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Western Australia.*

Fisheries Management Paper No. 308

DRAFT West Coast Rock Lobster Resource Harvest Strategy

October 2023

Version control

Version	Change description	Date
1.0	First draft of the West Coast Rock Lobster Resource Harvest Strategy.	August 2023
1.1	Second draft incorporating feedback from Western Rock Lobster Council and Recfishwest	September 2023
1.2	Third draft incorporating feedback from Western Rock Lobster Council and Recfishwest, specifically relating to social and economic objectives.	October 2023
1.3	Fourth draft incorporating feedback from Western Rock Lobster Council and Recfishwest, specifically relating to determination of the Allowable Harvest Level, Total Allowable Commercial Catch setting process, and social and economic objectives.	October 2023

Important disclaimer

The Chief Executive Officer of the Department of Primary Industries and Regional Development and the State of Western Australia accept no liability whatsoever by reason of negligence or otherwise arising from the use or release of this information or any part of it.

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List of acronyms

AHL	Allowable Harvest Level
AMM	Annual Management Meeting
ARMA	<i>Aquatic Resources Management Act 2016</i>
ASL	Australian Sea Lion
BSMA	Breeding Stock Management Area
CDR	Catch and Disposal Record
CEO	Chief Executive Officer (DPIRD)
DPIRD	Department of Primary Industries and Regional Development
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EBFM	Ecosystem Based Fisheries Management
ERA	Ecological Risk Assessment
ESD	Ecologically Sustainable Development
ETP	Endangered, Threatened and Protected
FRMA	<i>Fish Resources Management Act 1994</i>
FRMR	<i>Fish Resources Management Regulations 1995</i>
HCR	Harvest Control Rules
MEY	Maximum Economic Yield
MSC	Marine Stewardship Council
MSY	Maximum Sustainable Yield
OCP	Operational Compliance Plan
SCB	South Coast Bioregion
SLED	Sea Lion Exclusion Device
TACC	Total Allowable Commercial Catch
TARC	Total Allowable Recreational Catch
WA	Western Australia
WCRLMF	West Coast Rock Lobster Managed Fishery
WCRLR	West Coast Rock Lobster Resource
WRL	Western Rock Lobster Council

1.0 Introduction

Harvest strategies for Western Australia's (WA) aquatic resources are formal documents developed by the Department of Primary Industries and Regional Development (DPIRD, the Department) 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) and the *Aquatic Resources Management Act 2016* (ARMA), which is anticipated to replace the FRMA once fully implemented.

This West Coast Rock Lobster Resource (WCRLR) Harvest Strategy (Harvest Strategy) has been developed and revised in line with the Department's 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 WCRLR 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 DPIRD, 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 *West Coast Rock Lobster Harvest Strategy and Control Rules 2014-2019* provided the guiding principles for the management of the commercial West Coast Rock Lobster Managed Fishery (WCRLMF). 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 WCRLR which is a single target species, the western rock lobster (*Panulirus cygnus*). The WCRLR is harvested primarily by the commercial and the recreational (including charter) sectors under a formal catch sharing arrangement. Commercial catches are taken by potting, whilst recreational catches of western rock lobster are taken by potting and diving.

The scope of this Harvest Strategy includes the take of western rock lobster within the waters of the WCRLMF which extends from Cape Leeuwin to the Northwest Cape and extends west to the boundary of the Australian Fishing Zone (as defined in Schedule 1 of the *West Coast Rock Lobster Managed Fishery Management Plan 2012*). This area includes the Houtman Abrolhos Islands. The take of western rock lobster in waters south of the WCRLMF is considered within the scope of the South Coast Offshore Crustacean Resource Harvest Strategy.

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 western rock lobster is a decapod crustacean which is endemic to the waters off WA with a distribution extending from the Northwest Cape in the north, to around Albany in the south. It is the dominant lobster throughout this range, with minimal overlap with tropical lobster species (e.g. *P. ornatus*, *P. versicolor*) in the north of its range, and *Jasus edwardsii* (southern rock lobster) in the south.

While western rock lobster can live up to 20 years and weigh up to 5.5 kg, they typically live for 10-15 years and weigh less than 3 kg. Juvenile western rock lobsters predominantly inhabit the inshore shallow reefs (< 40 m) throughout their distribution (Bellchambers *et al.* 2012, de Lestang *et al.* 2016).

Growth in both male and female western rock lobster is categorised by rapid juvenile growth, followed by a reduction in growth rate after sexual maturity (de Lestang 2018). In juveniles, growth rates are inversely related to carapace length, rapidly decreasing as carapace length increases (de Lestang 2018). Juvenile growth rates do not differ between sexes (Chittleborough 1975, de Lestang 2018), however, the reduction in growth rates with sexual maturity is more pronounced in females than males, and as a result, adult males have higher growth rates than adult females and therefore attain larger maximum sizes. On average this species attains maturity at ~ six years post settlement.

2.2 Fishing Activities

2.2.1 Commercial Fishing

The WCRLMF has been operating since the mid-1950s. The industry comprises of some 230 vessels that use baited pots to fish for lobsters, which are primarily sold by air freight to international markets and also within the domestic market. It is WA's most valuable

commercial fishery, with an estimated gross value of production (GVP) in 2022 of \$210 million. Historically it has been Australia's most valuable single-species wild capture fishery when the GVP peaked pre-COVID at \$440 million.

Until 2009, the WCRLMF operated as an input managed fishery (total allowable effort) and the commercial harvest averaged 11,000 tonnes per annum based on a Maximum Sustainable Yield (MSY) harvesting approach. Following poor recruitment years from 2007-2009, the WCRLMF reduced its harvest to 5,500 tonnes. In 2012, the WCRLMF was formally transitioned to a quota management system and is managed primarily through output controls in the form of Individual Transferable Quota (ITQ), in accordance with the *West Coast Rock Lobster Managed Fishery Management Plan 2012* (WCRLMF Management Plan). Total Allowable Commercial Catch limits (TACCs) are set annually for each management zone in the WCRLMF using a Maximum Economic Yield (MEY) based approach.

The WCRLMF is managed in three zones: south of latitude 30°S (Zone C), north of latitude 30°S (Zone B) and a third offshore zone around the Abrolhos Islands (Zone A) (Figure 1). The TACC is split between the zones (refer to section 4.3.1.1 for further information).

Between 2014-2020, the annual commercial catch of western rock lobster averaged around 6000 tonnes. The WCRLMF was scheduled to incrementally increase the TACC towards a target level in line with MEY, however as a result of COVID and market challenges between 2020 and 2022, adaptive management arrangements were implemented and the TACC was maintained around 6000 t. During the 2023 and 2024 seasons (included three transitional seasons), the TACC was incrementally increased to 7300 tonnes to align with the target harvest rate for the resource (section 3.4.1).

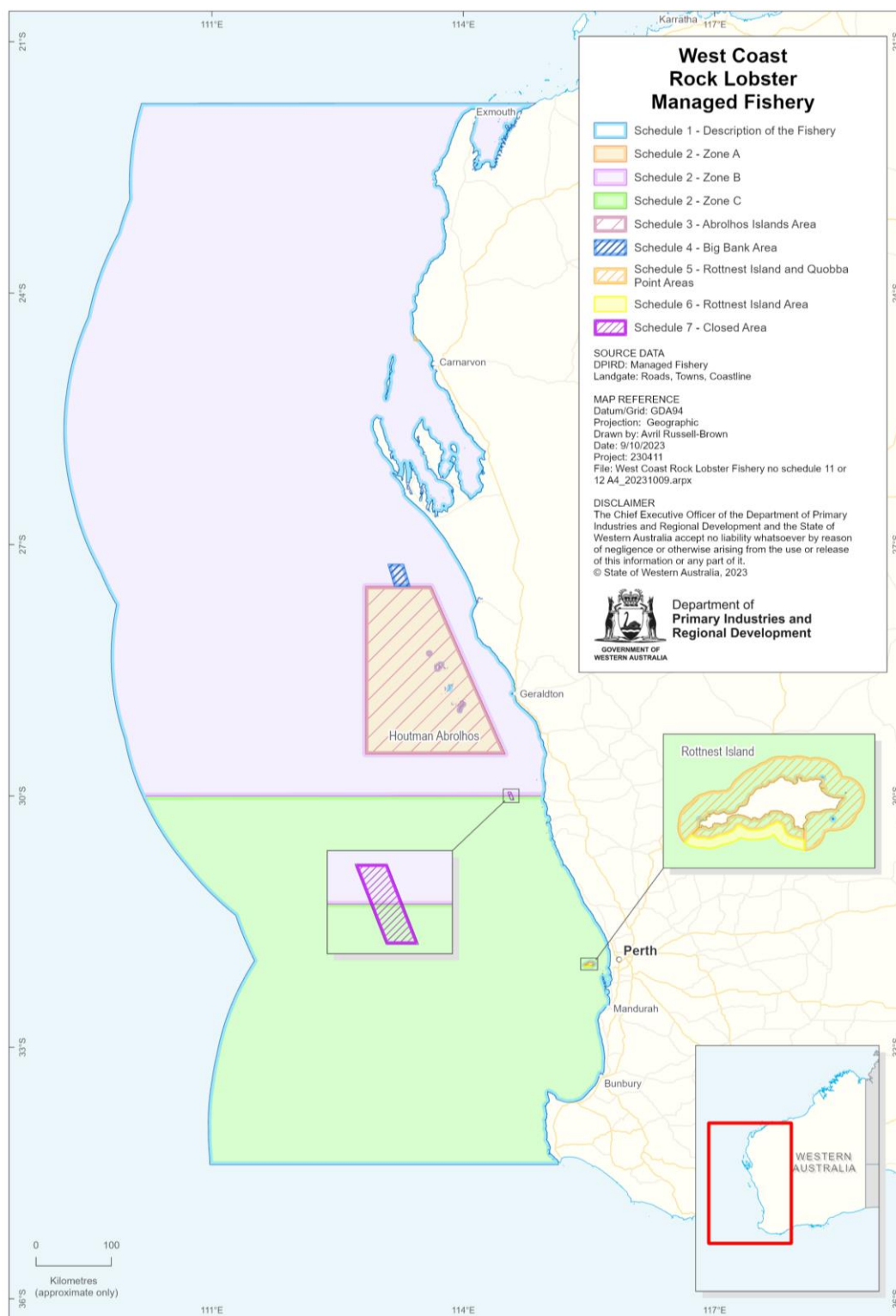


Figure 1. Map of the West Coast Rock Lobster Managed Fishery indicating the three zones (Zone A, Zone B and Zone C).

2.2.2 Recreational Fishing

Recreational fishing for lobsters in WA is a popular activity which provides a range of important economic and social benefits to the WA community. There are over 50,000 recreational rock lobster licences issued annually in WA, most of which are held by fishers who reside in the Perth metropolitan area.

The lobster species most frequently caught by recreational fishers is western rock lobster, with potting the most popular fishing method. The majority of recreationally caught western rock lobster are caught from the Perth Metropolitan Area followed by boat ramps up the west coast of WA to Geraldton. The recreational catch of western rock lobster has increased from 249 tonnes in 2014 to ~500 tonnes in the 2020s.

Rules for managing recreational fishing are primarily contained within the *Fish Resources Management Regulations 1995* (FRMR). The recreational catch is managed through a combination of measures including bag, boat and possession limits, minimum size limits and gear specifications. Recreational fishers must have a recreational rock lobster licence to fish for any species of rock lobster. It is prohibited to sell or use recreationally caught rock lobsters for any gain or reward, including barter or exchange for other goods or services.

2.2.2.1 Charter Fishing

There are currently 97 Fishing Tour Operator Licences (FTOL) issued in the WCRLMF enabling them to undertake a wide range of chartered fishing activities, including pot-based and dive-based rock lobster fishing. When operating fishing tours, FTOL holders are subject to recreational bag and boat limits. The charter catch of western rock lobster has increased from ~1 tonne in 2014/15 to ~17 tonnes in the 2020s.

A Rock Lobster Charter Trial has been in place since November 2019, providing eligible charter operators the opportunity to undertake pot-based rock lobster fishing tours with increased pot allowances and a higher boat limit to develop marine tourism opportunities and enhance experiences for local, interstate, and international visitors. A notional allowable annual catch of 20 tonnes of rock lobster per season was set aside for the trial which is included in the recreational sector catch allocation. There are 49 FTOL holders currently participating in the trial. Eligibility to participate in the trial was based on criteria established by the Department, including a history of conducting pot-based rock lobster tours. Governance of the charter trial is provided within an Instrument of Exemption.

In addition to the Rock Lobster Charter Trial, 28 FTOLs have also run pot-based and dive-based rock lobster fishing tours under existing rock lobster charter arrangements (six pots and a boat limit of 24 lobster) since 2019.

A holistic review of the charter fishing arrangements is scheduled for 2023/24, which will consider the outcomes of the rock lobster charter trial and future arrangements.

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 western rock lobster however, customary catches of western rock lobster from oceanic waters are highly likely to be low in comparison to commercial and recreational catches.

2.3 Catch-Share Allocations

Formal allocations of the WCRLR were determined by the Minister for Fisheries under the Integrated Fisheries Management Policy ([IFM](#)) in 2010. This formal allocation defines and assigns the current sectoral shares of the permitted catch of western rock lobsters. These sectoral allocations could be reviewed to ensure they still meet the Economic and Social objectives outlined in [Section 3.2.2](#).

The current allocations between the sectors are:

- Customary allocation of 1 tonne per year
- Commercial allocation (potential TACC) = 95% * AHL
- Recreational allocation (Total Allowable Recreational Catch: TARC) = 5% * [AHL](#)

There is no incidental retention of western rock lobster permitted by any other commercial fisheries within the boundaries of the WCRLMF. An overview of the management measures used to ensure sectors remain within their allocations is outlined in Section 4.2.

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 WCRLR (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 WCRLR is to deliver predictable, ecologically sustainable harvest levels and allocations of western rock lobster that maintains the stock near a target harvest level, thus optimising the opportunities to generate overall, long term economic benefits to the state from commercial lobster 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 each target species at a level where the main factor affecting recruitment is the environment;
- 2) To maintain stock biomass of each other retained species (non-target species) at levels where the main factor affecting recruitment is the environment;
- 3) To ensure fishing impacts do not result in serious or irreversible harm to bycatch species' populations;
- 4) To ensure fishing impacts do not result in serious or irreversible harm to ETP species' populations;
- 5) To ensure fishing impacts do not result in serious or irreversible harm to habitat structure and function; and
- 6) 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) Maintain evidence-based Maximum Economic Yield TACC setting to optimise the profitability of commercial lobster fishing to the WA community; and,
- 2) Maintain or improve cultural, recreational and lifestyle benefits for recreational (including charter) fishing participants, and maximise the overall flow of economic and social contribution of recreational and charter lobster fishing to the broader WA community.

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 WCRLR is harvested based on a constant stock size approach where the available catch is adjusted annually to ensure a certain minimum proportion of the biomass is

expected to be present in the future. The AHL is set each year based on the state of the resource relative to biological- and area-specific reference levels (see below for more detail). Once the AHL is set, it is shared among the users of the resource according to Catch-Share Allocations (Section 2.3).

The WCRLMF is managed primarily through output controls in the form of TACCs, set annually in the relevant management areas (Figure 1) and allocated to licence holders as Individually Transferable Quotas. The fishing period for WCRLR is 1 July – 30 June the following year.

The recreational (including charter) sector is managed through a mix of input and output controls in the form of a TARC, including bag, boat and size limits, licence requirements, and spatial closures.

The Harvest Strategy is based on the extensive documentation and knowledge of the WCRLR contained within previous reports completed to meet ESD (Fletcher *et al.* 2005) and EBFM requirements (Fletcher *et al.*, 2010, 2012; Cochrane *et al.* 2014; Fletcher 2015); MSC certification plus previous Harvest Strategies (Department of Fisheries, 2016b). Key elements of this harvest strategy are largely refinements of the annual western rock lobster AHL setting processes used over the last few decades.

3.4.1 Allowable Harvest Level

The AHL is defined as the total quantity of western rock lobster that could be taken in the next season by the combined commercial and recreational (including charter) sectors. After the priority quantity of one tonne of live western rock lobster for customary fishing has been allocated, the AHL is determined based on the current available legal biomass and the target harvest rate.

The AHL for the WCRLR is generated from the zonal level AHLs, i.e. by estimating the average catch that would be taken each season, over the subsequent five seasons, if fishing were to occur at a target harvest rate, with the fifth year representing the longer-term equilibrium level of the AHL.

The harvest rate is the proportion of the legal biomass of lobsters taken each season. A harvest rate of 0.39 means that 39% of the lobsters in the WCRLR which are classified as legally able to be taken (due to size, spawning status, current resource access areas available to fish, etc.), are harvested. Refer to Section 3.5.1.1.1 for further information about the target harvest rate.

3.4.1.1 Long term AHL

Historically, the AHL has been based on a single-year calculation of the available harvestable (legal) biomass for the following season. However, to achieve more stable and secure outcomes that consider upcoming changes in recruitment and the environment, the AHL is based on the model-projected legal biomass for the fifth year of fishing. This ensures that the AHL remains relatively stable, and the stock remains close to the target reference level.

The stock assessment model is used to calculate the AHL based on available information of current biomass levels, future recruitment, and potential impact of a subsequent (following year) poor recruitment. The AHL is determined in a stepwise process using the model:

1. Model is updated and fitted to all available data (including TACC set for future season).
2. The model is then projected out five seasons with the target harvest rate (0.39).
3. Catches forecast over the subsequent five seasons are recorded for AHL calculation (Figure 2).
4. The fifth year of this projection is selected as it most closely represents the catch that would be obtained if WCRLMF maintained fishing at the target harvest rate, under current puerulus levels (Figure 2 green point).

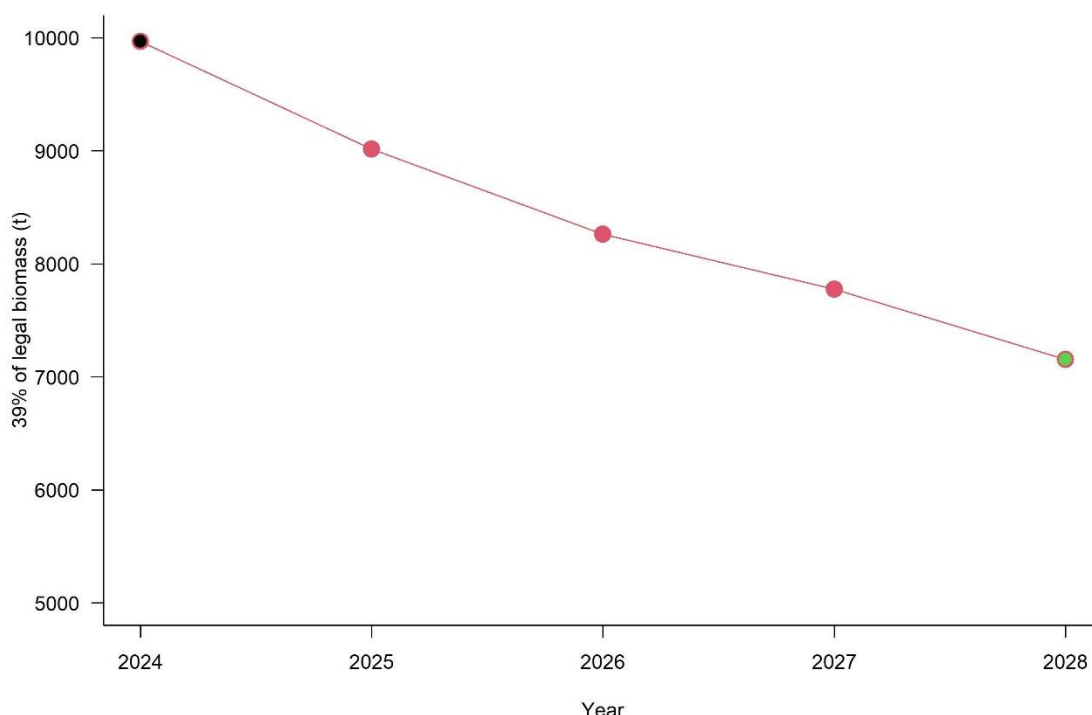


Figure 2. Catch level that equates to target harvest rate (39%) of the legal biomass available for capture over the five projection years. The black point represents harvest rate in the first year and green represents harvest rate in the fifth year of projections.

Using the first year (black point) before the biomass has equilibrated to the harvest rate will lead to a higher AHL that will decline over subsequent years (Figure 2). By fishing at the target harvest rate consistently (fifth year), all catch projections would be very similar to each other and catch rates would remain steady over the five years compared to Figure 2.

Basing the calculation of AHL on a target harvest level associated with the long-term MEY has the advantage of minimising interannual variations which will assist in maximising economic and social benefits from the WCRLR.

Any change (increase or decrease) in the calculated AHL for a fishing season (as determined by the parameters outlined in the harvest strategy) due either to fishing or non-fishing impacts on stock levels will result in the same proportional change to both the

TACC and TARC being applied, notwithstanding the transitional arrangements for long term TARC as detailed in [Section 4.3.2.1](#)

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 WCRLR, clear performance indicators and reference levels that define acceptable from unacceptable stock performance in determining each season's allowable catch levels (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.

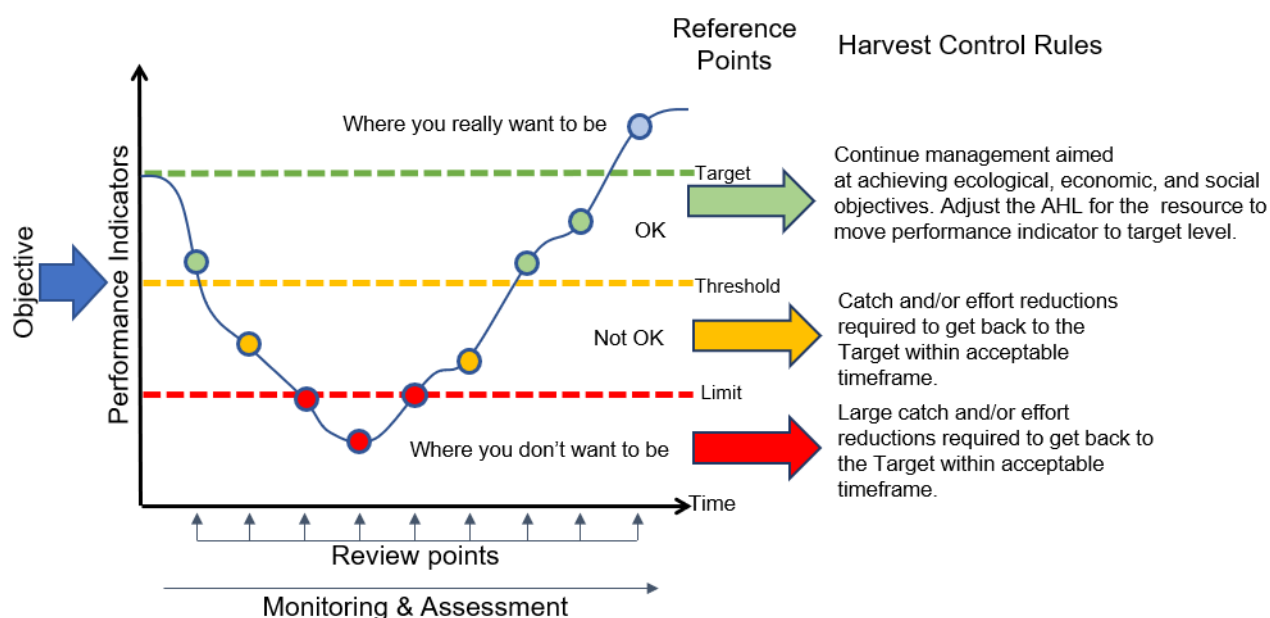


Figure 3. Relationship between performance indicators, Harvest Control Rules limits, thresholds and targets.

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 WCRLR must 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

3.5.1.1.1 Target Reference Level

The performance indicator used to evaluate the status of the WCRLR is harvest rate of legal biomass, determined on a WCRLR-wide basis.

A target reference level is defined as the optimum value (which must be more conservative than the biological threshold level which is generally set at MSY), for an indicator(s) to deliver economic and/or social objectives. The target reference level is therefore generally based on MEY, or a proxy where the targeted biomass is at least 20% that at above MSY.

Previous work on MEY for the WCRLR has shown there are a range of harvest rates (e.g. 0.3 – 0.4) that generate maximum profitability for fishing. These MEY levels are significantly lower than those associated with even a conservative estimate of MSY (~0.6 – 0.8) (Caputi *et al.*, 2015a; Caputi *et al.*, 2018).

There are varying costs and benefits experienced by the commercial and recreational fishing sectors, the WA community, and the State, depending on where the harvest rate is set (Caputi *et al.* 2015a). When considering this approach in the context of providing the best overall return to the state, a harvest rate of 0.39 approximates the level of fishing consistent with MEY whilst also providing benefits to all sectors.

The target reference level for the WCRLR is set at a harvest rate of 0.39 (**H₃₉**) of the legal biomass, which approximates the upper end of MEY, and has been used as the target since 2016.

3.5.1.1.2 Threshold and Limit Reference Levels

The WCRLR (by WCRLMF zone) is assessed based on modelled-derived estimates of egg production (E) relative to levels considered conservatively sustainable (E_s). Estimates of E relative to E_s are periodically compared as outlined in the Department's Harvest Strategy Policy (Department of Fisheries 2015). Recognising the naturally fluctuating stock levels of western rock lobsters, this harvest strategy aims to maintain egg production above those levels (threshold) experienced by the WCRLR prior to it becoming fully exploited. These levels are applied as a threshold reference level (*i.e.* below which exploitation will be reduced) rather than as a target level, to ensure management is precautionary (Appendix 1). Any stock size above this level is therefore consistent with meeting the objectives for biological sustainability and also satisfies stock status requirements under the MSC standard for sustainable fishing.

The conceptual basis of using these reference levels for threshold and limit was that the lobster stock in the early 1980s was considered to be not nearly as exploited as it would later become in the 1990s due to fishing efficiency increases. This was especially the case in deeper-water regions, where most of the spawning stock resides. Consequently, as there has not been any evidence of recruitment overfishing in the 1990s, the egg production levels in the early-mid 1980s were considered to be greater than the minimum sufficient level required to ensure ongoing recruitment to the WCRLR. Average levels of egg production estimated for the early 1980s (an average of 1982 – 1984) in each main

region of the WCRLR have been used to determine threshold reference levels (Figure 4). The MSC accepted this logic during the certification process for the WCRLMF in 2000.

Given the spatial structure of the current stock assessment model, region-specific threshold levels are used for four separate areas (breeding stock management areas: BSMA), with the areas being based on biological and management differences. The four BSMA are southern deep-water (south of 30°), central (offshore deep-water from 28 – 30°), northern deep-water (north of 28°) and shallow (< 40 m) Abrolhos (Figure 5). The northern deep-water region (which includes the Big Bank area) was not as heavily exploited as the rest of the WCRLMF until the 1990s. As such, its threshold level was set at an average of the early 1990s breeding stock level (average of 1992-1994). Associated limit reference levels for each of these BSMA were set at 20% below threshold levels ($E_s * 0.8$) (Appendix 1). If one of these BSMA are breached, then a review of the strategy is needed as to whether the current zonal arrangements are still working.

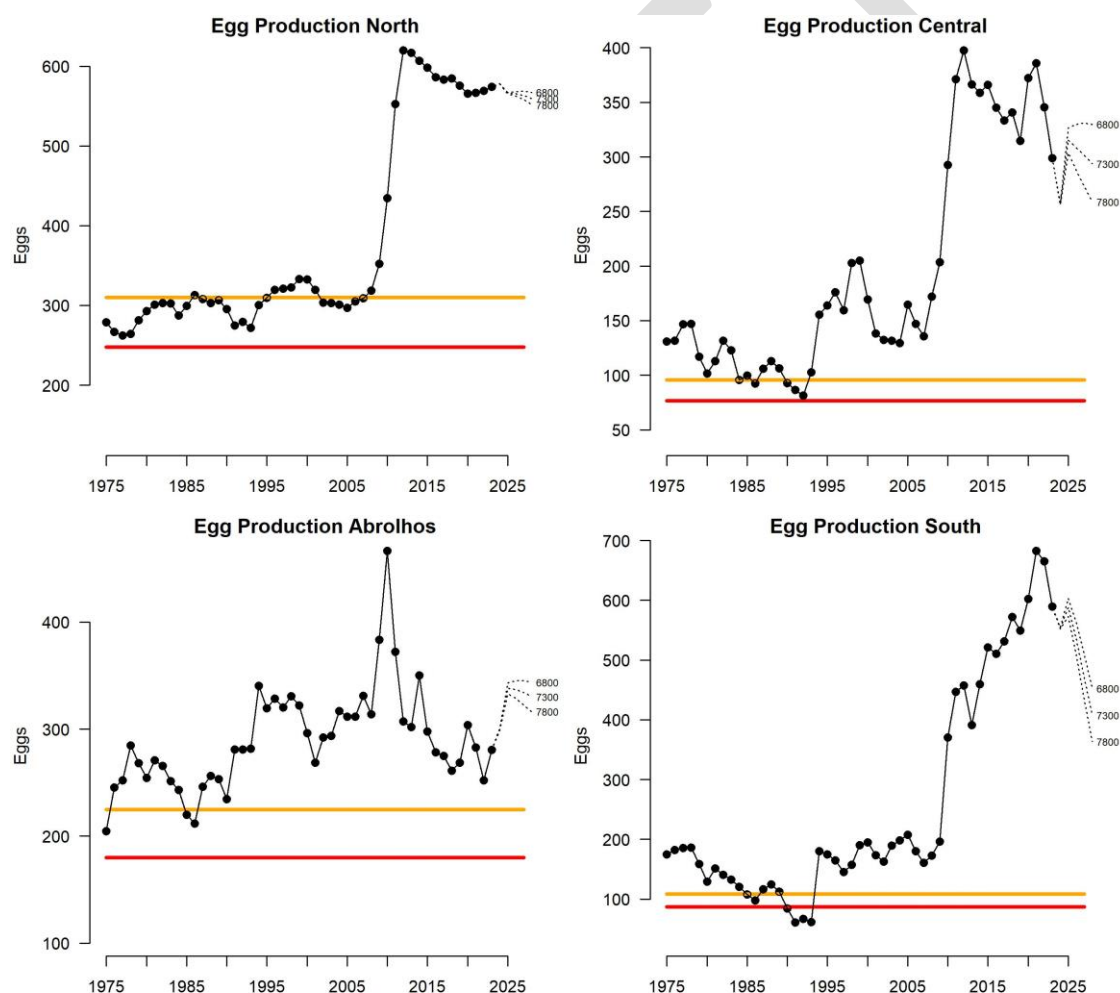


Figure 4. Model projected egg production for BSMA from 2023 stock assessment. Orange and red lines represent threshold and limit reference points, respectively.

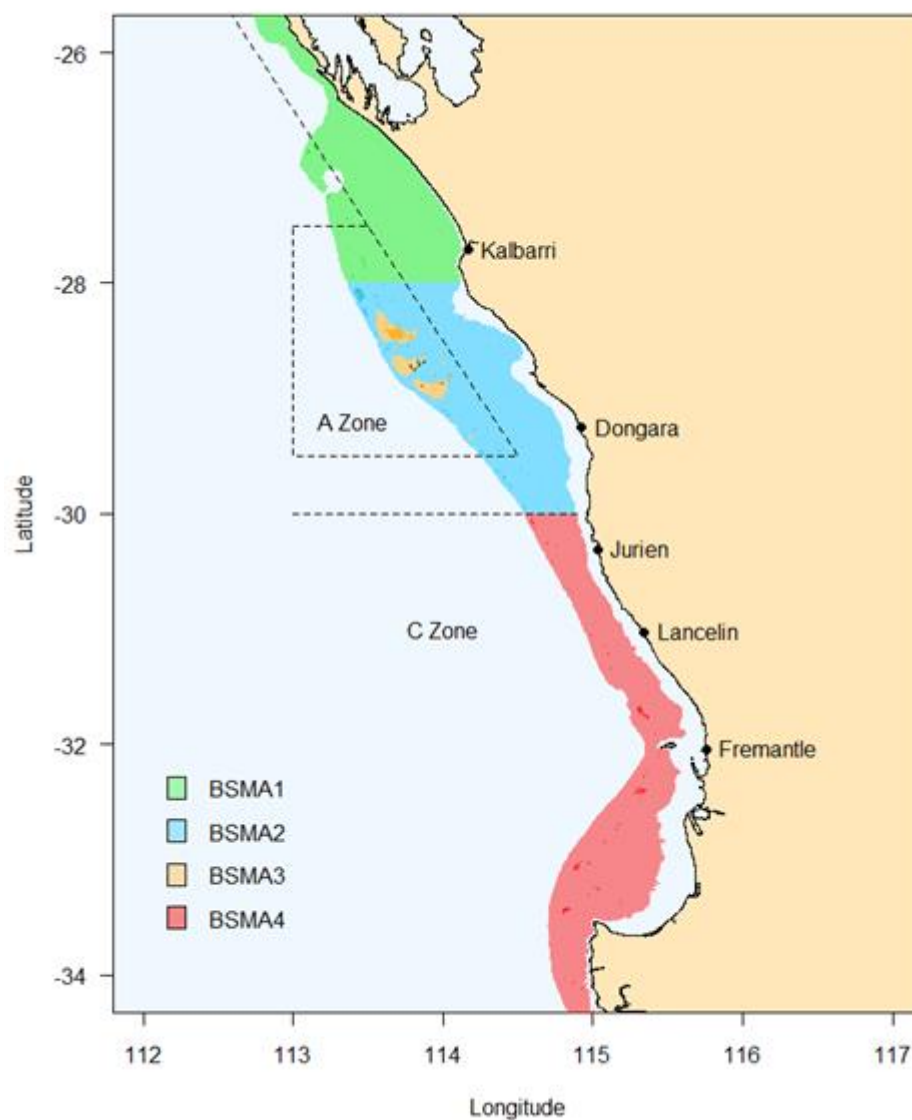


Figure 5. Map of the four Breeding Stock Management Areas used within the stock assessment model to inform region-specific threshold levels.

Table 1. Reference Levels for western rock lobster. H_{39} is a harvest rate of 0.39, E_s is the modelled-derived estimates of egg production (E) relative to levels considered conservatively sustainable, and $E_{0.8s}$ is $E_s * 0.8$ (20% below E_s).

Performance indicator	Reference level		
	Target	Threshold	Limit
Harvest rate of fishery-wide legal biomass	H_{39}	N/A	N/A
Historic Breeding Stock Management Area (BSMA) egg production	N/A	E_s	$E_{0.8s}$

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). These HCRs are designed to maintain the WCRLR above the threshold (i.e. at the target level) or rebuild it where it has fallen below the threshold (undesirable) or the limit (unacceptable) levels.

3.5.2.1 *Target Species*

The AHL is set at the legal biomass that is achieved from a harvest rate of 0.39. If model projections (five years) indicate that the biomass is deviating from the harvest rate by more than 0.05, then the AHL will be adjusted for the following season(s) to a level where model projections indicate that the WCRLR will return to the target level within five years.

If model projections based on known (four years) and assumed (fifth year – which is set conservatively at either the 25th percentile or the fourth year, whichever is lower) puerulus settlement levels (total five years) indicate that the threshold level will be breached, the AHL will be reduced for the following season(s) to a level where model projections indicate that the WCRLR will not breach the threshold level.

If model projections (five years) indicate that the limit reference level will be breached, a review will be initiated immediately and completed within three months to develop management arrangements to return and maintain the WCRLR above the limit. If modelling indicates that it has already breached the limit reference level, a review will be initiated immediately and completed within three months to develop a recovery plan that will implement management measures to return the WCRLR to above the limit within five years.

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). The description of risk levels specific for the WCRLR is available in Stoklosa 2022.

Changes to these risk levels are expected to only potentially affect the activities associated with the harvesting of WCRLR, not the allowable catch levels.

3.6 Fishery Performance

Defining periodic tolerance levels for fisheries provides a formal and efficient basis to evaluate the effectiveness of current management arrangements in delivering the levels of catch and/or effort specified by the HCRs and, where relevant, any sectoral allocation decisions (Fletcher *et al.* 2016). In line with the principles of ESD, this fishery-level review process can also consider the performance against any objectives relating to the economic and social amenity benefits of fishing. Where possible, and in due consideration of ecological sustainability, fisheries management arrangements can be adjusted or reformed to help meet these economic and/or social objectives.

If the annual catch/effort (or any other indicator specified to measure performance against the economic and social objectives) remains within the tolerance range, the fishery/sector is considered to be operating 'acceptably' with no need to review the management settings. If any fishery performance indicator falls outside of the tolerance range and this cannot be adequately explained (e.g. documented evidence of environmental or market-induced impacts), this will result in a review of the cause and re-assessment of the resource status against the performance indicators and HCRs. This could potentially lead to a change in management settings and therefore a revision of the tolerance levels.

3.6.1 Tolerance levels

The annual fishery performance of the WCRLR is primarily evaluated by: (1) assessing whether the TACC (for each zone of the WCRLMF) and TARC were achieved; and (2) comparing the commercial catch rates with the catch rate tolerance level. This assessment is undertaken as part of the annual review of the WCRLR.

The tolerance range for attainment of the TACC is currently defined as achieving at least 90% of the TACC in each zone, each fishing season. If this is not attained, investigate the reasons for low catches to ensure there are no underlying stock issues.

The catch rate tolerance level is based on the standardised annual commercial pot CPUE (kg/pot lift) and defined as greater than 2 kg per pot lift. If the catch rate falls below this threshold in any one zone, a review will be required.

3.6.2 Economic and Social Benefits

Achieving economic and social benefits is intrinsic to the status of the WCRLR. The periodic and annual reviews of the WCRLR 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:

- Optimise the economic performance of the commercial sector through consideration of annual market variability to determine the TACC (within the 95% allocation) to provide high economic returns and greater amenity to the WCRLMF.
- Maintain accessible and reliable local supply of rock lobsters to the WA community.

Following the commercial sector's allocation (95%) of the AHL, WRL via the TACC Committee provide a TACC recommendation to the Minister for Fisheries that considers annual market variability, as well as a number of other factors, to deliver optimum economic returns for the commercial sector (fishers and processors). Further information about this process and considerations is provided at Appendix 2. To evaluate this objective, annual GVP is used as the performance indicator.

Export market value has been adopted as a performance indicator for the commercial sector on the basis that it is a factor of four key elements that affect the economic performance of the fishery; total catch, beach price, value added and market price. Total catch is influenced by annual TACC setting and the capacity for fishers to achieve the TACC. Beach price is market driven and can be influenced by factors such as product quality, continuity of supply and seasonal demand. Value added considers how the value of a lobster increases at each stage of its production, taking in factors such as transport, resulting in the final market price.

To evaluate the accessibility of local lobsters to the community, the number of ports where Back of Boat lobsters are landed should remain stable or increase year on year. The industry objective for Back of Boat Sales is to meet local consumer demand. Local demand is limited and fluctuates so to evaluate supply meeting demand, the number of online ordering and payment complaints about supply will be used.

Additional performance indicators to evaluate flow of commercial fishing related economic benefit to the broader WA community could be measured by economic contribution studies.

3.6.2.2 *Recreational (including charter) sector*

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

- Maintain or improve the unique experience and culture of recreational rock lobster fishing, with a focus on high-value experiences during the annual migration of lobster in the lead up to Christmas.

To evaluate this objective, recreational catch rate has been chosen as the performance indicator. Further analysis is still required to use catch rate, so in the interim catch, participation and license numbers will be adopted to monitor recreational fishing experience. A target of catch would be attainment of the TARC, with a tolerance of achieving at least 90% of TARC each fishing season. In terms of participation and licence numbers, the target is maintaining the current levels.

While changes in participation over time provides a measure that the amenity or economic value associated with a recreational fishery may have been affected (in a positive or negative manner), additional tools (such as satisfaction/economic surveys) may be required to determine exactly what factors are driving the change.

3.7 Monitoring and Assessments 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 can report digitally with an electronic catch reporting system or on paper through catch and disposal reporting (CDR) information through a daily CDR book with 10 x 10 nautical mile statistical reporting blocks. Information recorded includes catches (weight and numbers), effort, statistical reporting block, fishing, landing, and weighing location. In addition, commercial fishers must also report any interactions with ETP species as part of the statutory reporting.

The information from these statutory returns provides the basis for calculating the standardised catch and biomass modelling for target and retained 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 western rock lobster is monitored through the state-wide recreational rock lobster survey.

The annual survey combines the data from the following sources to accurately estimate WA's recreational rock lobster 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 rock lobster fishing to inform management and ensure WA's recreational fisheries remain sustainable.

In line with DPIRD Fisheries Digital Transformation Project, the use of phone apps for reporting recreational lobster catches is being investigated for future use. A phone app for digital catch reporting for recreational fishers is in development for the West Coast Demersal Scalefish Resource which could be expanded to WCRLR in the future.

3.7.1.3 Charter Monitoring

Charter catches of western rock lobster, effort and participation information is monitored through a mandatory online nomination system and statutory logbooks. DPIRD is also monitoring the rock lobster charter trial based on feedback from stakeholders, coupled with data relating to changes in the number of rock lobster tours and participants.

3.7.1.4 Fishery-Independent Information

Fishery-independent surveys are undertaken each year to monitor the recruitment and spawning stock levels of western rock lobster. Puerulus surveys (at some sites since 1968) occur monthly and monitor the levels of post-larval recruitment that occur at nine sites across the WCRLR. This data is used to predict the recruitment into the WCRLR of legal lobsters 3-4 years in the future and is a key input in the stock assessment model,

allowing it to project biomass and egg production levels out four years. Juvenile surveys (since 2021) compliment the puerulus data as they measure juvenile lobster abundance at 12 shallow water sites across the WCRLR, linking post-larval recruitment to pre-recruits prior to their entry into the WCRLR. As the surveys are relatively new, they are yet to be added into the stock assessment model. Breeding stock surveys (since 1992) occur annually at up to eight locations and measure the abundance, size and condition of mature lobsters across the main breeding grounds. These data produce an independent index of egg production as well as input into the stock assessment model and are especially useful in examining levels of fishing efficiency.

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 WCRLR is determined based on a weight of evidence assessment of all available information. Stock assessment is informed by several stock assessment models which utilise multiple data sources, including independent breeding stock surveys, puerulus settlement indices, on-board commercial monitoring, and commercial catch data, to produce indices of egg production and biomass.

Modelled estimates of egg production are compared against historic levels to ensure the resource is above the limit and threshold levels (Table 1). Estimates of legal biomass are utilised to set the AHL based on the target harvest rate (Table 1).

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 September 2022, ERA for the WCRLR (Stoklosa 2022) were undertaken to consider the ecosystem impacts of the fishing activities targeting WCRLR, 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 WCRLR. 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, anticipated to be replaced by the ARMA once fully implemented;
- FRMR, anticipated to be replaced by the Aquatic Resources Management Regulations once ARMA is fully implemented); and
- WCRLMF 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 WCRLR 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 WCRLR or within an individual sector to ensure the AHL is not exceeded.

Table 2. Management measures and instrument of implementation for the WCRLR.

Measure	Description	Instrument
Licences	Commercial and recreational fishers must hold a current, relevant rock lobster fishing licence.	WCRLMF Management Plan FRMR
Output-controls	TACC limits and ITQ in Zones A, B and C of the WCRLMF.	WCRLMF Management Plan
Gear Restrictions	Commercial fishers must comply with pot configuration restrictions; including maximum size, entrance to pot and escape gaps.	WCRLMF Management Plan FRMR
	Recreational rock lobster fishers must comply with gear specifications when using pots; alternatively catching lobsters by hand, hand-held snare or a blunt crook is permitted.	FRMR

Australian sea lion (ASL) exclusion devices (SLED)	SLED zones are in place for commercial fishers around all known ASL colonies, in these areas SLEDs must be used to reduce the risk of drownings.	WCRLMF Management Plan
Spatial Closures	Parts of the West Coast of WA includes marine protected areas and with some areas closed to commercial and recreational fishing.	EPBC Act FRMA (Section 43 Orders)
Temporal Closures	A night fishing ban is in place for recreational fishers, under which setting pots or diving for rock lobster is not permitted at certain times.	FRMR
Size Limits	Species-specific size limits apply to western rock lobsters.	FRMR
Recreational Bag and Boat Limits	Recreational boat and bag limits are in place for rock lobsters.	FRMR
Possession limits	A maximum number of western rock lobsters combined permitted in a person's possession applies under the recreational fishing requirements.	FRMR
Reporting	Licensed commercial fishers are required to report all retained species catches, effort, ETP species interactions and fishing location in statutory logbooks.	FRMR
Monitoring	Commercial operators are required to make nominations pre- and post-fishing.	WCRLMF Management Plan

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) WRL and Recfishwest are the primary source of advice and representation from the commercial sector and recreational (including charter) sector, respectively.

4.3.1 Commercial Sector

The Western Rock Lobster Council (WRL) is the peak sector body dedicated to representing the interests of the western rock lobster commercial fishing industry.

Under its funding agreement with DPIRD, WRL has been funded to undertake statutory consultation functions related to fisheries management and the facilitation of management meetings for the WCRLMF.

Annual Management Meetings (AMMs) between DPIRD, WRL and licence holders in the WCRLMF are an important forum to discuss the annual stock assessment and management of the fishery. During these meetings, current and future management issues that may have arisen during the previous fishing season and any proposed changes to the management arrangements are discussed. Follow-up meetings may be held as required.

4.3.1.1 TACC Setting and Review

Following determination of the AHL and the commercial sector's 95% allocation, the WRL may make a TACC recommendation within the 95% allocation to the Minister for Fisheries (Figure 6). This process can consider market elasticity caused by market and supply chain variability, as well as any other identified factors, to ensure the commercial sector can maximise profitability and achieves its operational economic objectives (Section 3.6.2). Further information regarding the WRL TACC Committee process and considerations is outlined at Appendix 2.

Once determined, the TACC is allocated across the zones of the fishery in accordance with set percentages (Zone A: 18%, Zone B: 32% and Zone C: 50%).

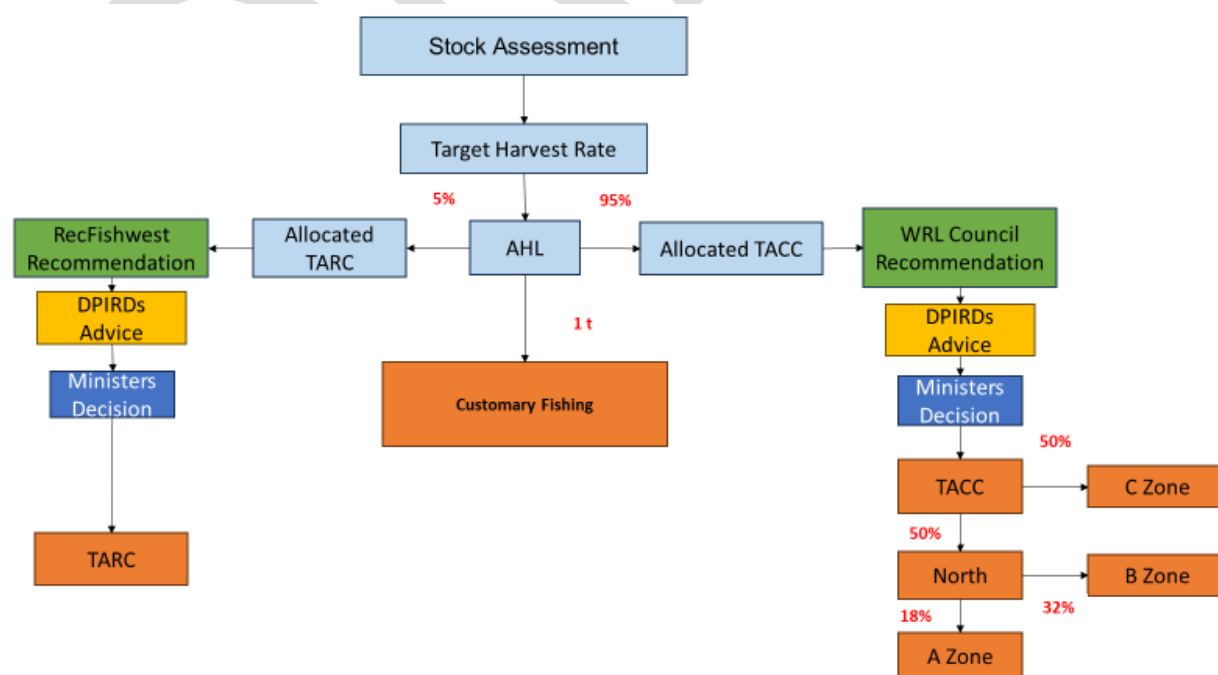


Figure 6. Consultation process for setting TACC/TARC

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.

4.3.2.1 TARC Setting and Review

Following determination of the AHL and the recreational sector's 5% allocation, Recfishwest may recommend a TARC to the Minister for Fisheries within the 5% allocation to maximise recreational fishing experiences and other social and economic benefits to the recreational (including charter) sector (Figure 6).

Notwithstanding this, a transitional TARC of 500 tonnes will be set annually for the next five years (2024 – 2028). In line with the harvest control rules (section 3.5.2), the 500 tonnes TARC would be reviewed if a threshold/limit for the target species is breached. The transitional TARC reflects the average recreational sector catch for the last five years (2018-2022) and will provide a stable catch for the recreational sector as the biomass trends downwards towards the long-term AHL (target level).

An annual assessment of the recreational catch against its allocation of WRL catch is undertaken based on 5-year historic moving averages of the retained catch (from licensed fishers and tour operators) and the TARC. Any breaches of the recreational sector's allocation would be reviewed in consultation with Recfishwest to determine appropriate action to return catches to within the TARC.

4.3.3 Consultation with Other Groups

Consultation on western rock lobster 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 WCRLR-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 WCRLR 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 WCRLR;
- to protect the fisheries' environmental values, while providing fair and sustainable access to the WCRLR's 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 WCRLR 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 WCRLR target species and other ecological assets that may be impacted by fishing activities undertaken by commercial, recreational and charter fishers while targeting western rock lobster.

Component	Operational objective	Resource/asset	Performance indicators	Reference levels	Control rules
Target species	To maintain ecological sustainability where by future recruitment is only affected by environmental variability.	Western Rock Lobster	Harvest rate of fishery-wide legal biomass.	Target: Legal biomass that is achieved from harvest rate of 0.39.	Continue current management settings. If the performance indicator is projected to trend away by more than 0.05 from the target level, adjust the AHL for the resource to move performance indicator to target level.
			Historic Breeding Stock Management Area (BSMA) egg production	Threshold: Egg production before full exploitation (E_s). (1982-1984 in BSMA 1-3 and 1992 – 1994 in BSMA 4).	If model projections indicate a threshold level in any one BSMA will be breached, initiate a review within three months on current zonal allocation process (Section 3.5.1.1.2). Reduce the AHL to a level where the resource remains above the threshold level within the five years of model projection.

Component	Operational objective	Resource/asset	Performance indicators	Reference levels	Control rules
			Historic BSMA egg production	Limit: 80% of egg production before full exploitation ($E_{S0.8}$).	<p>If model projections indicate a limit level in any one management area will be breached, a review will be initiated immediately and completed prior to commencement of next season to develop management arrangements to return the performance indicator above the Limit level.</p> <p>If modelling indicates that the Limit level has been breached, a review will be initiated immediately and completed within three months to develop a recovery plan that will implement management measures to return the performance indicator to above the threshold level within five years.</p>
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	Demersal Scalefish	Refer to West Coast Demersal Scalefish Resource Harvest Strategy.		
		West Coast Deep Sea Crustacean	Refer to West Coast Deep Sea Crustacean Resource Harvest Strategy.		
		Octopus	Refer to Octopus Resource of Western Australia Harvest Strategy.		

Component	Operational objective	Resource/asset	Performance indicators	Reference levels	Control rules
		All other retained non-target species	<p>Assessed level of risk for each non ETP species/group from lobster fishing activities from periodic risk assessments incorporating:</p> <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 lobster fishing.	Maintain current management settings.
				Thresholds: Adding to a moderate risk level from lobster 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 lobster 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	<p>Periodic risk assessments for each bycatch species/group from lobster fishing activities incorporating:</p> <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, 	Target: Lobster 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 Lobster fishing impacts are considered to generate an undesirable level of risk to any bycatch species'	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.

Component	Operational objective	Resource/asset	Performance indicators	Reference levels	Control rules
			<ul style="list-style-type: none"> other available research. 	<p>populations (<i>i.e.</i> high risk).</p> <p>Limit: Lobster fishing impacts are considered to generate an unacceptable level of risk to any bycatch species' populations (<i>i.e.</i> severe risk).</p>	<p>Initiate an immediate management response to reduce the risk to an acceptable level as soon as practicable.</p>
ETP species	To conduct lobster 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	<p>Assessed level of risk for each ETP species/group from lobster fishery activities from periodic risk assessments incorporating:</p> <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. 	<p>Target: Lobster fishing impacts are expected to generate an acceptable risk level to all ETP species' populations (<i>i.e.</i> medium risk or lower).</p>	Continue management aimed at achieving ecological, economic, and social objectives.
				<p>Thresholds: A potentially material change to risk levels is identified; or Lobster fishing impacts are considered to generate an undesirable level of risk to any ETP species' populations (<i>i.e.</i> high risk).</p>	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.
				<p>Limit: Lobster fishing impacts are considered to generate an unacceptable level of risk to any ETP species'</p>	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
				populations (<i>i.e.</i> severe risk).	
Habitats	To conduct lobster 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 lobster 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: Lobster 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; and or Lobster 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: Lobster fishing impacts are considered to generate an unacceptable level of risk to any benthic habitats (<i>i.e.</i> severe risk).	Initiate an immediate management response to reduce the risk to an acceptable level as soon as practicable.
Ecosystem	That the overall effects of lobster 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 lobster fishery activities from periodic risk assessments incorporating:	Target: Lobster fishing impacts are expected to generate an acceptable risk level to all ecological processes within the	Continue management aimed at achieving ecological, economic, and social objectives.

Component	Operational objective	Resource/asset	Performance indicators	Reference levels	Control rules
			<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. 	ecosystem (<i>i.e.</i> medium risk or lower).	
				Thresholds: A potentially material change to risk levels is identified; and or Lobster 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: Lobster 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.

Appendix 2 – WRL considerations for TACC recommendation

Maximum Economic Yield and TACC setting

Maximum Economic Yield (**MEY**) is defined as the catch or effort level that maximises profit for the fishery as a whole over a number of seasons. Maximum profit happens at the point when there is the largest difference between total revenues and total costs of fishing. In most cases, MEY will be associated with a lower catch level (a higher level of biomass) than that associated with Maximum Sustainable Yield (MSY). Along with other inputs and considerations, MEY is used to inform Total Allowable Commercial Catch (**TACC**) recommendations to the Minister for Fisheries.

The Western Rock Lobster (**WRL**) MEY model (jointly developed by DPIRD and WRLC) provides an economic evaluation tool that considers the commercial fleet's costs of fishing, lobster biomass levels, expected catch rates and expected longer-term (time frame a year or more) price responses to longer-term changes in supply (increases in annual quota). Versions of the model operate in Excel and app environments, highlighting responses in the industry profit function to changes in user inputs. A link to the MEY model app can be found on the WRL website. As an evaluation tool, it can be used to assess ongoing impacts of changes to quota, market factors, fishing costs, and the expected profitability of industry.

Lobster biomass levels and projected catch rates under different catch (quota) scenarios are derived from DPIRD stock assessment models.

The fishing cost components of the model are based on data collected through the WRL's benchmarking interviews with commercial lobster fishers. The revenue elements of the model are based on two western rock lobster products (live and frozen) and project long term expected annual product mix and beach-price pricing outcomes, based on the experience and views of the TACC Committee. Membership of the TACC Committee is outline in its Terms of Reference and includes representatives from WRL, commercial fishers, rock lobster processors and DPIRD.

Lobster biomass levels and projected catch rates under different catch (quota) scenarios are derived from DPIRD stock assessment models.

The fishing cost components of the model are based on data collected through the WRL's benchmarking interviews with commercial lobster fishers. The revenue elements of the model are based on two western rock lobster products (live and frozen) and project long term expected annual product mix and beach-price pricing outcomes.

The model has been developed to help provide an evidence-based means of determining the optimal longer-term level of harvest for the commercial western rock lobster fishery as a whole. It is necessarily reliant on judgement and informed opinion on market dynamics into an uncertain future. In reality, demand and supply for live western rock lobster change seasonally and indeed daily, which is further impacted by the availability of substitute products (rock lobster live and frozen; other species of lobster live and frozen, and other substitute products) and longer term, other economic drivers.

As a tool, the model generates outputs that enable an understanding to be gained on the likely shape of long-term, industry-wide revenue and profit outcomes as a range of inputs

and assumptions are altered. Hence it can substantially add to the understanding of position of MEY for the fishery and can be used to evaluate a range of alternative assumptions. As an evaluation tool, it can be used to assess ongoing impacts of increasing quota and the expected profitability of industry and provide the best estimate of price revenue trends in response to changes in supply and knowledge of trade conditions and geopolitical trends.

The model also shows the MEY position for the fishery practically falls within a range of yield values. The setting of a TACC value for the next fishing period takes into account the history of past decisions, industry understanding of risk, the status of the fishery under the harvest strategy and expected market outcomes.

In providing recommendations on the TACC for the fishery, the TACC Committee are assisted in the preparation of their advice by a comprehensive statistical evidence report on world trade and trends on all lobster species prepared by WRL.

Ultimately the TACC recommendations proposed by the TACC Committee flows to WRL. This advice is framed against previous knowledge and reporting of all indicators of rock lobster resource sustainability, all independent indicators of recruitment, breeding stock levels, catch and biomass trends and predictions by DPIRD at the Annual Management Meetings with the western rock lobster industry.

TACC setting process

In practice, the TACC setting process involves six key stages driven primarily through the annual reporting of the fishery to industry by DPIRD in stage 1, by the TACC Committee through stages 2 and 3, WRL board through stages 4 and 5, and ultimately determined by the Minister for Fisheries at stage 6.

1. DPIRD provides annual stock assessment in accordance with the harvest strategy and provides AHL for following season.
2. WRL review outputs from MEY model, trade data, industry experience from all sources.
3. TACC committee formulate advice based on the information provided from step 1 and 2.
4. WRL considers TACC committee advice, forms recommendation and seeks industry feedback on recommendation at both AMMs and through an online survey to all members.
5. Final recommendation determined by WRL and sent to Minister, together with all supporting documentation.
6. Minister determines TACC and TARC.

Effectively this process delivers joint DPIRD and industry integration of data and information and enables industry to apply their own risk profile to the resource co-management approach for the fishery.