



# Trawl fishery (northern region) harvest strategy: 2021–2026

Business unit owner Management & Reform

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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 harvest of trawl fishery resources within the northern trawl region. Current stock levels for key prawn species in the northern trawl region are sustainable and effort is below levels associated with maximum sustainable yield. Tiger prawns (brown and grooved) are recognised as the principal target species that controls fishing effort.

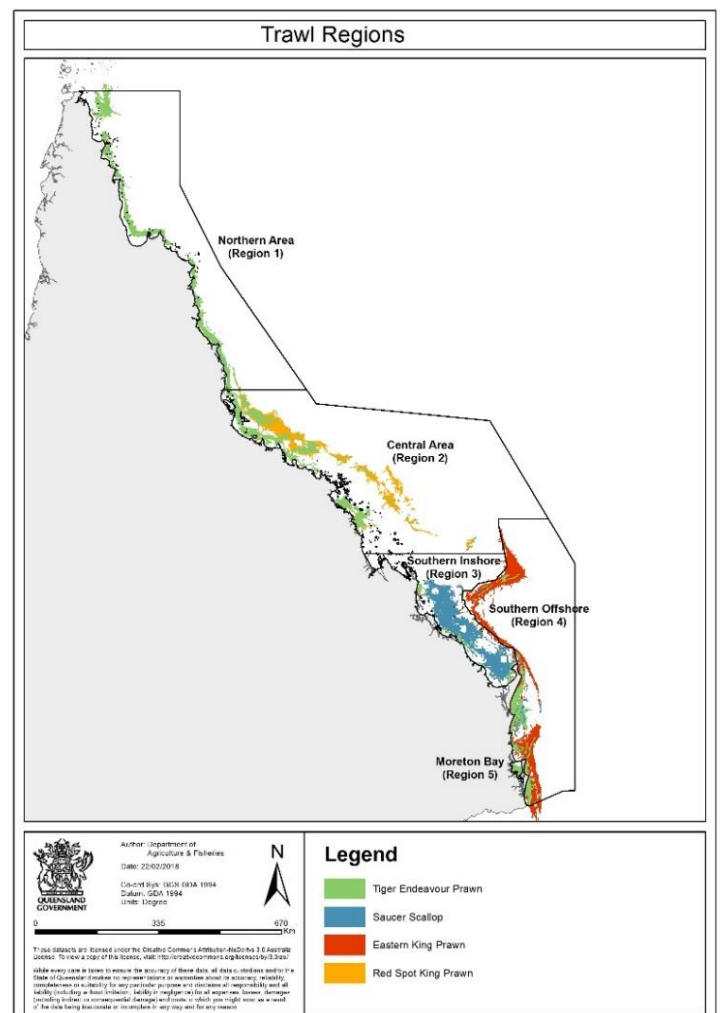
The aim of this harvest strategy is to manage fishing mortality through setting sustainable effort limits at a level that allows the stock to achieve its biomass targets. For all other retained species, effort triggers have been designed to monitor changes in fishing behaviour or stock trends, and hence optimising economic yield, while at the same time being precautionary in detecting changes in species composition within historic catch levels. 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 northern trawl fishery primarily targets tiger prawns, with endeavour prawns also contributing to the catch. The fishery region extends from 18 degrees latitude to the tip of Cape York. It is managed using regional effort units along with a range of other input controls limiting vessel size and the fishing gear that can be used.

The northern trawl region relies heavily on mother shipping services due to the remoteness of fishing locations. Fuel and product transport are key services provided by mother ships to allow vessels to remain at sea for longer periods and avoid the high fuel costs of steaming between their home port of Cairns and the fishing grounds.

A quantitative assessment using weekly delay-difference modelling of the combined brown and grooved tiger prawn resource in the Queensland east coast otter trawl fishery indicated that fishing mortality may have been above sustainable levels before 2000, depleting spawning stock biomass to 80–90% of the level required to achieve maximum sustainable yield (*Smsy*). The spawning stock in the north and south regional sub-stocks, which contribute approximately 80% of the landings from this resource, has since recovered to levels consistently at or above two times *Smsy* (north region) and between 1.2 and two times *Smsy* (south region).



## Stocks covered by the harvest strategy

While tiger prawns are the primary target species, this harvest strategy also manages a number of other permitted species that can be retained while operating under a T1 licence. Table 1 provides a summary of fish stocks covered by this harvest strategy.

A significant proportion of the known brown and grooved tiger prawn distribution is protected by areas closed to trawling. In 2005, an estimated 38% of the brown tiger prawn biomass and 26% of the grooved tiger prawn biomass occurred within closed areas in the Great Barrier Reef Marine Park.

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

Feature	Details
<b>Target species (tier 1)</b>	Brown and grooved tiger prawns ( <i>Penaeus esculentus</i> and <i>Penaeus semisulcatus</i> )
<b>Secondary species (tier 2)</b>	Endeavour prawns ( <i>Metapenaeus endeavouri</i> ) Banana prawns ( <i>Penaeus indicus</i> and <i>Penaeus merguensis</i> ) Moreton Bay bugs ( <i>Thenus</i> spp.)
<b>By-product species (tier 3)</b>	Permitted trawl species: <ul style="list-style-type: none"> <li>• Balmain bugs</li> <li>• blue swimmer crabs</li> <li>• cuttlefish</li> <li>• mantis shrimps</li> <li>• octopus</li> <li>• pipefish</li> <li>• red champagne lobsters</li> <li>• slipper lobsters</li> <li>• threadfin bream</li> <li>• three-spotted crabs</li> </ul>
<b>Biology</b>	Known recruitment periods for tiger prawns are protected by existing closures (15 Dec – 1 Mar) Multiple spawning periods throughout the season for tiger prawns means that a spawning closure period is not viable

## Management units for the harvest strategy

The single management unit for this harvest strategy is the waters from Cape York to latitude 18 degrees. The fishery area is defined by the Fisheries (Commercial Fisheries) Regulation 2019.

## Summary of management information

A summary of the management arrangements for the northern trawl region is set out in Table 2 (overleaf). Fishers may access copies of fisheries legislation via the internet 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 management arrangements for the northern trawl region**

Feature	Details
<b>Commercial access</b>	Primary commercial fishing licence with a T1 fishery symbol
<b>Relevant fisheries legislation</b>	<p><i>Fisheries Act 1994</i></p> <p>Fisheries (General) Regulation 2019</p> <p>Fisheries (Commercial Fisheries) Regulation 2019</p> <p>Fisheries Declaration 2019</p> <p>Fisheries Quota Declaration 2019</p>
<b>Other relevant legislation</b>	<p><i>Great Barrier Reef Marine Park Act 1975</i> and Great Barrier Reef Marine Park Regulations 2019 (Cwlth)</p> <p><i>Marine Parks Act 2004</i></p> <p><i>Environment Protection and Biodiversity Conservation Act 1999</i> and Environment Protection and Biodiversity Conservation Regulations 2000 (Cwlth)</p>
<b>Regional harvest strategy workshop</b>	<p>Northern trawl region harvest strategy workshops are held at least annually</p> <p>Further advice on proposed management arrangement and fishery performance will be shared with the trawl fishery working group</p> <p>Terms of reference and communiques are available at <a href="http://fisheries.qld.gov.au">fisheries.qld.gov.au</a></p>
<b>Gear</b>	<p>Otter trawl apparatus may be used</p> <p>Refer to <a href="#">fisheries legislation</a> for gear requirements</p>
<b>Main management methods</b>	<p>Primary management method is individual effort units and a total allowable effort cap for the region</p> <p>Other management methods include:</p> <ul style="list-style-type: none"> <li>• limited access through primary commercial fishing licences</li> <li>• 20 m maximum vessel length</li> <li>• hull unit (HU) limit of 120 HU</li> <li>• gear restrictions such as net length and mesh size</li> <li>• spatial and temporal closures</li> </ul>
<b>Fishing year</b>	1 March – end of February
<b>Stock status</b>	<p>Stock status is assessed using the nationally agreed <a href="#">Status of Australian Fish Stocks</a> (SAFS) classification framework – tiger prawns are listed as ‘sustainable’ (SAFS 2018)</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’ under 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 specific species 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 2021)</p> <p>Part 13A: Accredited (expires 2021)</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 aspirations and operational direction for the management of this fishery. The primary objective of the Queensland east coast otter trawl fishery is to:

- maintain the target species in the northern trawl region at, or returned to, a target spawning 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 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 commercial effort (TACE). The existing resource allocation arrangements (as at 2018) are set out in Table 3 and this harvest strategy will aim to maintain the existing catch shares between the sectors.

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 to have 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.

**Table 3: Resource allocation arrangements for the northern trawl region**

Species	Commercial Fishing*	Recreational fishing** (including charter)
Tiger prawns	99%	1%

\* Commercial catch data is based on the existing commercial catch level.

\*\* Recreational catch share includes charter fishing and is based on information from statewide recreational fishing surveys.

## Managing the performance of the fishery

Key indicators measure the fishery's performance. 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:

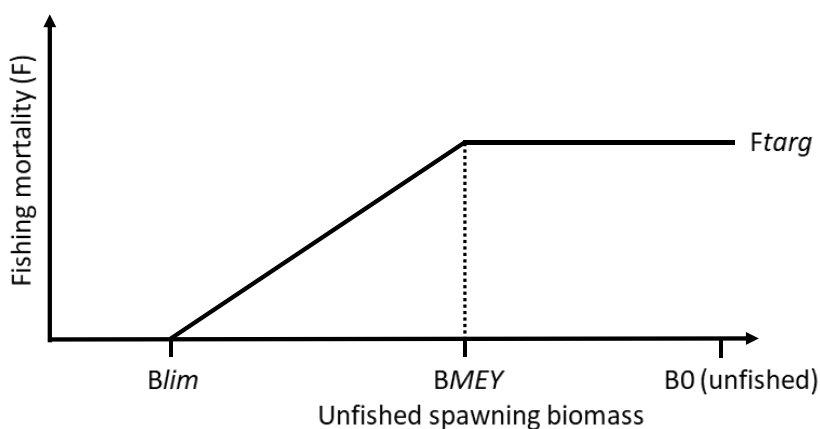
- a target reference point ( $B_{targ}$ ) of 60% of the unfished spawning biomass being the relative biomass level the harvest strategy aims to achieve for tier 1 species and some tier 2 species within the fishery.– this is also considered a proxy for achieving  $B_{mey}$
- a limit reference point of 20% of the unfished spawning biomass ( $B_{lim}$ ) 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'.

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 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 northern trawl region are based on a 'hockey stick' approach. This is where the TACE 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 TACE are set at the level to achieve MEY (Figure 1).

The decision rule takes into account the current biomass level of the stock for determining the TACE to achieve the  $B_{targ}$ . The recommended TACE is calculated by applying the rate of fishing mortality to achieve  $B_{targ}$  to the current spawning biomass level. As a result, the recommended TACE represents the total catch from all sectors (including discards) that can be harvested in the next three 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  $B_{mey}$**



## Setting total allowable commercial effort

The initial effort cap in the northern trawl region was set at levels to achieve maximum sustainable yield (MSY) based on a 2015 report using a bio-economic model for the tiger prawn stock. The total MSY tonnage for tiger prawns was 1836 tonnes – based on a 70% historical catch share in the northern trawl region, this equates to 1285 tonnes or 418 657 effort units.

The harvest strategy is also designed to adjust the TACE based on updated regional fishing power estimates. Fishing power will be updated periodically as part of each scheduled stock assessment. When an updated stock assessment becomes available that indicates the average level of fishing power has changed, the TACE will be set at a level to achieve *B<sub>targ</sub>*.

## Management of secondary commercial and by-product species

If biomass is not available as a primary indicator for secondary (tier 2) and by-product (tier 3) species, commercial catch will be monitored to assess changes in fishing mortality. Annual commercial catch triggers are used to assess changes in fishing mortality when compared to historic catch levels.

Secondary species (tier 2) are important species that aren't always targeted by fishers. These species have historical commercial catch ranges set and annual commercial catch is monitored against these. Historical commercial catch ranges from 2010 to 2019 were used to set the indicator values (Table 4). As the level of exploitation changes outside of historic levels, species will be elevated to higher levels of monitoring, assessment and management.

By-product species (tier 3) are sometimes retained by fishers and have trip limits or no-catch limits in place. Annual commercial catch of by-product species will be monitored against a two-year mean of commercial catch to detect changes in fishery behaviour that may represent unacceptable risk to sustainability. Mean commercial catch from 2017 to 2019 was used to set the reference point for by-product species.

**Table 4: Performance indicators and reference points for the northern trawl region**

Species	Performance indicator	Reference point / buffer	Reference level
Tiger prawns (tier 1 species)	Spawning biomass	Target ( <i>B<sub>targ</sub></i> )	60% spawning biomass
Tiger prawns (tier 1 species)	Spawning biomass	Limit reference point ( <i>B<sub>lim</sub></i> )	20% spawning biomass
Secondary and by-product species (if available) (tier 2 and tier 3)	Biomass	Target ( <i>B<sub>targ</sub></i> )	60% biomass
Secondary and by-product species (if available) (tier 2 and tier 3)	Biomass	Limit reference point ( <i>B<sub>lim</sub></i> )	20% biomass
Secondary species (tier 2)	Annual commercial logbook catch	Commercial catch range	2010–2019
By-product species (tier 3)	Annual commercial logbook catch	2-year mean commercial catch	2017–2019

## Management of target species

### 1.0 Decision rules for tiger prawns

The decision rules provide guidance to set the TACE based on estimates of biomass being available. The decision rules use the outputs of the stock assessment and aim to achieve the target biomass (*B<sub>targ</sub>*) of 60%.

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- 1.1 If the biomass is at or above *B<sub>targ</sub>*, set the TACE 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 TACE 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 any new information becomes available indicating that the assessment and TACE-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 the level of fishing mortality required to maintain a stock at MSY at equilibrium.
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### 2.0 Breakout rules for regional effort usage

- 2.1 If the three-year average regional effort unit usage is 5–15% above the 2019 level, then conduct a review to investigate the reasons for the increased effort.
  - 2.2 If the three-year average regional effort unit usage is more than 15% above the 2019 level, then:
    - implement changes to manage effort unit usage if required, taking any changes in footprint into consideration
    - undertake a stock assessment within three months
    - sets the TACE in accordance with reference points.
  - 2.3 If new information becomes available to suggest that a change to the fishery closure dates should be made to meet the objectives of the fishery, then the fishery closure dates should be adjusted for the following season.
  - 2.4 If and when any new information becomes available indicating that the assessment and TACE-setting arrangements are not consistent with the sustainable management of the fishery, the scientific method and review rules must be reviewed and, if appropriate, the reference points must be adjusted.
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### **3.0 Decision rules for fishing power adjustments**

To ensure that the TACE reflects current fishing power in the northern trawl region, the decision rules allow for adjustment to the TACE if a new fishing power estimate becomes available. The new fishing power estimate will be calculated as the mean change in the most recent five years of fishing power estimates.

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- 3.1 If no new estimate of fishing power is available, then the existing estimate is applied to the TACE. If the fishing power estimate is to be applied at regular intervals between scheduled stock assessment years, the TACE will be set to adjust accordingly.
  - 3.2 When a new estimate of fishing power becomes available, generally every three years through the scheduled stock assessment, then the TACE will be adjusted to the new estimate of fishing power (i.e. an increase in fishing power will result in a proportional decrease in the TACE).
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## **Management of secondary and by-product species**

### **4.0 Decision rules for secondary species**

The secondary species are classified as tier 2 species in this fishery and do not have catch limits. The harvest control rules below monitor effort shift to ensure there is no unacceptable levels of fishing pressure for tier 2 species (e.g. endeavour prawns, Moreton Bay bugs).

The harvest strategy also includes decision rules to allow management arrangements to be implemented if updated biomass estimates become available.

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- 4.1 If the annual catch is between 300 and 520 tonnes for endeavour prawns or 10 and 22 tonnes for Moreton Bay bugs, then no management action is required.
  - 4.2 If the catch for two consecutive years is outside of the catch range of 300–520 tonnes for endeavour prawns or 10–22 tonnes for Moreton Bay bugs, a review is to be undertaken to understand the reason for the increased harvest, assess the risks and ensure catch of a species does not increase more than 20% above the upper catch range. If rule 4.2 is triggered, management action must be in place for the following fishing season until a detailed review is completed (e.g. trip limits, size limits or spatial/temporal closures). If the review identifies that a species is of increasing importance, the species may be considered for further stock assessment, monitoring or management action. If the review identifies sustainability is at risk, a stock assessment for this species is required within three years.
  - 4.3 If a stock assessment becomes available, then the stock assessment will be used to inform management of the species.
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## 5.0 Decision rules for by-product species

By-product species are classified as tier 3 in this fishery and do not have catch limits. The harvest control rules below monitor effort shift to ensure there is no unacceptable levels of fishing pressure for tier 3 species (e.g. Balmain bugs, blue swimmer crabs).

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- 5.1 If the three-year average commercial catch of any species is no more than 10% above the average catch from 2017 to 2019, then no management action is required.
  - 5.2 If the three-year average commercial catch of any species is more than 10% above average catch from 2017 to 2019, a review is to be undertaken to understand the reason for the increased harvest, assess the risks and ensure catch of a species does not exceed 10% above average catch from 2017 to 2019. If catch of a species exceeds more than 10% above average catch from 2017 to 2019, management action must be in place for the following fishing season until a detailed review is completed (e.g. trip limits, size limits or spatial/temporal closures). If the review identifies sustainability is at risk, a stock assessment this species is required within three years.
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## 6.0 Breakout rules for secondary and by-product species

- 6.1 If a biomass estimate is available through a stock assessment for secondary or by-product species that indicates a reduction in fishing mortality is required to achieve a *B<sub>targ</sub>* or avoid *B<sub>lim</sub>* (, then management action is to be taken (e.g. trip limits, size limits or spatial/temporal closures) to pursue the fishery objectives.
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## Management of ecological risks from fishing

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.

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- 7.1 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 risk, and appropriate management action taken to reduce the risk to an acceptable level.
  - 7.2 If the northern trawl region effort footprint in any given year is greater than the 2019 effort footprint, a review will be undertaken to understand the reason for the increased effort footprint and identify appropriate management strategies to reduce the risk, including options that reduce the permitted area that can be trawled. If the review identifies sustainability is at risk, management action is required within two years.
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The most recent ERA was completed in 2012 through a collaborative project between the Great Barrier Reef Marine Park Authority, Fisheries Queensland and the Queensland Seafood Industry Association. The ERA was for the entire Great Barrier Reef Marine Park area; however, the key findings for the northern trawl region are as follows:

- Risks from trawling have reduced in the Great Barrier Reef since the introduction of a fishery management plan in 1999 and subsequent management actions.
- Marine park zoning has been important in reducing risks from trawling.
- Commercial fishers have been proactive in seeking and using better fishing practices to reduce trawling impacts.
- Current risk levels from trawling activities are generally low. Under current practices, and based on 2009 effort levels, the overall ecological risks from trawling to harvested species, as well as the broader environmental values and, are low.
- Trawl fishing effort is a key driver of ecological risk. Real risks will be addressed through harvest strategies and the fishery working group, taking into account the factors contributing to high-risk ratings, the adequacy of current management regime and, if applicable, strategies to reduce and mitigate the risk to the environment. Measures may include regional trawl effort caps under harvest strategies, further reductions in trawl bycatch, high compliance with rules, and accurate information from ongoing risk monitoring etc.

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For more information about the ERA for the east coast otter trawl fishery in the Great Barrier Reef Marine Park, refer to the [summary report](#) or the [full technical report](#).

Fisheries Queensland developed the [Ecological risk assessment guideline](#) to assess ecosystem impacts of fishing activities. Future risk assessments 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 in fishing operations or management 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 *B<sub>msy</sub>* (around 60% of unfished biomass) to support the most economically efficient use of the resource, improve the fishing experience for all sectors and promote a resilient system that can respond to other adverse environmental conditions (e.g. floods, cyclones and bleaching). The harvest strategy decision rules have been set up to achieve this target biomass level.

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

**Table 5: Social and economic indicators for the northern trawl fishery**

Objective	Performance indicators	Management options
Maximise economic performance of the commercial sector	<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 return, gross state product, gross value of production</li> <li>• 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 holding, latent effort review</p>
Monitor the broader social and economic benefits of the fishery to the community	<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 unit/licences that are owned (rather than leased)</li> <li>• Gini coefficient of unit 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>
Maintain Wildlife Trade Operation (WTO) accreditation under the <i>Environment Protection and Biodiversity Conservation Act 1999</i>	Number of conditions met as required through WTO accreditation	Amend fisheries legislation or implement other measures as required to align with best practice and maintain accreditation
Maintain United States turtle exclusion device inspection program and Section 609 United States export accreditation	United States inspection report	Amend fisheries legislation as required to align gear requirements with accreditation requirements

## Data collection, validation and assessment

### Fishery-dependent data (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. Commercial catch rates are standardised to account for fishing power, along with a range of potential influencing variables. The trawl logbook is available at [business.qld.gov.au](http://business.qld.gov.au).

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

### 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 an effort-managed fishery, compulsory effort unit deductions provide an accurate record of fishing activity.. 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

A stock assessment was completed in 2013 and provided MSY and MEY catch and effort estimates for tiger prawns north of 16 degrees south. The assessment presented a joint analysis using linear mixed effects models to standardise the catch per unit effort of multiple species. These standardised catch rates are used in the delay difference model to assess stock status and to provide MSY and MEY reference points. These approaches are applied to the fishery's prawn stocks, including tiger prawns (*Penaeus esculentus* and *Penaeus semisulcatus*), endeavour prawns (*Metapenaeus endeavouri*) and red spot king prawns (*Melicertus longistylus*).

## 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 through the harvest strategy workshop.

**Table 6: Information and research priorities for the northern trawl region**

Project description	Explanation of need	Priority
Regular periodical fishing power surveys	Collect information to improve catch rate standardisation	High
Bycatch reduction device (BRD) testing and evaluation program to support continued innovation	To support continued innovation of trawl BRDs	High

## Schedule of performance monitoring, assessment and review

### Annual performance monitoring and assessment

The fishery’s performance will be monitored against this harvest strategy **annually**. This will include an annual harvest strategy workshop to provide operational advice on the fishery’s performance and any matters that may need addressing.

The primary performance measure is spawning biomass, which will be used to review the TACE every three years. In the intervening years, fishing power estimates will be applied to the TACE, thus reducing the allowable effort proportionally. Refer to the most current [stock assessment](#).

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 stock assessment may need to be available prior to, or delayed beyond, the scheduled date. Any change to the stock 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 stock assessments the chief executive is concerned that a performance indicator (e.g. stock status, standardised commercial catch rate, total harvest) suggests 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 suggest it is achieving, or rebuilding to, target biomass levels, 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 stock assessment will be delayed.

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

	Year 1	Year 2	Year 3	Year 4	Year 5
<b>Assessment program</b>	Modelled stock assessment	Catch and effort monitoring	Catch and effort monitoring	Modelled stock assessment	
<b>Management program</b>	Review TACE, reference points and fishing rules  Fishing power adjustment is required	Review of catch and effort data  Adjust TACE for fishing power  Bring forward management decisions if needed	Review of catch and effort data  Adjust TACE for fishing power  Bring forward management decisions if needed	Review TACE, reference points and fishing rules  Fishing power adjustment is required	Harvest strategy review



## Harvest strategy review

This harvest strategy will remain in place for a period of five years, after which time it will be fully reviewed in accordance with the *Fisheries Act 1994*. The harvest strategy may also 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 strategy is not working effectively and the intent of the harvest strategy policy is not being met.

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

## 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>B<sub>mey</sub></i>)</b>	The average biomass which corresponds to maximum economic yield
<b>Biomass limit reference point (<i>B<sub>lim</sub></i>)</b>	The point beyond which the risk to the stock is regarded as unacceptably high
<b>BRD</b>	Bycatch reduction device
<b>Biomass target (<i>B<sub>targ</sub></i>)</b>	The desired biomass of the stock
<b>Bycatch</b>	<p>A species that is incidentally either:</p> <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> <p>Bycatch can include protected species</p>
<b>By-product</b>	<p>Any part of the catch that is kept or sold, but is not the target species</p> <p>By-product makes some contribution to the value of the catch in a fishery but less than that of key commercial species</p>
<b>Catch-per-unit-effort</b>	<p>The number or weight of fish caught by a unit of fishing effort</p> <p>Can be used as an index of relative abundance or indicator of change in the fishery</p>
<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>F<sub>targ</sub></i></b>	Fishing mortality target
<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>SAFS</b>	Status of Australian Fish Stocks

Acronym/term	Definition
<b>Smsy</b>	Spawning stock biomass – maximum sustainable yield
<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
<b>Total allowable commercial effort (TACE)</b>	The annual effort limit set for a stock, species or species group, used to control commercial fishing mortality within a fishery
<b>WTO</b>	Wildlife Trade Operation