



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

Business Unit Owner Management & Reform

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

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

Revision history

Version no.	Approval date	Comments
1.0	February 2020	Draft harvest strategy for consultation

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What the harvest strategy is trying to achieve

This harvest strategy has been developed to manage trawl fishery resources within the Northern region. Current stock levels for key prawn species in the Northern Region are sustainable and effort is below levels associated with maximum sustainable yield. In the Northern trawl fishery tiger prawns (brown and grooved) are recognised as the principal target species that controls fishing effort.

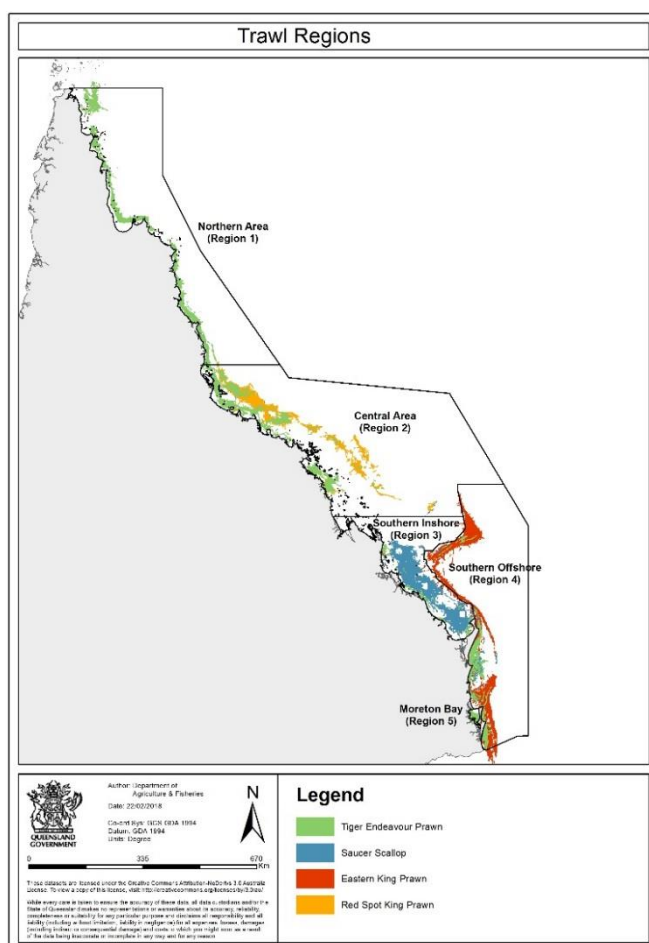
The aim of this harvest strategy is to manage fishing mortality through setting of sustainable effort limits at a level that allows the stock to achieve its biomass targets. For all other retained species effort triggers have been designed to monitor changes in fishing behaviour or stock trends, and hence optimising economic yield, while at the same time being precautionary in detecting changes in species composition within historic catch levels.

Fishery overview

The East Coast Trawl (Northern Region) 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 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 to 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 (ECOTF) 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 MSY (S_{MSY}). The spawning stock in the north and south regional sub-stocks which contribute approximately 80 per cent of the landings from this resource, has since recovered to levels consistently at or above two times S_{MSY} (north region) and between 1.2 and two times S_{MSY} (south region).



Fish 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 through trawling. 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 occurs within closed areas in the Great Barrier Reef Marine Park (GBRMP).

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

Feature	Details
Target species	Brown and grooved tiger prawns (<i>Penaeus esculentus</i> and <i>Penaeus semisulcatus</i>)
Other species	<p>Endeavour Prawns (<i>Metapenaeus endeavouri</i>), Banana Prawns (<i>Penaeus indicus</i> and <i>Penaeus merguensis</i>), and Moreton Bay Bugs (<i>Thenus</i> spp.),</p> <p>Permitted trawl species:</p> <ul style="list-style-type: none"> • Balmain Bugs • Blue Swimmer Crabs • Cuttlefish • Mantis Shrimps • Octopus • Pipefish • Red Champagne Lobsters • Slipper lobsters • Threadfin Bream • Three Spotted Crabs
Biology	Known recruitment periods for Tiger Prawns are protected by existing closures (15 Dec-1 Mar) and multiple spawning periods throughout the season for Tiger Prawns means that a spawning closure period is not viable.

Management units for this harvest strategy

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

- *Northern Trawl Region* is located from Cape York to latitude 18 degrees south.

Fishery summary

A summary of the management arrangements for the northern trawl region are set out in table 2. Fishers should consult the relevant fisheries legislation for the latest and detailed fishery rules or visit www.fisheries.qld.gov.au.

Table 2: Summary of management arrangements for the Northern Trawl Region.

Feature	Details
Commercial Fisheries symbol	Primary Commercial Fishing Licence with a “T1” fishery symbol
Relevant fisheries legislation	<i>Fisheries Act 1994</i> <i>Fisheries (General) and (Commercial Fisheries) Regulations 2019</i> <i>Fisheries Declaration 2019</i>
Other relevant legislation	<i>Great Barrier Reef Marine Park Act 1975 and Regulation 2019</i> <i>Marine Parks Act 2004</i> <i>Environment Protection and Biodiversity Conservation Act 1999 and Regulation 2000</i>
Working Group	Southern Offshore Region Harvest Strategy Working Group Terms of Reference and meeting communiques are available online
Gear	Otter Trawl
Main management methods	<i>Commercial only</i> <ul style="list-style-type: none"> • Primary management method is Individual Effort Units and a total allowable effort cap for the region <p>Other management methods include:</p> <ul style="list-style-type: none"> • Limited access through Commercial Fishing Boat Licences • 20m maximum vessel length • Hull Unit limit of 120 HU • Gear restrictions such as net length and mesh size • Spatial and temporal closures
Fishing year	1 March – End of February
Stock Status	Tiger Prawns are listed as ‘ Sustainable ’ by SAFS 2018 https://www.daf.qld.gov.au/business-priorities/fisheries/monitoring-compliance/data/sustainability-reporting/stock-status-assessment Australian fish stocks (SAFS) www.fish.gov.au <small>*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 Sustainable Fisheries Strategy 2017-2027.</small>
Accreditation under the Environment Protection and Biodiversity Conservation Act 1999	Part 13: Accredited (expires 2020) Part 13A: Accredited (expires 2020) https://www.environment.gov.au/marine/fisheries/qld/east-coast-otter-trawl

Fishery objectives

Fishery objectives set out the aspirations and operational direction for the management of this fishery.

- 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.

While:

- Minimising and mitigating high ecological risks arising from fishing related activities;
- Maximising profitability for the commercial 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 are set out in Table 3 below to ensure that catch shares among sectors are maintained in response to changes in the 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.

Aboriginal and Torres Strait Islander peoples traditional fishing rights 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 and Torres Strait Islander peoples desire more economic opportunities through fishing, particularly in their own sea country. In line with the Indigenous Commercial Fishing Development Policy, an Indigenous Fishing Permit may be issued on a case by case basis 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 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.

Managing performance of the fishery

Key indicators measure how healthy the fishery is performing. The indicators relate to the objectives, and use reference points to establish acceptable performance. 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 spawning biomass (for key target species) being the relative biomass level the harvest strategy aims to achieve. This is also considered a proxy measure of *B_{me}* for the purposes of this harvest strategy;

- A limit reference point (*Blim*) of 20% of the spawning biomass being the level that the harvest strategy aims to avoid. If the stock is assessed to be below *Blim* 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 for the stock to attain the target biomass level (*Btarg* 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 harvest strategy are based on a ‘hockey stick’ approach. This is where the Total Allowable Commercial Effort (TACE) is set based on a linear relationship between *Blim*, where the level of fishing mortality (*F*) is equal to zero, and *Btarg* where the exploitation rate and TACE is 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 *Btarg*. The recommended TACE is calculated by applying the rate of fishing mortality to achieve *Btarg* 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.

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 three generations (where a generation is defined as the average age of full maturity for the fish species). The rebuilding timeframe of three generation takes into account the productivity and life span of the fish species.

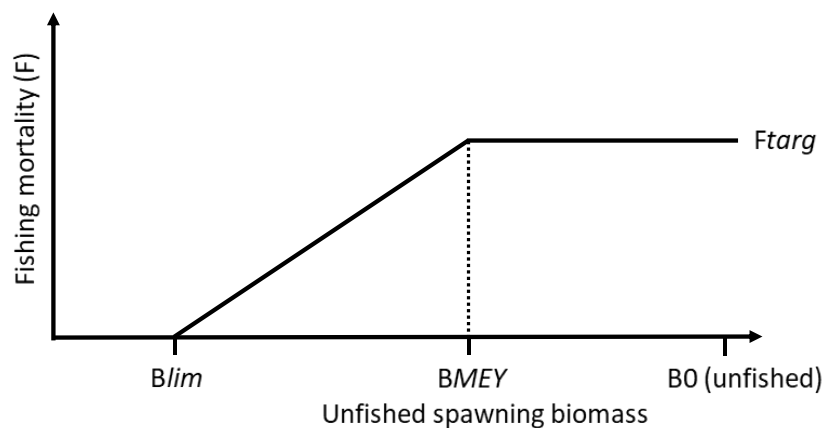


Figure 1: showing the “hockey stick” rule, *Blim* is limit reference point, *Bmey* is the biomass at MEY, *B0* is the unfished biomass at 100%, *F* is fishing mortality and *Ftarg* is the level of fishing mortality for *Bmey*.

Setting Total Allowable Commercial Effort

The initial effort cap in the Northern Trawl Region was set at levels to achieve MSY based on a bio-economic model for the tiger prawn stock. The total MSY tonnage for tiger prawns was 1836t and based on a 70% historical catch share in the Northern Trawl Region this equates to 1285t or 418 657 effort units.

The harvest strategy is also designed to adjust the TACE based new regional fishing power estimates. Fishing power is updated periodically as part of each stock assessment. When an updated stock assessment becomes available that indicates the average level of fishing power has changed then TACE will be set at a level to achieve *Btarg*.

Management of secondary commercial and byproduct species

For secondary commercial and by product species where biomass is not available as a primary indicator, catch triggers are used to assess changes in fishing mortality when compared to historic catch levels. Annual catch levels are assessed against a reference period to detect changes in fishery behaviour that may represent an unacceptable risk. A fixed reference period from 2017-2019 has been defined for the commercial fishery. This reference period represents a stable period of operation where catch, effort and active licences were relatively stable. As the level of exploitation increases above historic levels, species will be elevated to higher levels of monitoring, assessment and management.

Management of target species

Decision rules for tiger prawns

The decision rules below have been designed to provide clear guidance to the TACE setting process by defining how advice should be developed and implemented from stock assessments.

- 1.1 If the biomass is at or above B_{targ} , set the TACE at a level that maintains biomass at B_{targ} .
- 1.2 If biomass is below B_{targ} and above B_{lim} , 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_{targ} .
- 1.3 If biomass is below B_{lim} , 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_{lim} within three generations.
- 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 that required to achieve B_{targ} (i.e. F_{60}); and
 - 1.6 The TACE should not exceed the level of fishing mortality required to maintain a stock at MSY.
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Breakout rules for the take of tiger prawns

- 2.1 If the 3-year average regional effort unit usage is 10 - 25% above the 2019 level, then conduct a review to investigate the reasons for the increased effort.
 - 2.2 If the 3-year average regional effort unit usage is more than 25% above the 2019 level, then:
 - Implement changes to manage effort unit usage if required;
 - undertake a stock assessment within 3 months; and
 - 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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Decision rules for fishing power adjustments

To ensure that the TACE cap reflect current effort in the fishery, the decision rules allow for adjustment to the effort cap if a new fishing power estimate becomes available. The new fishing power estimate will be calculated as the mean change in the most recent 5 years of fishing power estimates.

- 3.1 If no new estimate of fishing power is available, then the existing estimate is applied for the current season and the TACE adjusted accordingly
 - 3.2 When a new estimate of fishing power becomes available every 3 years then the Northern Trawl Region 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

Decision rules for secondary commercial species

The following harvest control rules are to ensure that fishing does not result in unacceptable levels of fishing pressure on endeavour prawns or Moreton Bay bugs. The harvest strategy also includes rules to allow management arrangements to be implemented if an updated biomass estimates becomes available.

- 4.1 If the annual harvest is between 300-520t for endeavour prawns or 10-22t for Moreton Bay bugs, then no management action is required.
 - 4.2 If the harvest for two consecutive years is outside of the catch range of 300-520t for endeavour prawns or 10-22t for Moreton Bay bugs, undertake a review of the trigger and implement management changes for the following season to ensure commercial catch of a species does not increase more than 20% above the upper catch range until a review is completed (e.g. trip limits, size limits or spatial/temporal closures). If the review identifies sustainability of a species is at risk, permanent changes to management arrangements such as those detailed above may be implemented and a stock assessment for this species is required within 3 years.
 - 4.3 If a stock assessment becomes available for endeavour prawns or Moreton Bay bugs that indicates a reduction in fishing mortality is required in order to achieve biomass targets then management action should be undertaken (e.g. trip limits, size limits or spatial/temporal closures).
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Decision rules for byproduct species

The following harvest control rules are to ensure that fishing does not result in unacceptable levels of fishing pressure on any byproduct species (i.e. non target or secondary commercial species).

- 5.1 If the three-year average harvest of any species is no more than 10% above the average catch from 2017 - 2019, then no management action is required.
 - 5.2 If the three-year average harvest of any species is more than 10% above average catch from 2017 - 2019, implement management changes (e.g. trip limits, size limits or spatial/temporal closures) to ensure commercial catch does not exceed 10% above average catch from 2017 -2019 until review is completed. If the review identifies sustainability of a species is at risk, permanent changes to management arrangements such as those detailed above may be implemented and a stock assessment this species is required within 3 years.
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Minimising ecological risks from fishing

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 (ERA) 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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- 6.1 If an ERA identifies fishing impacts that are considered to generate an undesirable level of risk to any secondary or bycatch 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.
 - 6.2 If the Northern Region trawl footprint in any given year is greater than the 2019 footprint, then undertake a review to identify appropriate management strategies to reduce the risk including options that reduce the area trawled.
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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:

- 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 integrity are low.
- Trawl fishing effort is a key driver of ecological risk. Real risks will be addressed through harvest strategies and the fisheries 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.

The relevant ERA is published online at gbrmpa.gov.au and the Summary Report with the main findings is at this link <http://hdl.handle.net/11017/1147> and full Technical Report is at this link <http://hdl.handle.net/11017/1148>

Fisheries Queensland's Ecological Risk Assessment Guideline is published online at <https://www.daf.qld.gov.au/business-priorities/fisheries/sustainable-fisheries-strategy/ecological-risk-assessment-guidelines>.

Future risk assessments will be undertaken periodically to reassess any current or new issues that may arise in the fishery. 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 the social and economic performance

The Sustainable Fisheries Strategy 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 spawning 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). The harvest strategy rules have been set up to maintain the stock to this target biomass level.

The following objectives are to 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 4: social and economic indicators for the Northern Trawl Fishery

Objective	Performance indicators	Management options
Maximise economic performance of the commercial sector	Potential indicators to monitor include: <ul style="list-style-type: none"> • Capacity utilization • CPUE (average per day) • Costs, earnings and net financial and economic profit • Sale and lease price • Profit decomposition (using profit or lease price) to determine impacts of prices, costs and stock/catch rates on changes in profits 	Consider regulatory and non-regulatory options. Adjust management as needed. Options include minimum holding, latent effort review.
Monitor the broader social and economic benefits of the fishery to the community	Potential indicators to monitor include: <ul style="list-style-type: none"> • Fisher satisfaction (with their fishing experience – commercial and recreational) • Percent of unit/licences that are owned (rather than leased) • Gini coefficient of unit owner (measure of concentration) • Percent of total costs/inputs purchased from local businesses/residents • Income generated (crew plus profit – gross value added) • Proportion of catch sold locally • Fish prices • Number of platforms/number of active licenses/total capacity • Community satisfaction (with their fisheries and the way in which they are managed) 	Consider regulatory and non-regulatory options. Adjust management as needed

Objective	Performance indicators	Management options
Maintain US TED inspection program & Section 609 US export accreditation	US Inspection Report	Amend management and fisheries legislation as required to align gear controls with accreditation requirements.

Monitoring and assessment

The catch and effort data required to inform the take of permitted species is obtained through commercial logbook returns. The trawl logbook is at <https://www.business.qld.gov.au/industries/farms-fishing-forestry/fisheries/monitoring-reporting/requirements/logbooks>

As the northern trawl region is an effort-managed fishery, real-time monitoring of effort and catch disposal records are also required to provide an accurate records of the catch for compliance. All boats in the northern trawl fishery are required to have vessel tracking installed and operational on all primary vessels to verify fishing effort reported in commercial fishing logbooks. Vessel tracking is used to draw down effort unit quotas in real time with logbook and catch disposal records used to verify the catches associated with the effort used.

The catch and effort data required to determine the standardised commercial catch rate for key species are obtained from catch and effort logbook returns and VMS data. Commercial catch rates are standardised to account for fishing power along with a range of potential influencing variables.

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 CPUE 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 5 to help meet the objectives of this harvest strategy. These will be updated as required.

Table 5: Information and research priorities for the northern trawl

Project description	Explanation of Need	Priority
Updated stock assessments and program for periodic delivery every 3 years	Essential for setting effort caps in the fishery regions through the harvest strategy	High
Annual standardised catch rate analysis and reference points for key species in each region.	Essential to measure progress towards biomass targets and implement proxies between assessment updates	High
Regular periodical fishing power surveys	Collect information to improve catch rate standardisation	Medium

Project description	Explanation of Need	Priority
Bycatch Reduction Device (BRD) testing and evaluation program to support continued innovation	To support continued innovation of trawl BRDs	High

Schedule of performance assessment and review

The fishery's performance will be reviewed against this harvest strategy annually. This review will include convening the Northern Trawl Fishery Working Group in November/December to provide operational advice on the fishery's performance and any matters that may need addressing. The primary performance measure will be spawning biomass, which will be reviewed every three years, with a review of catch and effort data in intervening years. Table 6 summaries the key review and decision points for the northern trawl region.

Table 6: Schedule of performance assessment and review

	Year 1	Year 2	Year 3	Year 4	Year 5
Assessment Program	Modelled stock assessment	Catch and effort monitoring	Catch and effort monitoring	Modelled stock assessment	
Management Program	Review TACE, reference points & fishing rules Fishing power adjustment is required	Review of catch and effort data, adjust TACE for fishing power and bring forward management decisions if needed	Review of catch and effort data, adjust TACE for fishing power and bring forward management decisions if needed	Review TACE, reference points & fishing rules Fishing power adjustment is required	Harvest Strategy Review

The above schedule outlines the expected timeframes that assessment information will be available to inform management action. There may be instances where an assessment may need to be available prior to, or delayed beyond the scheduled date. Any change to the schedule should be considered by the working group 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, 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

The fishery's performance will be reviewed **annually** against this harvest strategy.

While harvest strategies provide certainty and transparency in terms of management decisions in response to fishery information, there has to be flexibility to allow new information or changing circumstances to be considered. This harvest strategy will remain in place for a period of five (5) years, after which time it will need to be fully reviewed.

The harvest strategy may also 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; or
- Drivers external to management of the fishery increase the risk to fish stock/s; or
- It is clear the strategy is not working effectively and the intent of the harvest strategy policy is not being met.

Further explanation and information on the processes for amending harvest strategies can be found in the *Queensland Harvest Strategy Policy and Guidelines*, published at <https://www.daf.qld.gov.au/business-priorities/fisheries/sustainable-fisheries-strategy/harvest-strategy>.