and  $F_{targ}$  is the level of fishing mortality for  $B_{mey}$**

### Management of tier 2 species

For Tier 2 species where the primary performance indicator (biomass) is not available, catch triggers are used to inform increases in fishing mortality. Annual catch levels are assessed against a reference level to detect changes in catch that may represent an unacceptable risk to an individual tier 2 quota group. The catch triggers are defined in Table 4 (overleaf) and have been informed by a management strategy evaluation. If the annual catch for a tier 2 species exceeds its trigger level, then a TAC will be set to maintain the annual catches of that species at, or below, the trigger level until a further assessment can be undertaken. Other performance indicators for the stock (e.g. stock status, length frequency distributions, standardised commercial catch rates, total harvest etc.) will also be reviewed by the sea cucumber fishery working group to ensure that stocks are performing in a way that will achieve the target biomass.

**Table 4: Trigger reference levels for tier 2 species**

Species	Trigger reference level (tonnage)
Prickly redfish	40 t
Blackfish	25 t
Curryfish ( <i>S. vastus</i> )	25 t
Curryfish ( <i>S. hermanni</i> )	50 t
Sandfish	15 t
Golden sandfish	10 t
Surf redfish	25 t
Deep water redfish	25 t
Stonefish	10 t
Leopardfish ( <i>Bohadschia argus</i> )	25 t

Species	Trigger reference level (tonnage)
Amberfish	50 t
Flowerfish	25 t
Lollyfish	50 t
Snakefish	25 t
Pinkfish	50 t
Elephant trunkfish	50 t
Tigerfish	25 t
Greenfish	50 t
Brown sandfish	25 t

### **Rotational harvest**

The fishery also operates under a rotational harvest arrangement (RHA), aimed to mitigate the risk to sea cucumber stocks by spreading fishing effort. Under the RHA, the fishery area is split into 158 zones – each of the 158 zones are allocated a limited number of fishing days (18) only once every three years on a rotational basis (see Appendix A). The objective of the RHA is to reduce the risk of localised depletion and therefore the overall risk of unsustainable fishing practices.

## Management of target species

### 1.0 Decision rules for commercial tier 1 species

The decision rules below have been designed to provide clear guidance to the total allowable commercial catch (TACC) setting process for tier 1 species by defining how advice should be developed and implemented from stock assessments.

- 
- 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, where 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 at or below *B<sub>lim</sub>*, there will be no targeted fishing for that species, and a rebuilding strategy will be developed to increase the stock biomass to above *B<sub>lim</sub>* within a biologically reasonable timeframe and as informed by the *Queensland Harvest Strategy Policy*.
  - 1.4 If and when 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:

- 1.5 The rate of fishing mortality should not exceed that required to achieve *B<sub>targ</sub>*.  
**AND**
  - 1.6 The TACC should not exceed the level of fishing mortality required to maintain a stock at maximum sustainable yield (MSY) at equilibrium.
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### 2.0 Breakout rules for burrowing blackfish

- 2.1 If the annual harvest of burrowing black fish for the defined regions is more than the following catch levels – lizard = 120 tonnes, gould = 45 tonnes or bunker = 60 tonnes – then a competitive TACC will be set at the trigger level and an assessment will be required to determine the risk of localised depletion.
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### 3.0 Decision rules for commercial tier 2 species

The following harvest control rules are to ensure that fishing does not result in unacceptable levels of fishing pressure on tier 2 species. The below rules are set to constrain catch of tier 2 species within harvest levels based on historical catch limits of within the fishery that have been evaluated as acceptable (as outlined in Table 1).

- 
- 3.1 If the annual harvest of any tier 2 species is less than the prescribed trigger level (Table 4), then no management action is required.
  - 3.2 If the annual harvest of any tier 2 species exceeds the prescribed trigger level (Table 4), then a competitive TACC will be set at the trigger level and an assessment will be required to determine the appropriate level of fishing to achieve a 60% biomass target.
- 

### 4.0 Breakout rules for commercial tier 2 species

- 4.1 If a performance indicator (e.g. stock status, length frequency distributions, standardised commercial catch rates, total harvest etc.) suggests that a tier 2 stock is not performing in a way that will achieve the target biomass level, then further assessment or management may be undertaken.
-

## Management of ecological risks from fishing

A foundation of sustainable fisheries management is managing the impact of fishing activities on target and 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 QSCF operates within the Great Barrier Reef World Heritage Area, and as a result this harvest strategy also considers the potential for management action to be taken if fishing for sea cucumber is identified as a high risk under a Great Barrier Reef Marine Park Authority (GBRMPA) Reef Health Incident Response Plan. The below decision rules are in place to minimise and mitigate high ecological risks arising from fishing-.

- 
- 5.1 If an ERA identifies fishing impacts that are considered to generate an unacceptable level of risk to any ecological component, a review is triggered to investigate the reason for the increased risk. Appropriate management action should be taken to reduce the risk to acceptable level.  
**AND**
  - 5.2 To ensure fishery impacts do not result in serious or irreversible harm to the Great Barrier Reef World Heritage Area, if a reef event is identified under the GBRMPA Reef Health Incident Response Plan, a review will be led by GBRMPA and additional management action (voluntary or regulated) may be considered in order reduce the risk to an acceptable level.

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Fisheries Queensland developed the [Ecological risk assessment guideline](#) to assess ecosystem impacts of fishing activities. ERAs will be undertaken in line with the guideline to reassess any current or new ecological risks that may arise in the fishery. ERAs 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.

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## 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, taken initially to correspond to around 60% of exploitable biomass. This is to support the most economically efficient use of the resource, improve the fishing experience for all sectors 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 and performance indicators 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 QSCF**

Objective	Performance indicators	Management options
<p>Maximise economic performance of the commercial harvest sector</p>	<p>Potential indicators to monitor include:</p> <ul style="list-style-type: none"> <li>• capacity utilisation</li> <li>• catch per unit effort (average per day)</li> <li>• costs, earnings and net financial and economic profit</li> <li>• net economic returns, gross state product, gross value of production</li> <li>• quota sale and lease price</li> <li>• profit decomposition (using profit or lease price) to determine impacts of prices, costs and stock/catch rates on changes in profits</li> </ul>	<p>Consider regulatory and non-regulatory options</p> <p>Adjust management as needed</p> <p>Options include minimum quota holding, latent effort review</p>
<p>Monitor the broader social and economic benefits of the fishery to the community</p>	<p>Potential indicators to monitor include:</p> <ul style="list-style-type: none"> <li>• fisher satisfaction (with their fishing experience – commercial and recreational)</li> <li>• Recreational fisher participation and economic information</li> <li>• percentage of quota/licences that are owned (rather than leased)</li> <li>• Gini coefficient of quota owner (measure of concentration)</li> <li>• percentage of total costs/inputs purchased from local businesses/residents</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 licences / total capacity</li> <li>• community satisfaction (with their fisheries and the way in which they are managed)</li> </ul>	<p>Consider regulatory and non-regulatory options</p> <p>Adjust management as needed</p>

## Data collection, validation and assessment

### Fishery-dependent information (self-reported)

Catch and effort data is obtained through commercial logbook returns and real-time landing reports. The catch and effort data required to determine the standardised commercial catch rate for key species is obtained from catch and effort logbook returns and vessel tracking data. The QSCF logbook is available at [business.qld.gov.au](http://business.qld.gov.au).

### 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 a quota-managed fishery, 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.

### Scientific assessment of stock

No modelled stock assessment is currently available for the QSCF. It is a priority under this harvest strategy to develop a modelled stock assessment for the commercial fishery area to inform the TAC-setting process.

### Compliance with CITES requirements

The Convention on International Trade in Endangered Species of Wild Fauna and Fauna (CITES) lists tier 1 sea cucumber species as Appendix II species. This means they are not necessarily threatened with extinction, but they may become extinct, requiring trade to be closely controlled. International trade of Appendix II species may be authorised by the Australian Government granting an export permit or re-export certificate. Permits or certificates should only be granted if the relevant authorities are satisfied that certain conditions are met and the trade of species will not be detrimental to the survival of the species in the wild.

The QSCF is required to provide an annual report to the CITES Scientific Authority of Australia as part of annual reporting under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) Wildlife Trade Operation accreditation.

## 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 reviewed and updated as required.

**Table 6: Information and research priorities for the QSCF**

Project description	Explanation of need	Priority
White teatfish	Stock assessment	High
Black teatfish	Stock assessment	High
Burrowing blackfish	Stock assessment	Moderate

## Schedule of performance monitoring, assessment and review

### Annual performance monitoring and assessment

The fishery’s performance will be reviewed against this harvest strategy **annually**. This will include an annual sea cucumber fishery working group meeting to provide operational advice on the fishery’s performance and any matters that may need addressing.

The primary performance measure will be exploitable biomass, which will be reviewed approximately every three years, with a review of catch and effort data in intervening years.

While harvest strategies provide certainty and transparency in terms of management decisions in response to certain fishery information, there must also be flexibility to allow new information or changing circumstances to be appropriately considered. There may be instances in which a risk assessment may need to be available prior to, or delayed beyond, the scheduled date. Any change to the risk assessment schedule should be considered by the harvest strategy workshop and decided on by the chief executive based on the below conditions:

- If during the period between scheduled risk assessments the chief executive is concerned that a performance indicator (e.g. stock status, commercial catch and effort, total harvest) suggests the stock is not performing in a way that will ensure sustainability, the chief executive may decide that a risk assessment will be undertaken before the scheduled timeframe.
- If the chief executive is satisfied that (1) indicators for the stock suggest it is sustainable, and that there is a low ecological risk to the stock under the current management arrangements, or (2) if resourcing requirements prohibit the ability for an assessment to be delivered in the scheduled timeframe, the chief executive may decide that a scheduled risk assessment will be delayed.

**Table 7: Schedule of performance monitoring, assessment and review**

	Year 1 (2021–22)*	Year 2 (2022–23)	Year 3 (2023–24)*	Year 4 (2024–25)*	Year 5 (2025–26)	Future years
<b>Monitoring and assessment activity</b>	Modelled assessment (tier 1 species)	Catch and effort monitoring	Industry survey (white teatfish)  Catch and effort monitoring	Modelled assessment (tier 1 species)	Catch and effort monitoring	Industry survey (burrowing blackfish)  Catch and effort monitoring
<b>Management activity</b>	Review of TAC  Declaration made if required	Review of catch and effort data  Bring forward TAC decision if needed	Review of catch and effort data and bring forward TAC decision if needed	Review of TAC  Declaration made if required	Review harvest strategy  Reset reference points and TAC if required	Review of catch and effort data  Bring forward TAC decision if needed

**\*Note:** The schedule for species-specific surveys and modelled stock assessments may vary. Surveys are undertaken on a rotational species basis every three years to provide updated population abundance information for black teatfish, white teatfish and burrowing blackfish. Each species is surveyed once every nine years. Under this harvest strategy, modelled stock assessments are required approximately every three years from delivery of the initial stock assessment to assess the sustainability of the fishery.

## 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 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
- 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](#).



## Acronyms and definitions

Acronym/term	Definition
<b>Biomass</b>	Total weight or volume of a stock or component of a stock (e.g. spawning stock biomass would refer to all adult (reproductively mature) fish in a population)
<b>Biomass at maximum economic yield (<i>Bmey</i>)</b>	The average biomass that corresponds to maximum economic yield
<b>Biomass limit reference point (<i>Blim</i>)</b>	The point beyond which the risk to the stock is regarded as unacceptably high
<b>Biomass target (<i>Btarg</i>)</b>	The desired biomass of the stock
<b>Bycatch</b>	A species that is incidentally either: <ul style="list-style-type: none"> <li>• taken in a fishery and returned to the sea</li> <li>• killed or injured as a result of interacting with fishing equipment in the fishery, but not taken</li> </ul> Bycatch can include protected species
<b>Catch-per-unit-effort</b>	The number or weight of fish caught by a unit of fishing effort Can be used as an index of relative abundance or indicator of change in the fishery
<b>Ecological risk assessment (ERA)</b>	An assessment process that evaluates the relative risk posed by fishing on species, habitats and communities within a fishery
<b>F</b>	Fishing mortality
<b><i>Ftarg</i></b>	Fishing mortality target
<b>GBRMPA</b>	Great Barrier Reef Marine Park Authority
<b>Individual transferable quota (ITQ)</b>	Amount of catch or effort allocated to an individual fisher or company
<b>Maximum economic yield (MEY)</b>	Sustainable level of harvest that allows net economic returns (profit) to be maximised
<b>Maximum sustainable yield (MSY)</b>	The maximum average sustainable annual fishing mortality that can occur on a stock over an indefinite period under prevailing environmental conditions
<b>QSCF</b>	Queensland sea cucumber fishery
<b>RHA</b>	Rotational harvest arrangement
<b>SAFS</b>	Status of Australian Fish Stocks
<b>Total allowable catch (TAC)</b>	The harvest limit set as an output control on fishing for all fishing sectors
<b>Total allowable commercial catch (TACC)</b>	The harvest limit set for the commercial fishing sector usually achieved through setting TACC, but sometimes through input controls

## Appendix A: Rotational harvest arrangement

### Annual zone allocation

Year 1					Year 2					Year 3				
C3	C6	C7	C10	C13	C1	C4	C8	C11	M3	C2	C5	C9	C12	M1
M2	M5	M8	M11	M14	M6	M9	M12	M15	M18	M4	M7	M10	M13	M16
M17	M20	M23	M26	M29	M21	M24	M27	M30	M33	M19	M22	M25	M28	M31
M32	M35	M38	M41	M44	M36	M39	M42	M45	M48	M34	M37	M40	M43	M46
M47	M50	M53	M56	M59	M51	M54	M57	M60	M63	M49	M52	M55	M58	M61
M62	O1	O4	O7	O10	O2	O5	O8	O11	O14	O3	O6	O9	O12	O15
O13	O16	O19	O22	O24	O17	O20	O25	O28	O31	O18	O21	O23	O26	O29
O27	O30	O33	O36	O39	O34	O37	O40	O43	O46	O32	O35	O38	O41	O44
O42	O45	O48	O51	O54	O49	O52	O55	O58	O61	O47	O50	O53	O56	O59
O57	O60	O63	O66	O69	O64	O67	O70	O73	O76	O62	O65	O68	O71	O74
O72	O75	C14			O22a	CS1	Ashmore / Boot			O77	CS2			