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**DRAFT Western Australian Octopus
Resource
Harvest Strategy**

October 2024

DRAFT

Version control

Version	Change description	Date
1.0	Octopus resource of Western Australia harvest strategy 2018 – 2022	April 2018
2.0	Draft of the Octopus Resource Harvest Strategy for engagement with peak bodies and industry.	June 2024
2.1	Draft of the Octopus Resource Harvest Strategy for public consultation.	October 2024

Important disclaimer

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List of acronyms

ARMA	Aquatic Resources Management Act
BMSY	Stock biomass that can support the Maximum Sustainable Yield
CAES	Catch and Effort Statistics
CDR	Catch Disposal Record
CEO	Chief Executive Officer of DPIRD
CSLPMF	Cockburn Sound Line and Pot Managed Fishery
DOF	Developmental Octopus Fishery
DPIRD	Department of Primary Industries and Regional Development
EBFM	Ecosystem Based Fisheries Management
ESD	Ecological Sustainable Development
EPBC	Environment Protection and Biodiversity Conservation Act 1999
ETP	Endangered, Threatened and Protected
FRDC	Fisheries Research and Development Corporation
FRMA	Fish Resources Management Act 1994
FRMR	Fish Resources Management Regulations 1995
GLM	Generalised Linear Model
HCR	Harvest Control Rules
MSC	Marine Stewardship Council
OIMF	Octopus Interim Managed Fishery
OCP	Operational Compliance Plan
SCPUE	Standardised Commercial Catch Rate
SLA	Service Level Agreement
WA	Western Australia
WAFIC	Western Australia Fishing Industry Council
WCRLMF	West Coast Rock Lobster Managed Fishery

1.0 Introduction

Harvest strategies for Western Australia's (WA) aquatic resources are formal documents developed to support decision-making processes that ensure the outcomes are consistent with the principles of Ecologically Sustainable Development (ESD; Fletcher 2002a) and Ecosystem Based Fisheries Management (EBFM; Fletcher *et al.* 2012). Harvest strategies are a key component of all contemporary fishery management systems and a requirement for certification under the Marine Stewardship Council (MSC). The objectives of ESD are reflected in the objectives of the *Fish Resources Management Act 1994* (FRMA).

This Octopus Resource Harvest Strategy (Harvest Strategy) has been developed and revised in line with the Harvest Strategy Policy for Aquatic Resources (Department of Fisheries 2015; Fletcher *et al.*, 2016) and is consistent with relevant national harvest strategy policies and guidelines (*e.g.* Sloan *et al.* 2014; Department of Agriculture and Water Resources 2018a, b). It establishes the specific set of decision rules that determine the appropriate harvest levels for all sectors to meet the ecological, economic and social objectives established for the resource.

The publication of this Harvest Strategy is intended to make the decision-making considerations and processes for the management of the Octopus Resource transparent and provide a basis for informed dialogue on management actions with resource users and other stakeholders (Department of Fisheries 2015).

The Harvest Strategy provides guidance for decision-makers but does not derogate from or limit the exercise of discretion required for independent decision-making by the Minister for Fisheries, the Chief Executive Officer (CEO) of the Department of Primary Industries and Regional Development (DPIRD, the Department), or other delegated decision-makers in order to meet the objects of the FRMA.

1.1 Review Process

The Department's Harvest Strategy Policy recognises that management of resources may need to change over time and that a review period should be built into each Harvest Strategy to ensure it remains relevant (Department of Fisheries 2015). Prior to the commencement of this harvest strategy, the *Octopus resource of Western Australia harvest strategy 2018-2022* (Harvest Strategy) provided the guiding principles for the management of the commercial Octopus Interim Managed Fishery (OIMF) and Cockburn Sound Line and Pot Managed Fishery (CSLPMF). This updated Harvest Strategy is scheduled to be reviewed after five years but if required it may be subject to review and amendments within this five-year period.

2.0 Scope

This Harvest Strategy applies to the take of octopus in WA State waters and all the waters within the Australian Fishing Zone. The Octopus Resource includes all octopus species, in particular the Western Rock Octopus (*Octopus djinda*). The Octopus Resource is harvested primarily by the commercial and the recreational sectors. Commercial catches are taken by passive and active traps, while recreational catches of octopus are taken by passive and active traps, and diving.

Consistent with the Department's Harvest Strategy Policy for Aquatic Resources (Department of Fisheries 2015), in addition to considering fishing impacts on the target species, this harvest strategy also considers the impact of fishing on other retained species, bycatch, endangered, threatened and protected (ETP) species, habitats and ecosystems, to ensure any risks to these elements are managed effectively.

2.1 Target Species

The primary target of octopus fishing activities in WA is the Western Rock Octopus (*Octopus djinda*). *O. djinda* has been conclusively identified as a separate species (Amor and Hart 2021), but was formerly known as *Octopus aff. tetricus* or *Octopus cf. tetricus*.

The Western Rock Octopus is endemic to the temperate waters of Western Australia from Shark Bay to Esperance (Edgar 1997). It occurs in depths of 5 to 100 m and inhabits rocky reefs, seagrass meadows, and sandy substrates (Edgar 1997, Norman and Reid 2000). Males reach sexual maturity around 8 months and females 12 months. The maximum age for both sexes is around 18 months (Leporati et al. 2015). Size and sex composition data suggest that the Western Rock Octopus migrates from inshore to offshore waters with increasing age (Leporati et al. 2015).

Females are highly fecund laying ~100,000 eggs that take ~30 days to hatch (Joll 1976). Hatchlings spend ~50 days as paralarvae in the water column before settlement (Hart et al. 2016). The Western Rock Octopus is semelparous and death occurs shortly after egg laying for females and the onset of senility for males (Joll 1983). Major predators include grey nurse sharks, wobbegong, West Australian dhufish, mulloway, queen snapper, groupers (subfamily Epinephelinae) and also Australian sea lions.

Incidences of other octopus species being caught in the OIMF are infrequent, with occasional reports of *Octopus cyanea* and *Octopus ornatus* in northern waters and *Macroctopus maorum* off the south coast (Hart et al. 2016).

2.2 Fishing Activities

Fishing activities in WA include commercial fishing, recreational fishing (including charter) and customary fishing.

2.2.1 Commercial Fishing

2.2.1.1 *Octopus Interim Managed Fishery*

Potential for an octopus fishery in WA was first investigated by Japanese researchers from 1979 to 1981 in response to high levels of octopus predation and bycatch in the West Coast Rock Lobster Managed Fishery (WCRLMF). A developmental strategy for octopus fishing was implemented in the late 1990s and the Developmental Octopus Fishery (DOF) was established in 2001 under exemptions from the FRMA. Initially, shelter

pots (passive trap), an open-ended and unbaited fishing gear that provided a refuge for octopus, were the permitted gear for the DOF. Shelter pots were set on demersal longlines of approximately 500 pots per line that required a soak-time of 15 to 25 days and, due to their design, could only be set in shallow (< 20 m), protected waters.

From 2007 to 2009 fishers in the DOF developed and tested a new gear type known as trigger (active) traps. Trigger traps are a rectangular trap typically set in cradles of three, either as single lines or on longlines. Traps are baited with an artificial lure which rely on octopus attacking the lure and activating the trap door mechanism to prevent escape. This active fishing gear greatly reduced soak time to an average of 11 days, increased catch rates, and enabled fishing in previously inaccessible habitats.

The development of trigger traps provided the impetus to draft an adaptive management strategy for the DOF. In 2011/12, new management arrangements came into place that gave all fishers the opportunity to use the new gear type. The spatial management framework of the fishery was also modified to align with the northern and southern zones of the WCRLMF.

The DOF transitioned to more formal management arrangements in November 2015 with the introduction of the OIMF Plan. The OIMF is a limited entry fishery with ITE units within three zones.

Catch in the DOF/OIMF has grown rapidly with annual catches increasing from 164 tonnes in 2013 to 694 tonnes in 2022 (Desfosses et al., 2024).

Both active and passive traps are highly selective gear types and negligible amounts of species other than octopus are captured by the fishery. Interactions with endangered, threatened and protected (ETP) species are low and restricted to incidental entanglements of whales with ropes and floats. In October 2023, whale entanglement mitigation measures were improved across all three zones of the fishery and incorporated into the OIMF Plan.

The OIMF's Gross Value of Production (GVP) in 2023 was \$8.3 million, supported by a fishing fleet of 24 vessels and processing facilities in Fremantle and Geraldton. In addition to Australian domestic sales, vertically integrated fishers process octopus for supply to premium seafood export markets in Asia, the United States, Dubai and Europe.

2.2.1.2 Cockburn Sound Line and Pot Managed Fishery

The CSLPMF is one of five commercial fisheries established in Cockburn Sound in 1994 and is managed under the *Cockburn Sound (Line and Pot) Management Plan 1995*. The fishery operates using passive traps and is currently the second largest octopus fishery in WA with a 5-year annual average (2018–2022) of approximately 32 tonnes (Desfosses et al., 2024). Squid and fish are also able to be taken by line in the CSLPMF but are outside the scope of this Harvest Strategy. In May 2015, the octopus component of the CSLPMF was transitioned from a fishery where effort was primarily limited by vessel size restrictions to an octopus pot (passive trap) scheme of entitlement. Currently there are 13 licences in the fishery, with nine of these licences holding entitlements to fish for octopus.

2.2.1.3 West Coast Rock Lobster Managed Fishery

The current day OIMF has evolved from the WCRLMF and remains closely connected to this fishery. Historically, most octopus caught in WA was bycatch from rock lobster fishing. The octopus catch from this fishery has been < 40 t since 2009, well below the historical peak of 139 t in 2002 and a 5-year annual average (2018–2022) of 13 tonnes. In line with historical access, the WCRLMF continues to be permitted to deal in and sell octopus taken in the fishery.

2.2.1.4 Other commercial fisheries

In 2023, a prohibition on dealing in and selling octopus was introduced into the OIMF Plan. In accordance with historical arrangements, the following commercial fisheries are exempt from the prohibition and do take small byproduct catches of octopus in the waters of the OIMF.

- Marine Aquarium Fish Managed Fishery;
- South Coast Crustacean Managed Fishery;
- South-West Trawl Fishery; and
- West Coast Estuarine Managed Fishery.

The 5-year annual average (2018–2022) combined catch of octopus from these other commercial fisheries has been around 4 tonnes.

Other commercial fisheries which take octopus as bycatch from waters outside of the OIMF and CSLPMF include:

- Exmouth Gulf Prawn Managed Fishery
- Nickol Bay Prawn Managed Fishery
- Pilbara Crab Managed Fishery
- Shark Bay Prawn Managed Fishery
- Shark Bay Scallop Managed Fishery
- South Coast Estuarine Managed Fishery

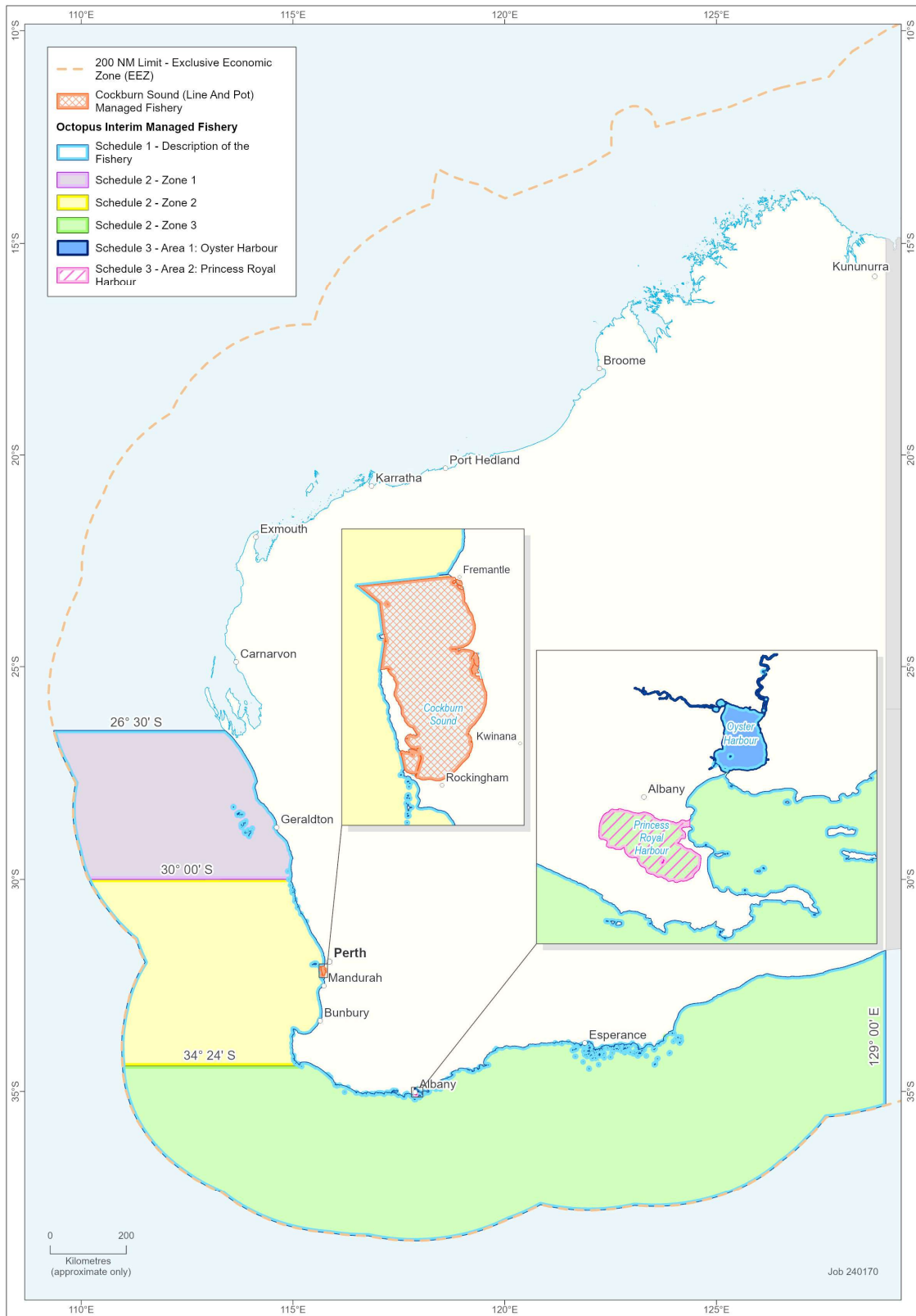


Figure 1 – Boundaries of the Octopus Interim Managed Fishery and Cockburn Sound Line and Pot Managed Fishery, the two main commercial fisheries that target the Octopus Resource.

2.2.2 Recreational Fishing (including Charter)

Recreational fishing for octopus is permitted throughout WA and consists of bycatch from recreational lobster pots and targeted octopus fishing using passive (shelter) and active (trigger) traps or by SCUBA divers.

In 2015, a trial was initiated allowing all persons holding a Recreational Fishing from Boat Licence (RFBL) and all persons operating under the authority of a Fishing Tour Operator's Licence (FTOL) to use a modified version of the commercial octopus active trap to target octopus from boats. Recreational fishers and Fishing Tour Operator's (Charter) are subject to a range of conditions and are permitted to use a maximum of six active traps. The trial is due to be reviewed prior to concluding on 31 December 2025.

Rules for managing recreational fishing are primarily contained within the *Fish Resources Management Regulations 1995* (FRMR). The recreational catch of octopus is managed through a combination of measures including bag limits, boat limits and gear specifications for active traps. It is prohibited to sell or use recreationally caught octopus for any gain or reward, including barter or exchange for other goods or services.

Most boat-based recreational catches of octopus (>80%) occurred in the West Coast Bioregion during summer and autumn months. The majority of catches were kept (2020/21; 12% released), with kept and released catches of octopus in 2020/21 similar to that in previous survey years (Ryan et al. 2022).

2.2.3 Customary Fishing

Customary fishing is recognised under the FRMA as fishing by an Aboriginal person that:

- a) is in accordance with the Aboriginal customary law and tradition of the area being fished; and
- b) is for the purpose of satisfying personal, domestic, ceremonial, educational or non-commercial communal needs.

Limited information is available on customary fishing for octopus however, customary catches of octopus from oceanic waters are highly likely to be low in comparison to commercial and recreational catches.

3.0 Harvest Strategy

The procedures used within this harvest strategy involve two interrelated decision-making processes. The first constitutes the formal review of targeted stocks and other ecological assets against defined reference levels to determine performance against management objectives relating to ecological sustainability (Section 3.5). The second process involves a fishery-level review that determines whether the current catch/effort by each of the relevant fisheries/sectors is consistent with the levels expected when ecological objectives are met (Section 3.6).

This Harvest Strategy is structured to describe, hierarchically:

- 1) the main objective for the resource (Section 3.1);
- 2) the high-level, long-term objectives of management (Section 3.2);
- 3) the short-term, operational objectives (Section 3.3); and

- 4) how these translate into the management approach used for the Octopus Resource (Section 3.4).

This is followed by a more detailed description of the:

- 5) processes for assessing ecological sustainability (Section 3.5);
- 6) processes for assessing fishery performance (Section 3.6); and
- 7) specific monitoring and assessment procedures used to ascertain if objectives are being met (Section 3.7).

3.1 Main Objective

The long-term objective to be achieved by managing the Octopus Resource is to ensure the ecological sustainability of the target species by maintaining the stock above a target reference level, thus optimising the opportunities to generate overall, long term economic benefits to the state from commercial octopus fishing, processing, and ancillary activities, while optimising experiences for the recreational (including charter) sector.

3.2 Long-term Objectives

3.2.1 Ecological Sustainability

- 1) To maintain spawning stock biomass of target species at a level where the main factor affecting recruitment is the environment;
- 2) To ensure fishing impacts do not result in serious or irreversible harm to bycatch species' populations;
- 3) To ensure fishing impacts do not result in serious or irreversible harm to ETP species' populations;
- 4) To ensure fishing impacts do not result in serious or irreversible harm to habitat structure and function; and
- 5) To ensure the effects of fishing do not result in an unacceptable risk of serious or irreversible harm to ecological processes.

3.2.2 Economic and Social Benefits

The social and economic benefits to be generated from the utilisation of a resource should be based on achieving the longer-term objectives outlined below and are to be considered within the constraints of ecological sustainability and while having regard for other fishing sectors:

- 1) To provide flexible opportunities to ensure commercial and charter fishers can maintain or enhance their livelihood, within the constraints of ecological sustainability; and
- 2) To provide fishing participants with reasonable opportunities to maximise cultural, recreational and lifestyle benefits of fishing, within the constraints of ecological sustainability.

3.3 Operational Objectives

Long-term management objectives are typically operationalised as short-term (e.g., annual or periodic) objectives through one or more performance indicators that can be measured and assessed against pre-defined reference levels to ascertain actual performance.

Consistent with the long-term ecological, social and economic objectives in Section 3.2, operational objectives aim to maintain each resource above the threshold and close to the target or rebuild the resource if it has fallen below the threshold or the limit levels (Section 3.5). Operational economic and social objectives are aimed at improving fishery performance as outlined in Section 3.6.

3.4 Harvesting and Management Approach

The Octopus Resource is harvested based on a constant exploitation approach, where the annual catch varies in proportion to variations in stock abundance. The catch tolerance range is based on the state of the resource relative to biological reference levels. The catch tolerance range applies to all uses of the resource.

The OIMF and CSLPMF are managed through an individually transferrable effort system and spatial regulations that restrict fishers to specific zones (Table 3). The fishing period for OIMF is 1 October to 30 September the following year, and CSLPMF is 1 January to 31 December the following year.

The recreational (including charter) sector is managed through a mix of input and output controls in the form of bag and boat limits, licence requirements when fishing from a boat, gear restrictions with limits on the number of active traps per fisher and spatial closures.

3.5 Resource Status and Performance Levels

The Department conducts a formal, resource-level review to assess the status of target stocks and performance in relation to each ecological objective. Based on the relevant operational objectives for the Octopus Resource, clear performance indicators and reference levels that define acceptable from unacceptable stock performance (Figure 3) need to be established, whereby:

- Target level is where the stock indicators should be to best meet the economic and social objectives.
- Threshold level is where you review your position in relation to meeting the target species or other ecological objectives.
- Limit level is where you do not want the stock indicator to be, as it is not meeting the target species or other ecological objectives.

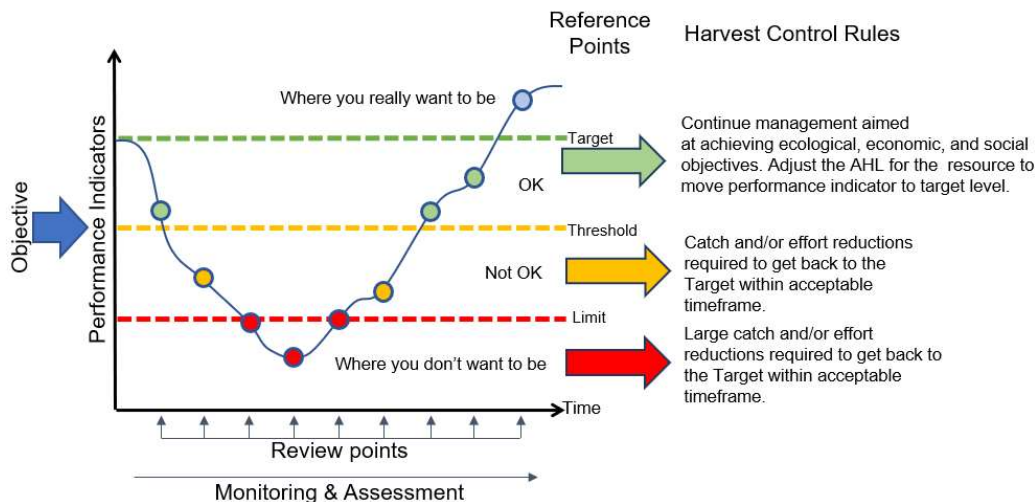


Figure 3: Relationship between performance indicators, Harvest Control Rules limits, thresholds and targets.

Harvest Control Rules (HCRs) define the management actions that should occur in relation to the value of each indicator compared to the reference levels (Section 3.5.1).

The HCRs for the Octopus Resource aim to maintain the resource at its target level and return it to this level when a threshold or limit level has been breached. A summary of the operational objectives and associated performance indicators, reference levels and HCRs are provided in Appendix 1.

3.5.1 Performance Indicators and Reference levels

3.5.1.1 Target Species

The performance indicator used to evaluate the status of the Octopus Resource (stock status) is commercial catch rates, which are assumed to be an index of abundance and used as a proxy for spawning biomass. The performance indicator for the Octopus Resource is the standardised commercial catch per unit effort (SCPUE) of octopus caught using active traps in all three fishing zones of the OIMF, expressed in landed weight (Appendix 1).

A target reference level is defined as the optimum value, for an indicator(s) to deliver the ecological objectives. The reference levels are nominally set to 40% (target), 30% (threshold) and 20% (limit) of initial catch rates $SCPUE_0$ in 2010 (Table 1), which are consistent with current internationally accepted benchmarks (Mace 1994; Caddy and Mahon 1995; Gabriel and Mace 1999; Wise et al. 2007).

The SCPUE performance indicator is based on data solely from the OIMF which is considered to be the best measure of the Octopus Resource status. This single performance indicator applies to all sectors exploiting the Octopus Resource. This is considered appropriate given the stock connectivity of the target species inferred by biological characteristics and the current catch distribution between the various sectors and fisheries accessing the Octopus Resource.

This overall approach is expected to be sufficiently risk-averse noting the high productivity of the target species, coupled with initial surveys that have shown substantial octopus biomass and only moderate levels of catchability with current allowable gear (Hart et al. 2016). The current catch rate-based performance measures will be further refined as additional data becomes available or until there is a sufficiently long time series of data available to construct a population model.

Table 1. Catch rate-based performance indicator used as a proxy for spawning biomass for the Octopus Resource.

Performance Indicator	Reference Level		
	Target	Threshold	Limit
Spawning biomass (B)	B ₄₀	B ₃₀	B ₂₀
SCPUE Proxy (kg per pot lift)	0.4 x SCPUE ₀	0.3 x SCPUE ₀	0.2 x SCPUE ₀

3.5.1.2 *Other Ecological Assets*

Other ecological assets incorporated in this harvest strategy include other retained species, bycatch, ETP species, habitats and ecosystem processes that may be affected by commercial and recreational fishing activities (Appendix 1). For all ecological components, reference levels have been set to differentiate acceptable fishery impacts from unacceptable fishery impacts according to the risk levels defined in Fletcher (2015).

3.5.2 *Harvest Strategy Control Rules*

For each ecological performance indicator and reference level, an accompanying HCR directs the management needed to meet sustainability objectives (Appendix 1).

3.5.2.1 *Target Species*

The HCRs for octopus are designed to maintain the Octopus Resource at the target level or rebuild it where it has breached the threshold (undesirable) or limit (unacceptable) levels (Appendix 1).

3.5.2.2 *Control Rules for other Ecological Assets*

Ecological Risk Assessments (ERA) (described in Section [3.7.2.2](#)) results are used to determine when additional management actions may be required for other ecological assets such as other retained species, bycatch, ETP species, habitats and ecosystem processes that may be affected by commercial and recreational fishing activities.

Reference levels for these assets differentiate acceptable fishery impacts (low/moderate risk levels) from unacceptable fishery impacts (high/severe risk levels) according to the calculated risk levels as defined in Fletcher (2015). Changes to these risk levels are expected to only potentially affect the activities associated with the harvesting of the Octopus Resource, not the allowable catch levels.

3.6 **Fishery Performance**

Defining annual tolerance levels provides a formal but efficient basis to annually evaluate the effectiveness of current management arrangements in delivering the levels of catch (or effort) specified by HCRs and where relevant, any sectoral allocation decisions

(Fletcher et al. 2016). If the annual catch and effort remains within the 'tolerance range' (based on historical variations in recruitment and/or fishing operations) the fishery is considered to be operating 'acceptably' with no need to review the management settings. Where the annual catch or effort falls outside of this range and this cannot be adequately explained (e.g. documented evidence of, for example, environmental or market induced impacts), this will result in a review of the cause which may lead to a re-assessment of the resource status. This would necessitate reassessing the status against the performance indicators and HCRs which could potentially lead to a change in management settings and therefore a revision of the tolerance levels.

3.6.1 Allowable Harvest Level (AHL)

A combined long term AHL of 500 to 1000 tonnes is currently in place for all fisheries within the Octopus Resource to maintain the performance indicator above the target reference level (refer to section 3.5.1.1). This long term AHL has been set with the expectation of catches further increasing in the OIMF as the fishery continues to develop. AHLs are reviewed annually and are based on historical catch ranges published in the State of Fisheries and Aquatic Resource Report, and in DPIRD's Annual Report to the WA parliament.

3.6.2 Economic and Social Benefits

Achieving economic and social benefits is intrinsic to the status of the Octopus Resource. The periodic and annual reviews of the Octopus Resource incorporate all available fishery-independent and fishery-dependent data for the stock, as well as environmental, economic and social information. Specific performance indicators and reference levels to evaluate economic and social benefits have been developed for some of the economic and social operational objectives (see below).

3.6.2.1 Commercial sector

The economic and social benefit operational objectives for the commercial fishing sector are to:

- Maintain or provide opportunity to maximise the flow of commercial fishing related economic and social benefits to the broader WA community; and
- Provide flexible opportunities to ensure fishers can maintain or enhance their livelihood, within the constraints of ecological sustainability.

It is important to note that management actions relating to these objectives are applied within the constraints of ecological sustainability. The economic and social objectives for the commercial sector do not currently have explicit performance measures within the harvest strategy. Rather, it is through formal consultation processes that regulatory impediments to maintaining or enhancing economic return, and maximising social benefits of fishing, are discussed. Where possible, and in due consideration of ecological sustainability, fisheries management arrangements can be adjusted or reformed to help meet these objectives.

Once suitable and measurable indicators for monitoring performance against the economic and social objectives have been identified, these will be included in future revisions of this harvest strategy.

3.6.2.2 *Recreational (including charter) sector*

The economic and social benefit operational objective for the recreational fishing sector is to:

- Provide fishing participants with reasonable opportunities to maximise cultural, recreational and lifestyle benefits of fishing, within the constraints of ecological sustainability.

It is important to note that management actions relating to these objectives are applied within the constraints of ecological sustainability. The economic and social objectives for the recreational (including charter) sector do not currently have explicit performance measures within the harvest strategy. Rather, it is through formal consultation processes that regulatory impediments to maintaining or enhancing economic return, and maximising social benefits of fishing, are discussed. Where possible, and in due consideration of ecological sustainability, fisheries management arrangements can be adjusted or reformed to help meet these objectives.

Once suitable and measurable indicators for monitoring performance against the economic and social objectives have been identified, these will be included in future revisions of this harvest strategy.

3.6.3 *Dealing with uncertainty*

For target species, the performance indicator is considered to have breached a reference level (Target, Threshold or Limit) when there is greater than a 20% probability that these levels have been exceeded. That is, the 20th percentile of a distribution of the estimated performance indicator (i.e. the lower bound of a 60% confidence interval) falls below the Target, Threshold or Limit level for SCPUE or spawning biomass.

An AHL is considered breached when the annual reported catch falls above or below the AHL.

3.7 Monitoring and Assessment Procedures

3.7.1 *Information and monitoring*

3.7.1.1 *Commercial Fishing Information*

There is a statutory obligation for commercial fishers to report catch information. Fishers are required to provide statutory Catch and Effort Statistics (CAES) through paper logbooks. Information recorded in logbooks includes fishing date, session, location (GPS coordinates), depth, line type (long/single), trap type, number of traps, number of cradles, soak time (in days), ETP interactions, lost/irrecoverable traps, bait use, retained catch of octopus (number and weight retained, and number released), and discarded octopus and other species (number) by session.

The information from these statutory returns provides the basis for calculating the standardised catch rates for target species, which inform the broader weight-of-evidence assessments of stocks. All returns are checked by Departmental staff, and any possible erroneous entries or gaps are verified directly with the skippers or relevant licensees.

3.7.1.2 *Recreational Monitoring*

Recreational take of octopus is monitored through the state-wide recreational fishing survey conducted every 3 years. The survey combines the data from the following sources to accurately estimate WA's recreational octopus fishing participation, effort and catch:

1. Off-site phone-diary survey information.
2. On-site access point boat ramp interviews.
3. Boat ramp camera footage.

The purpose of the survey is to provide up-to-date information on recreational fishing to inform management and ensure WA's recreational fisheries remain sustainable.

3.7.1.3 *Charter Monitoring*

Charter catches of octopus, effort and participation information is monitored through statutory logbooks. Data reported includes catch of each species (numbers kept and released), method (line, diving, potting), location (GPS or block), effort (fishing days, sessions) and interactions with ETP species (number and status (alive or dead) of each species).

3.7.1.4 *Fishery-Independent Information*

Fishery-independent monitoring of octopus occurs periodically in WA. During the developmental phase of the OIMF, a Fisheries Research and Development Corporation (FRDC) Project 010/200 was conducted to develop ageing methodology and age validation, provide a detailed investigation of life history, depletion experiments, and analysis of data to determine gear efficiency and catchability (Hart et al. 2016). Data collected from this study were used to estimate biomass, conduct per recruit modelling and estimate sustainable catch and harvest levels for octopus. Given the continual development in trap design ongoing analysis of data to determine gear efficiency and catchability is occurring. With the expansion of the OIMF updated estimates of biomass and sustainable harvest levels for the entire Octopus Resource are being produced.

3.7.2 *Assessment Procedures*

The different methods used by DPIRD to assess the status of aquatic resources in WA have been categorised into five broad levels, ranging from relatively simple analysis of annual catch levels and catch rates, through to the application of more sophisticated analyses and models that involve estimation of fishing mortality and biomass (Fletcher and Santoro 2015). Irrespective of the types of assessment methodologies used, all stock assessments undertaken by DPIRD take a risk-based, weight of evidence approach that considers all of the available (fishery-dependent and fishery-independent) information (Fletcher 2015).

3.7.2.1 *Target Species*

The overall status of the Octopus Resource is determined based on a weight of evidence assessment of all available information. Assessment of the Western Rock Octopus is undertaken annually based on an analysis of commercial catch rates in the OIMF. Daily logbook data on the whole weight of octopus catch are analysed using a Generalised Linear Model (GLM) that estimates the average annual weight of octopus caught per

potlift, standardised for the effects of year, month, water depth, differences in individual fishing vessels, and the number of days pots were left fishing for. This analysis captures the major seasonal and spatial effects that influence octopus catch rates and is applied only to trigger traps in all zones of the OIMF. Note that final catch rates are divided by 1.3 and presented in landed weight (head removed), a more economically relevant term.

The rationale for the current development and expansion of the OIMF is outlined in the final report for FRDC Project 2010/200 (Hart et al. 2016). A key part of this study was a depletion experiment conducted during 2013 that was used to estimate the biomass of octopus in two sites near Mandurah, and the catchability of octopus to trigger traps. Using information on the area of suitable habitat, this enabled a conservative calculation of total biomass of octopus for the wider OIMF. Coupled with per recruit modelling it provided the initial guidance on what level of catch is likely to be sustainable in the fishery.

3.7.2.2 Risk Assessments

The Department uses a risk-based EBFM framework to assess the impacts of fishing on all parts of the marine environment, including the sustainability risks of other retained species, bycatch, ETP species, habitats, and the ecosystem. This framework has led the development of the periodic risk assessment process, which is used to prioritise research, data collection, monitoring needs and management actions to ensure that fishing activities are managed both sustainably and efficiently.

Most recently in October 2023, ERA for the Statewide Cephalopod Resource (Desfosses et al., 2024) were undertaken to consider the ecosystem impacts of the fishing activities targeting the Statewide Cephalopod Resource, assessed both individually and cumulatively. Most of the components related to this Harvest Strategy were evaluated as medium or below, which do not require any specific management action.

Risk assessments will continue to be undertaken periodically (approximately every 5 years) to reassess any current or new issues that may arise from fishing activities targeting the statewide Cephalopod Resource. However, a new risk assessment can also be triggered if there are significant changes identified in fishery operations or management activities or controls that are likely to result in a change to previously assessed risk levels.

4.0 Management Framework

4.1 Governance

The commercial, recreational and customary fishing sectors are managed by the Department in accordance with, but not limited to, the following legislation:

- *FRMA*;
- *FRMR*;
- *OIMF Plan*; and
- *CSLPMF Management Plan*.

Fishers must also comply with the requirements of the:

- *Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).*
- *Marine Safety (Domestic Commercial Vessel) National Law Act 2012.*
- *Western Australian Marine Act 1982.*
- *Western Australian Biodiversity Conservation Act 2016.*
- *Western Australian Conservation and Land Management Act 1984.*
- Any other legislation governing the use of the marine environment in which impacts on fishing.

4.2 Management Measures

Management measures for managing the Octopus Resource are outlined in Table 2. These measures can be amended as needed to meet ecological, social or economic objectives and does not preclude the consideration of other options. The management measures can be used across the Octopus Resource or within an individual sector to ensure the AHL is not exceeded.

Table 3. Management measures and instrument of implementation for the Octopus Resource.

Measure	Description	Instrument
Limited Entry	<p>OIMF: A limited number of Managed Fishery Permits (40) are permitted to operate; 10 in Zone 1, 25 in Zone 2 and 5 in Zone 3.</p> <p>CSLPMF: A limited number of Managed Fishery Licences (9/13 licences have octopus entitlement) are permitted to operate.</p>	<p><i>OIMF Management Plan 2015</i></p> <p><i>CSLPMF Management Plan 1995</i></p>
Input-controls	<p>OIMF: The maximum number of traps that can be set within each zone of the fishery is specified in the Management Plan and these are allocated through units of entitlement:</p> <p>Zone 1: 20,550 units</p> <p>Zone 2: 34,908 units</p> <p>Zone 3: 12,213 units</p> <p>Permit holders must hold a minimum entitlement of 600 units. Entitlement may be transferred among permit holders and new permits temporarily granted, subject to minimum entitlement levels. Conversion 1 active trap = 5 passive traps.</p> <p>CSLPF: The maximum number of pots (13,005 units) in the fishery is specified in the management plan and these are allocated through units of entitlement. Passive traps only.</p>	<p><i>OIMF Management Plan 2015</i></p> <p><i>CSLPMF Management Plan 1995</i></p>
Gear Restrictions	<p>Commercial fishers must comply with active and passive trap configuration restrictions; including maximum size, entrance to pot, etc.</p>	<p><i>OIMF Management Plan 2015</i></p> <p><i>CSLPMF Management Plan 1995</i></p> <p>FRMR</p>
	<p>Recreational octopus fishers must comply with gear specifications when using trigger traps; alternatively catching octopus by hand or passive traps is permitted.</p>	<p>FRMR</p>

Spatial Closures	OIMF: Commercial fishing is prohibited in Oyster Harbour and Princess Royal Harbour. All sectors: Commercial and recreational fishing is restricted or prohibited in a range of fisheries management and marine conservation areas that overlap with the octopus resource.	EPBC Act FRMA (Section 43 Orders)
Recreational Bag and Boat Limits	Recreational boat (30) and bag (15) limits are in place for octopus, squid and cuttlefish (combined).	FRMR
Reporting	Commercial fishers are required to report all retained (target and non-target) species catches, effort, ETP species interactions and fishing locations in statutory logbooks.	FRMR <i>OIMF Management Plan 2015</i> <i>CSLPMF Management Plan 1995</i>

4.3 Management Procedures for Implementing Changes

Decision-making processes can be triggered following the identification of new or potential issues as part of an ERA (generally reviewed every 5 years), results of research, management or compliance projects or investigations, monitoring, or assessment outcomes (including those assessed as part of the Harvest Strategy) and/or expert workshops and peer review of aspects of research and management.

There are two main processes for making decisions about the implementation of management measures and strategies for the resource:

- Annual decision-making processes that may result in measures to meet the operational objectives (driven by the harvest strategy); and
- Longer-term decision-making processes that result in new measures and/or strategies to achieve the long-term fishery objectives (i.e. changes to the management system).

If there is an urgent issue, stakeholder meetings may be called as needed to provide input for determining appropriate management actions.

Management changes are generally given effect through amendments to legislation, such as the management plan, regulations, and orders. These changes generally require consultation with all affected parties and the approval of the Minister for Fisheries and/or the CEO (or appropriate delegates). In making decisions relevant to fisheries, the Minister for Fisheries may choose to receive advice from any source, but has indicated that:

- 1) The Department is the primary source of management advice; and
- 2) The Octopus Industry Working Group chaired by the Western Australia Fishing Industry Council (WAFIC), the Western Rock Lobster Council and Recfishwest are the primary source of advice and representation from the commercial sector, WCRLMF and recreational (including charter) sector, respectively.

4.3.1 Commercial Sector

The WAFIC is the peak sector body dedicated to representing the interests of the WA commercial fishing industry. WAFIC chair the Octopus Industry Working Group which hold regular meetings.

4.3.2 Recreational Sector

Under the funding agreement with Recfishwest, the Department is required to consult with Recfishwest, as the recognised peak body for recreational fishing in WA. Recfishwest is required to engage and consult with recreational fishers as necessary in order to meet its obligations. Charter operators are also represented by Recfishwest and Marine Tourism WA.

4.3.3 Consultation with Other Groups

Consultation on octopus resource management with customary fishers and non-fisher stakeholders, including Government agencies, conservation sector Non-Government Organisations and other affected/interested parties is undertaken in accordance with the Departmental Stakeholder Engagement Guideline (Department of Fisheries 2016). DPIRD's approach to stakeholder engagement is based on a framework designed to assist with selecting the appropriate level of engagement for different stakeholder groups and includes collaborating with and involving key stakeholders, seeking input from interested parties through a public consultation process and keeping all parties fully informed through the provision of balanced, objective, and accurate information. Key Octopus Resource specific documents such as harvest strategies, recovery plans and bycatch action plans are subjected to both formal key stakeholder consultation and public consultation processes.

5.0 Compliance and Enforcement

As the key regulatory agency, the Department's compliance role is to achieve sustainability, economic and social objectives by addressing:

- our ability and capacity to influence compliance with the rules; and
- the effectiveness, capacity, and credibility of the compliance program.

Western Australian Fisheries Compliance Strategy (the Strategy; DPIRD 2018) was published in 2018. The purpose of the Strategy is to provide an understanding of the principles underlying the Department's compliance role and how its compliance services are delivered to the WA community. The Strategy aligns with, and complements, Department's Compliance Framework and Risk Assessment Policy which informs the risk-based model, compliance planning and the governance structure applied to fisheries compliance services.

The Department's compliance model is based on the Australian Fisheries National Compliance Strategy 2022-2026 (the National Strategy). Department's compliance program is aligned to support the three key compliance strategies recommended by the National Strategy:

- maximising voluntary compliance;
- effective deterrence; and
- organisational capability and capacity.

5.1 Operational Compliance Plans

Management arrangements for the Octopus Resource are enforced under Operational Compliance Plans (OCPs) that are informed and underpinned by a compliance risk assessment, which is reviewed every two years. These OCPs have the following objectives:

- to provide clear and unambiguous direction and guidance to Fisheries and Marine Officers for the yearly delivery of compliance in the Octopus Resource;
- to protect the fisheries' environmental values, while providing fair and sustainable access to the Octopus Resource commercial and social values; and
- to encourage voluntary compliance through education, awareness and consultation activities.

5.2 Compliance Strategies

Compliance strategies and activities that are used in the fisheries targeting the Octopus Resource include:

- land and on-water patrols;
- road-side checkpoints;
- catch, licence, gear and vessel inspections;
- wholesale and retail inspections;
- monitoring of fishing through fishing nominations; and
- covert surveillance of persons of interest under approved operations.

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Appendix 1 – Harvest Control Rules

Table A1-1 – Harvest Strategy performance indicators, reference levels and control rules for the Octopus Resource target species and other ecological assets that may be impacted by fishing activities undertaken by commercial, recreational and charter fishers while targeting western rock octopus.

Component	Operational objective	Resource / Asset	Performance Indicators	Reference Levels	Control Rules
Target species	To maintain spawning stock biomass of each retained species above BMSY to maintain high productivity and ensure the main factor affecting recruitment is the environment	Western Rock Octopus (<i>Octopus djinda</i>)	Annual standardised commercial catch per unit effort (SCPUE) of Western Rock Octopus caught in active traps across all Zones of the OIMF.	Target: 0.47 kg per pot lift (in 2023)	1. If the performance indicator is > the Target, set the allowable harvest level (AHL) range at 90-100% of long-term AHL. 2. If the performance indicator is < the Target and > the Threshold, set AHL at 70-90% of long-term AHL. Appropriate management action will be taken as soon as is practicable to adjust annual catches to within the revised AHL.
				Threshold: 0.35 kg per pot lift (in 2023)	If the performance indicator is < the Threshold and > the Limit, set AHL at 50-70% of long-term AHL. Appropriate management action will be taken as soon as is practicable to adjust annual catches to within the revised AHL.
				Limit: 0.23 kg per pot lift (in 2023)	If the performance indicator is < the Limit, set AHL at 0-50% of long-term AHL. Appropriate management action will be taken as soon as is practicable to adjust annual catches to within the revised AHL.

Component	Operational objective	Resource / Asset	Performance Indicators	Reference Levels	Control Rules
Retained (non-target) species	To maintain catch levels of non-target species that are consistent with harvest strategies for these species and do not impact on the risk levels	All retained non-target species	Assessed level of risk for each non ETP species/group from octopus fishing activities from periodic risk assessments incorporating: <ul style="list-style-type: none"> • current management arrangements, • annual fishing effort and catch (including discards), • species information, and, • other available research. 	Target: No impact on risk levels from octopus fishing.	Maintain current management settings.
				Thresholds: Adding to a moderate risk level from octopus fishing.	Review the reasons for this variation within three months and implement an appropriate management response to reduce risk to an acceptable level as soon as practicable.
				Limit: Adding to a severe level of risk to asset from octopus fishing.	Initiate an immediate management response to reduce the risk to an acceptable level as soon as practicable.
Bycatch (non-ETP) species	To conduct fishing activities in a manner that does not result in an unacceptable risk of serious or irreversible harm to bycatch species populations.	All (non-ETP) bycatch species	Periodic risk assessments for each bycatch species/group from octopus fishing activities incorporating: <ul style="list-style-type: none"> • current management arrangements, • annual fishing effort and catch (including discards), • review of alternative measures to minimise unwanted catch, • species information, and, • other available research. 	Target: Octopus fishing impacts are expected to generate an acceptable risk level to all bycatch species' populations (<i>i.e.</i> medium risk or lower).	Continue management aimed at achieving ecological, economic, and social objectives.
				Thresholds: A potentially material change to risk levels is identified; or Octopus fishing impacts are considered to generate an undesirable level of risk to any bycatch species' populations (<i>i.e.</i> high risk).	Review the reasons for this variation and develop a management response within three months. Implement an appropriate management response to reduce risk to an acceptable level as soon as practicable.
				Limit: Octopus fishing impacts are considered to generate an unacceptable level of risk to any bycatch species' populations (<i>i.e.</i> severe risk).	Initiate an immediate management response to reduce the risk to an acceptable level as soon as practicable.

Component	Operational objective	Resource / Asset	Performance Indicators	Reference Levels	Control Rules
ETP species	To conduct octopus fishing activities in a manner that does not result in an unacceptable risk of serious or irreversible harm to ETP species populations.	All ETP species	Assessed level of risk for each ETP species/group from octopus fishery activities from periodic risk assessments incorporating: <ul style="list-style-type: none"> • current management arrangements, • annual fishing effort and catch (including discards), • species information and number of reported ETP species interactions, and, • other available research. 	Target: Octopus fishing impacts are expected to generate an acceptable risk level to all ETP species' populations (<i>i.e.</i> medium risk or lower).	Continue management aimed at achieving ecological, economic, and social objectives.
				Thresholds: A potentially material change to risk levels is identified; or Octopus fishing impacts are considered to generate an undesirable level of risk to any ETP species' populations (<i>i.e.</i> high risk).	Review the reasons for this variation and develop a management response within three months. Implement an appropriate management response to reduce risk to an acceptable level as soon as practicable.
				Limit: Octopus fishing impacts are considered to generate an unacceptable level of risk to any ETP species' populations (<i>i.e.</i> severe risk).	Initiate an immediate management response to reduce the risk to an acceptable level as soon as practicable.
Habitats	To conduct octopus fishing activities in a manner that does not result in an unacceptable risk of serious or irreversible harm to habitat structure and function.	Benthic habitats	Assessed level of risk for benthic habitats from octopus fishery activities from periodic risk assessments incorporating: <ul style="list-style-type: none"> • current management arrangements, • annual fishing effort, • extent of fishing area annually, and, • other available research. 	Target: Octopus fishing impacts are expected to generate an acceptable risk level to all benthic habitats (<i>i.e.</i> medium risk or lower).	Continue management aimed at achieving ecological, economic, and social objectives.
				Thresholds: A potentially material change to risk levels is identified; or Octopus fishing impacts are considered to generate an undesirable level of risk to any benthic habitats (<i>i.e.</i> high risk).	Review the reasons for this variation and develop a management response within three months. Implement an appropriate management response to reduce risk to an acceptable level as soon as practicable.
				Limit: Octopus fishing impacts are considered to generate an	Initiate an immediate management response to reduce the risk to an

Component	Operational objective	Resource / Asset	Performance Indicators	Reference Levels	Control Rules
				unacceptable level of risk to any benthic habitats (<i>i.e.</i> severe risk).	acceptable level as soon as practicable.
Ecosystem	That the overall effects of octopus fishing do not result in an unacceptable risk of serious irreversible harm to ecological processes.	West Coast Bioregion	Assessed level of risk for ecosystem processes from octopus fishery activities from periodic risk assessments incorporating: <ul style="list-style-type: none"> • current management arrangements, • catch levels, • number of reported ETP species interactions, • extent of fishing activities, • ecosystem information, and • other available research. 	Target: Octopus fishing impacts are expected to generate an acceptable risk level to all ecological processes within the ecosystem (<i>i.e.</i> medium risk or lower).	Continue management aimed at achieving ecological, economic, and social objectives.
				Thresholds: A potentially material change to risk levels is identified; or Octopus fishing impacts are considered to generate an undesirable level of risk to any ecological processes within the ecosystem (<i>i.e.</i> high risk).	Review the reasons for this variation and develop a management response within three months. Implement an appropriate management response to reduce risk to an acceptable level as soon as practicable.
				Limit: Octopus fishing impacts are considered to generate an unacceptable level of risk to any ecological processes within the ecosystem (<i>i.e.</i> severe risk).	Initiate an immediate management response to reduce the risk to an acceptable level as soon as practicable.

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