



**Australian Government**

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**Department of the Environment and Energy**

**Assessment of the  
Western Australian Temperate Demersal Gillnet and  
Demersal Longline Fisheries**

Comprising the

**JOINT AUTHORITY SOUTHERN DEMERSAL GILLNET AND DEMERSAL  
LONGLINE MANAGED FISHERY (JASDGDLF)**

and the

**WEST COAST SOUTHERN DEMERSAL GILLNET AND DEMERSAL LONGLINE  
(INTERIM) MANAGED FISHERY (WCDGDLF)**

**AUGUST 2018**

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This report should be attributed as '*Assessment of the Western Australian Temperate Demersal Gillnet and Demersal Longline Fisheries August 2018, Commonwealth of Australia 2018*'.

### **Disclaimer**

This document is an assessment carried out by the Department of the Environment and Energy of a commercial fishery against the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries – 2nd Edition*. It forms part of the advice provided to the Minister for the Environment and Energy on the fishery in relation to decisions under Parts 13 and 13A of the *Environment Protection and Biodiversity Conservation Act 1999*. The views expressed do not necessarily reflect those of the Minister for the Environment and Energy or the Australian Government.

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## **EXECUTIVE SUMMARY OF THE ASSESSMENT OF THE WESTERN AUSTRALIAN TEMPERATE DEMERSAL GILLNET AND DEMERSAL LONGLINE FISHERIES**

In July 2018, the Western Australian (WA) Department of Primary Industries and Regional Development, submitted an application *Application to the Department of the Environment and Energy, Western Australia's Temperate Demersal Gillnet and Demersal Longline Fisheries*, to the Department of the Environment and Energy for assessment under the EPBC Act as a Wildlife Trade Operation (WTO), against the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries – 2<sup>nd</sup> Edition*. A public comment period was open from 6 July 2018 to 7 August 2018.

### **The fishery**

The WA Temperate Demersal Gillnet and Demersal Longline Fisheries (The fisheries), operate along the south and lower west coasts of WA. Demersal gillnets and demersal longlines (power-hauled reels) are used to target various shark species. Management of the commercial fishery is based (primarily) through input controls. The controls include: mesh, net height and hook size restrictions and maximum net length and transferable time/gear effort units (monitored with a satellite-based vessel monitoring system).

### **Target stocks**

Overall stock status for target (indicator) sharks in the south and west of WA, has been assessed as 'sustainable-recovering' and is assessed annually through the *Status reports of the fisheries and aquatic resources of Western Australia*.

### **Protected species (including CITES-listed species) and ecosystems**

Protected species interactions in the fishery have included Australian Sea Lions, various shark species, dolphins, Manta Rays, seabirds, sawfish, seals and marine turtles. Conservation of Australian Sea Lions is identified as a regional priority in the 'Marine Bioregional Plan for the South-west Marine Region 2012'. Although the 'Status Reports of the Fisheries and Aquatic Resources of Western Australia, 2016/17' state the risk to protected species is considered 'negligible-low', and there have been no reported interactions involving Australian Sea Lions since the previous WTO approval, the potential risk to Australian Sea Lions has been identified as the key protected species issue in WA, as this species is susceptible to fatal interactions with demersal gillnets. In June 2018 the WA Government implemented a network of gillnet exclusion zones to reduce the risk of interactions with foraging Australian Sea Lions.

The ongoing harvest of CITES listed Hammerhead shark species is considered within the levels considered by the 2014 non-detriment finding, made by the CITES Scientific Authority.

Impacts on the ecosystem are generally considered to be 'low' and management responses appear likely to be effective overall in minimising the impact of the fishery on the ecosystem. A new ERA and a Harvest Strategy to be developed in 2019 will formally outline management measures, to mitigate risk of significant impacts on the ecosystem.

### **Conclusion**

Following assessment against the Guidelines at Section 2, the WA Temperate Demersal Gillnet and Demersal Longline Fisheries has been found to meet the requirements of the EPBC Act subject to the conditions outlined in Section 4. On this basis, the Department considers that declaration of the harvest operations of the WA Temperate Demersal Gillnet and Demersal Longline Fisheries, as an approved wildlife trade operation for three years until 20 August 2021, is appropriate. Unless a specific time frame is provided, each condition must be addressed within the period of the approved wildlife trade operation declaration for the fishery.

**SECTION 1: ASSESSMENT SUMMARY OF THE WESTERN AUSTRALIAN TEMPERATE DEMERSAL GILLNET AND DEMERSAL LONGLINE FISHERIES AGAINST THE GUIDELINES FOR THE ECOLOGICALLY SUSTAINABLE MANAGEMENT OF FISHERIES (2ND EDITION), CONSISTENT WITH THE EPBC ACT**

Guidelines assessment	Meets	Partially meets	Does not meet	Details
Management regime	6 of 9	3 of 9		Development of a new management plan is underway and new management arrangements are scheduled to commence 1 January 2019. There is currently no formal Harvest Strategy in place. The 2005 Ecologically Sustainable Development (ESD) report needs to be reviewed and updated.
Principle 1 (target stocks)	7 of 11	4 of 11 1.1.1, 1.1.6, 1.2.1 and 1.2.2		No target stocks are being overfished. Biological stocks are assessed as <b>'sustainable-adequate'</b> (Gummy Sharks and Whiskery Sharks) and <b>'sustainable-recovering'</b> (Dusky Shark sand Sandbar Sharks). Fishery independent abundance data for adult Dusky Sharks and Sandbar Sharks, will be available in late 2018. A Harvest Strategy specifying reference levels (limits, targets, and thresholds), performance indicators and control rules for the fisheries will be formalised in 2019. The 2005 ESD report is intended to be reviewed and updated.
Principle 2 (bycatch and TEPS)	10 of 12		2 N/a.	Species level reporting for hammer head sharks would be beneficial to determine ongoing sustainability for protected species.
Principle 2 (ecosystem impacts)	1 of 5	4 of 5 2.3.2, 2.3.3, 2.3.4 and 2.3.5		Impacts on the ecosystem are generally considered to be 'low' and management responses appear likely to be effective overall in minimising the impact of the fishery on the ecosystem. A new ERA (to replace the existing ESD completed in 2005) and a

				Harvest Strategy to be developed in 2019 will formally outline management measures, to mitigate risk of significant impacts on the ecosystem.
<b>EPBC requirements</b>	<b>Meets</b>	<b>Partially meets</b>	<b>Does not meet</b>	<b>Details</b>
Part 12	Meets			Given the low physical impact of fishing gear and the management and mitigation measures in place, the fishery is not considered to have significant impact to key ecological features identified for the Recherche Archipelago and the Houtman Abrolhos Islands and the demersal slope and associated fish communities of the Central Western Province.
Part 13	11 of 12		1 N/a.	As per Part 13 conditions WA DPIRD to: conduct a review of the gillnet exclusion zones to assess their effectiveness in reducing the risk of interactions with Australian Sea Lions, and an ESD report review.
Part 13A	12 met		5 N/a.	The fisheries are operating consistent with the Objects of Part 13A. Declaration of the fishery as a Wildlife Trade Operation for three years, until 20 August 2021 is recommended subject to conditions detailed in Section 4 of this report.
Part 16	Meets			The fishery is managed in a precautionary manner.

## Notes

Assessment history:

1<sup>st</sup> assessment finalised – February 2006. Nine conditions and two recommendations.

2<sup>nd</sup> assessment finalised – April 2009. Five conditions and seven recommendations.

3<sup>rd</sup> assessment finalised – August 2012. Four conditions, five recommendations, and one Part 13 condition (three parts: A, B, C).

4<sup>th</sup> assessment finalised – August 2015. Three conditions, one Part 13 condition (three parts: A, B, C) and five recommendations.

The current Part 13 accreditation has one condition (three parts: A, B, C).

**Fishery reporting:**

Annual report – reported through the State of the Fisheries reports. – See page 176 of [Status reports of the fisheries and aquatic resources of Western Australia 2016/17](#).

Protected species interactions – *Reported publicly in the annual State of the Fisheries reports (see link above).*

**Key links:**

Fishery information page on agency website – <http://www.fish.wa.gov.au/Fishing-and-Aquaculture/Commercial-Fishing/Commercial-Fishing-Management/Pages/Major-Commercial-Fisheries.aspx>.

Management plan or equivalent (legislation/management plan changing in 2019):

[Joint Authority Southern Demersal Gillnet and Demersal Longline Limited Entry Fishery Notice 1992.](#)

[West Coast Demersal gillnet and Demersal Longline Interim Managed Fishery Management Plan 1997.](#)

Harvest strategy – This will be formally developed early 2019, by the WA Department of Primary Industries and Regional Development (DPIRD).

Submission for reassessment under the EPBC Act, received in July 2018, which includes information that articulates how the WA DPIRD has progressed with the conditions prescribed in the 2015 WTO declaration and Part 13 accreditation: <http://www.environment.gov.au/system/files/consultations/bb9205f1-2fb0-4d0d-81a9-e3b3b304de0a/files/temperate-demersal-gillnet-demersal-longline-fisheries-application-2018.pdf>.

**Enforcing legislation:**

*WA Fish Resources Management Act 1994* (FRMA, will be replaced by the *Aquatic Resources Management Act* once enacted).

*WA Fish Resources Management Regulations 1995* (FRMR).

WA FRMA Section 43 Order — *Prohibition on Commercial Fishing for Demersal Scalefish (Pilbara Area) Order 1997* and *Notice Prohibition on Line Fishing (Metal in Lines and Traces) Order 2008*.

**Risk assessment and mitigation:**

Ecosystem Based Fisheries Management assessments (reviewed annually) are reported in the [Status reports of the fisheries and aquatic resources of Western Australia 2016/17](#).

**Stock assessment and reports:**

The most recent stock assessments are reported annually in the State of the Fisheries report at <http://www.fish.wa.gov.au/About-Us/Publications/Pages/State-of-the-Fisheries-report.aspx>.

**Other:**

*[ASL Gillnet Exclusion Zones Map Coordinates \(2018\)](#).*

*[Statewide survey of boat-based recreational fishing in Western Australia 2015/16](#).*



**SECTION 2: DETAILED ANALYSIS OF THE WESTERN AUSTRALIAN TEMPERATE DEMERSAL GILLNET AND DEMERSAL LONGLINE FISHERIES AGAINST THE GUIDELINES FOR THE ECOLOGICALLY SUSTAINABLE MANAGEMENT OF FISHERIES (2ND EDITION)**

Guidelines criteria	Comment
<b>THE MANAGEMENT REGIME</b>	
The management regime does not have to be a formal statutory fishery management plan as such, and may include non-statutory management arrangements or management policies and programs. The regime should:	
Be documented, publicly available and transparent.	<p><b>Meets</b></p> <p>The Western Australian (WA) Temperate Demersal Gillnet and Demersal Longline Fisheries governing legislation and general information describing the management regime, are available online on the WA Department of Primary Industries and Regional Development (DPIRD) Fisheries website (link accessible in Section 1: Notes).</p>
Be developed through a consultative process providing opportunity to all interested and affected parties, including the general public.	<p><b>Partially meets</b></p> <p>The management strategies are prepared through stakeholder consultation, adhering to state legislation. The WA DPIRD has advised that the general public will have the opportunity to provide comment on the new management plan.</p> <p>Development of new management arrangements are undertaken in accordance with the consultative process described in the 2018 fishery application submission (link accessible in Section 1: Notes).</p>
Ensure that a range of expertise and community interests are involved in individual fishery management committees and during the stock assessment process.	<p><b>Meets</b></p> <p>Fisheries management decisions are negotiated between government (including fishery scientists) and industry, as well as directly with licence holders, and through the Western Australian Fishing Industry Council. The WA DPIRD also receives public correspondence about issues relating to stock status and management for the WA Temperate Demersal Gillnet and Demersal Longline Fisheries.</p> <p>The WA DPIRD stock assessments are publicly released on an annual basis. They are also tabled in parliament.</p>
Be strategic, containing objectives and performance criteria by which the effectiveness of the management arrangements are measured.	<p><b>Partially meets</b></p> <p>There is no Harvest Strategy in place, however a Harvest Strategy is scheduled to be developed in early 2019, by the WA DPIRD. The 2018 fishery application submission, states that "the operational management objective of the WA Temperate Demersal Gillnet and Demersal Longline Fisheries has been 'to maintain the biomass of the fisheries' for the three traditional target stocks (Gummy, Whiskery and Dusky sharks) at or above 40% of their unfished levels'."</p> <p>Performance measures are reported publicly in the annual <i>Status reports of the fisheries and aquatic resources of Western Australia 2016/17</i> (link accessible in Section 1: Notes).</p>

<p>Be capable of controlling the level of harvest in the fishery using input and/or output controls.</p>	<p><b>Meets</b></p> <p>Input controls are used for management of the WA Temperate Demersal Gillnet and Demersal Longline Fisheries. Controls include: transferable time/gear effort units; mesh and hook size restrictions; net height ('drop') and maximum net length. In addition, a satellite-based Vessel Monitoring System (VMS) monitors all boats. In addition, there are catch caps and recommended catch ranges for the indicator species.</p>
<p>Contain the means of enforcing critical aspects of the management arrangements.</p>	<p><b>Meets</b></p> <p>The 2018 fishery application submission states there has been an increase in Fisheries and Marine Officers (FMOs) undertaking landing inspections, to assist in compliance with fishery management arrangements.</p> <p>To promote voluntary compliance within the fishery, FMO Case Officers are assigned to most of the vessels in the fisheries, to investigate reported breaches, ensure advice is provided about current legislation, and attend any issues which arise. Training in shark trunk identification has been developed, and a guide is used by FMOs when conducting inspections.</p> <p>An annual compliance presentation is included in management meetings, which fishers also attend. Infringement notices have also been developed and issued as necessary to address instances of non-compliance.</p>
<p>Provide for the periodic review of the performance of the fishery management arrangements and the management strategies, objectives and criteria.</p>	<p><b>Partially meets</b></p> <p>In 2005, the WA DPIRD (then, Department of Fisheries) completed an Ecologically Sustainable Development (ESD) report for the WA Temperate Demersal Gillnet and Demersal Longline Fisheries. The report provided an overview of the operational objectives, performance measures, indicators, management responses and information requirements, used to assess the performance of the fisheries. However, the report will be reviewed as part of the Harvest Strategy development in 2019.</p> <p>The WA DPIRD will be completing an Ecological Risk Assessment (ERA) during 2019, with the intention of ERAs to replace ESDs. Until the ERA is in place, the <i>Status reports of the fisheries and aquatic resources of Western Australia</i> provides reports on the performance of the WA Temperate Demersal Gillnet and Demersal Longline Fisheries against objectives and performance measures outlined in the 2005 ESD report.</p> <p>The WA Temperate Demersal Gillnet and Demersal Longline Fisheries operates to a Harvest Strategy. The Harvest Strategy is scheduled to be formalised in 2019 by the WA DPIRD. The process will involve public consultation on the objective, performance indicators and control rules set out in the Harvest Strategy.</p>
<p>Be capable of assessing, monitoring and avoiding, remedying or mitigating any adverse impacts on the wider marine ecosystem in which the target species lives and the fishery operates.</p>	<p><b>Meets</b></p> <p>The WA DPIRD is capable of assessing, monitoring and avoiding, remedying or mitigating any adverse impacts on the wider marine ecosystem. The recent implementation of the Australian Sea Lion gillnet exclusion zones is an example of this. The ERA (scheduled for 2019) will reassess the assessment of potential impacts, including providing an up to date cumulative risk status for each of the ecological resource assets within relevant WA marine bioregions, is reviewed annually and reported through the <i>Status reports of the fisheries and aquatic resources of Western Australia 2016/17</i> (link accessible in Section 1: Notes).</p>

<p>Requires compliance with relevant threat abatement plans, recovery plans, the National Policy on Fisheries Bycatch, and bycatch action strategies developed under the policy.</p>	<p><b>Meets</b></p> <p>The WA Temperate Demersal Gillnet and Demersal Longline Fisheries is compliant with relevant Commonwealth plans and policies.</p>
<p><b>PRINCIPLE 1</b> - A fishery must be conducted in a manner that does not lead to over-fishing, or for those stocks that are over-fished, the fishery must be conducted such that there is a high degree of probability the stock(s) will recover.</p>	
<p><b>Objective 1</b> - The fishery shall be conducted at catch levels that maintain ecologically viable stock levels at an agreed point or range, with acceptable levels of probability.</p>	
<p><b>Information requirements</b></p>	
<p><b>1.1.1</b> There is a reliable information collection system in place appropriate to the scale of the fishery. The level of data collection should be based upon an appropriate mix of fishery independent and dependent research and monitoring.</p>	<p><b>Partially meets</b></p> <p>The fishers are required to submit fine-scale daily trip, catch and effort data, through to the WA DPIRD. In addition, there is at-sea monitoring by opportunistically-placed independent human observers on board vessels. Also, Fisheries and Marine Case Officers are assigned to most of the vessels in the fisheries, to investigate reported breaches in catch (and ensure advice is provided about current legislation, and attend any issues which arise).</p> <p>In recent years, on-board observer coverage has generally been more opportunistic. However, the WA DPIRD has indicated that strategic on-board sampling is proposed for 2019-2021.</p> <p>In addition, there has been fishery independent abundance information available for Sandbar and Dusky Sharks (and other tropical/subtropical species) since the early 2000s. These data are currently being analysed and will be published by late 2018 or early 2019.</p> <p>The WA DPIRD intend to initiate a more representative sampling of the fleet in coming years, as part of stock assessment and risk assessment requirements.</p>

**Assessment**

**1.1.2** There is a robust assessment of the dynamics and status of the species/fishery and periodic review of the process and the data collected. Assessment should include a process to identify any reduction in biological diversity and /or reproductive capacity. Review should take place at regular intervals but at least every three years.

**Meets**

The WA DPIRD reports annually on the status of the WA Temperate Demersal Gillnet and Demersal Longline Fisheries, through the *Status Reports of the Fisheries and Aquatic Resources of Western Australia* (link accessible in Section 1: Notes). The 2016/17 report includes stock status information up to and including the 2014/15 fishing season.

The WA Temperate Demersal Gillnet and Demersal Longline Fisheries target mainly Sharks. The overall stock status for sharks in the south and west, has been assessed as **'sustainable-recovering'**. The main shark species targeted in the fisheries are Gummy Sharks (*Mustelus antarcticus*), Dusky Sharks (*Carcharhinus obscurus*), Sandbar Sharks (*C. plumbeus*) and Whiskery Sharks (*Furgaleus macki*) These four Shark species make up 80% of Shark catch in the fisheries and are used as indicator species for the status of other temperate Sharks in the fisheries.

The 2018 fishery application submission indicates the status of indicator stocks in the fisheries (during the 2014/2015 season) as follows:

- Fishing effort levels in all management areas of the fisheries (Zones 1 and Zone 2) are assessed as being **'acceptable'**.
- The status of the Gummy and Whiskery shark biological stock remains **'adequate'**.
- Current level of fishing for Dusky and Sandbar Sharks results in the biological stock being classified as **'recovering'**.

The *Status Reports of the Fisheries and Aquatic Resources of Western Australia 2016/17* (see p.182 and p60. respectively) give the current status of the demersal scalefish resource (byproduct in the fisheries) as:

- South Coast Bioregion – **'sustainable-adequate'**.
- West Coast Bioregion (inshore) – **'sustainable-recovering'**.
- (offshore) – **'sustainable-adequate'**.

**1.1.3** The distribution and spatial structure of the stock(s) has been established and factored into management responses.

**Meets**

The 2018 fishery application submission indicates that the fishing effort levels are assessed as **'acceptable'** (based on assessment of all management areas of the WA Temperate Demersal Gillnet and Demersal Longline Fisheries, Zones 1, 2 and 3). Since the 2015 fishery export assessment, WA DPIRD have completed a project to determine the temporal and spatial dynamics of the target shark species in WA.

Monitoring of indicator species (which reflect the characteristics of the broader exploited stocks) including WA Dhufish, Pink Snapper and Baldchin Groper, is used to determine whether there is any risk to the various target species fished in the area. Appropriate management responses are developed as necessary.

**1.1.4** There are reliable estimates of all removals, including commercial (landings and discards), recreational and indigenous, from the fished stock. These estimates have been factored into stock assessments and target species catch levels.

#### **Meets**

Commercial: The most recent *Status Reports of the Fisheries and Aquatic Resources of Western Australia, 2016/2017* (see p.178 at link available in summary section above) determined that Commercial fishing levels were '**acceptable**' and has reported the following total catch levels, based on 2015-2016 :

- Sharks and rays = 994 tonnes (live weight).
- Scalefish = 143 tonnes (live weight).

Recreational and charter: Total recreational catch is considered to be less than 5% of the commercial catch (based on the catch of sharks in WA). Statewide boat-based surveys are conducted every two years. The surveys include sharks and rays. The most recent survey conducted is the Statewide survey of boat-based recreational fishing in Western Australia 2015/16 (link accessible in Section 1: Notes).

Indigenous: No estimates are available. However, the WA DPIRD has indicated that anecdotal evidence suggests the Indigenous catch is considered negligible, compared to commercial catch.

**1.1.5** There is a sound estimate of the potential productivity of the fished stock/s and the proportion that could be harvested.

#### **Meets**

The WA DPIRD conducts regular comprehensive assessments of indicator species. These assessments inform the management of the fishery ensuring harvest levels are maintained at sustainable levels and facilitate stock recovery at appropriate levels.

A new stock assessment, including catch rate trends is scheduled to be developed in 2019. The most recent *Status Reports of the Fisheries and Aquatic Resources of Western Australia, 2016/17* (see p.178 at link accessible in Section 1: Notes) provides the following assessment of stocks:

- Gummy Sharks (*Mustelus antarcticus*) – '**sustainable-adequate**'. Standardised catch rates have been reported as being stable since the mid-to-late 2000.
- Dusky Sharks (*Carcharhinus obscurus*) – '**sustainable-recovering**'. The report also states that risks identified in risk assessments, indicate risk levels are 'acceptable' and management arrangements are considered appropriate for the gradual recovery of breeding stocks.
- Whiskery Sharks (*Furgaleus macki*) – '**sustainable-adequate**'. The report states that although moderately increasing in recent years, standardised catch rates have been stable overall since the 1990's.
- Sandbar Sharks (*Carcharhinus plumbeus*) – '**sustainable-recovering**'. The report states that standardised catch rates have shown increasing trends (1980 to 2000), with high fluctuating levels since then. Catch of this species is considered at appropriate levels to allow recovery of breeding stocks. Risk levels indicated through risk assessments, are considered to be at 'acceptable' levels.

It is expected that trends will be reviewed and further estimates considered when the 2019 stock assessment is developed.

**Management responses**

<p><b>1.1.6</b> There are reference points (target and/or limit), that trigger management actions including a biological bottom line and/or a catch or effort upper limit beyond which the stock should not be taken.</p>	<p><b>Partially meets</b></p> <p>The fishery operates to a Harvest Strategy. Currently, there is a single biological Reference Point (RP) for Whiskery, Gummy and Dusky Sharks. The RP is 40% of the unfished biomass and was considered a target level as an overall management objective: 'to maintain the biomass of the fisheries' for the three traditional target stocks at or above 40% of their unfished levels by 2010 for gummy and whiskery sharks and by 2040 for dusky shark'.</p> <p>The Harvest Strategy will be formalised in 2019 and will specify the reference levels (limits, targets and thresholds), performance indicators and control rules for the fishery. It is expected that upper and lower trigger points for target species, along with performance indicators, will be specified in the Harvest Strategy.</p> <p>An Ecologically Sustainable Development (ESD) report for the WA Temperate Demersal Gillnet and Demersal Longline Fisheries was completed in 2005, which included an overview of the management responses. The WA DPIRD will be completing an Ecological Risk Assessment (ERA) during 2019 this is intended to replace the existing ESDs.</p>
<p><b>1.1.7</b> There are management strategies in place capable of controlling the level of take.</p>	<p><b>Meets</b></p> <p>Fishing effort and catch in the fisheries has been controlled over time based on a range of management measures including spatial closures, effort and catch limits.</p>
<p><b>1.1.8</b> Fishing is conducted in a manner that does not threaten stocks of byproduct species.</p>	<p><b>Meets</b></p> <p>Byproduct species caught in the fisheries are those species which are not taken as target species. Byproduct includes various shark species and scalefish, including:</p> <p><u>Shark species caught as byproduct:</u></p> <ul style="list-style-type: none"> <li>• Hammerhead Sharks (Family Sphyrnidae)</li> <li>• Spinner Shark (<i>Carcharinus brevipinna</i>)</li> <li>• Wobbegong Sharks (Family Orectolobidae)</li> <li>• Common Sawshark (<i>Pristiophorus cirratus</i>)</li> <li>• Ray species (order Batoidea).</li> </ul> <p><u>Scalefish species caught as byproduct:</u></p> <ul style="list-style-type: none"> <li>• Queen Snapper (<i>Nemadactylus valenciennesi</i>)</li> <li>• Blue Groper (<i>Achaoerodus gouldii</i>)</li> <li>• Pink Snapper (<i>Pagrus auratus</i>)</li> <li>• Dhufish (<i>Glaucosoma hebraicum</i>)</li> <li>• Samsonfish (<i>Seriola hippus</i>)</li> <li>• Mulloway (<i>Argyrosomus hololepidotus</i>)</li> <li>• Red fish (<i>Centroberyx</i> spp.).</li> </ul> <p>The WA DPIRD closely monitors catches in the fisheries to ensure catch composition is in line with the management objectives for sharks and scalefish. In the event of a change in catch composition (such as increased catch of scalefish) DPIRD will respond appropriately, by adjusting management settings.</p>

(Guidelines 1.1.1 to 1.1.7 should be applied to byproduct species to an appropriate level)	
1.1.9 The management response, considering uncertainties in the assessment and precautionary management actions, has a high chance of achieving the objective.	<b>Meets</b> The fishery's management arrangements appear likely to maintain stocks within ecologically viable levels.
<b>If overfished, go to Objective 2: If not overfished, go to PRINCIPLE 2:</b>	
<b>Objective 2</b> - Where the fished stock(s) are below a defined reference point, the fishery will be managed to promote recovery to ecologically viable stock levels within nominated timeframes.	
<b>Management responses</b>	
1.2.1 A precautionary recovery strategy is in place specifying management actions, or staged management responses, which are linked to reference points. The recovery strategy should apply until the stock recovers, and should aim for recovery within a specific time period appropriate to the biology of the stock.	<b>Partially meets</b> The WA DPIRD has operated to a recovery strategy for Dusky and Sandbar Sharks for the last ten years. The recovery strategy will remain in place until the stocks are fully recovered. Current management arrangements are considered suitable for the gradual recovery of the breeding stock. Measures include: annual surveys with data informing the stock assessments for long-lived species (Dusky Sharks).  Fishery independent abundance data for adult Dusky Sharks and Sandbar Sharks, will be available in late 2018. The 2018 fishery application submission (link accessible in Section 1: Notes), indicates that a Harvest Strategy is being developed during the first half of 2019.
1.2.2 If the stock is estimated as being at or below the biological and / or effort bottom line, management responses such as a zero targeted catch, temporary fishery closure or a 'whole of fishery' effort or quota reduction are implemented.	<b>Partially meets</b> Biological stocks are assessed as ' <b>sustainable-recovering</b> ' (Dusky Sharks and Sandbar Sharks).  Fishery independent abundance data for adult Dusky Sharks and Sandbar Sharks will be available in late 2018. Current annual surveys (with data informing the stock assessments) are considered suitable for the gradual recovery of the breeding stock.
<b>PRINCIPLE 2</b> - Fishing operations should be managed to minimise their impact on the structure, productivity, function and biological diversity of the ecosystem.	
<b>Objective 1</b> - The fishery is conducted in a manner that does not threaten bycatch species.	
<b>Information requirements</b>	
2.1.1 Reliable information, appropriate to the scale of the fishery, is collected on the composition and abundance of bycatch.	<b>Meets</b> Bycatch species in the fishery are those species which have limited or no commercial value. Bycatch species are generally discarded at sea. In these fisheries, bycatch includes species of sharks, rays and scalefish. A risk analysis of bycatch is reported through the <i>Status Reports of the Fisheries and Aquatic Resources of Western Australia, 2016/2017</i> (p. 177 link accessible in Section 1: Notes) and states that the risk level to bycatch species, is ' <b>low</b> '.  Ongoing recording of protected species interactions in these fisheries is monitored through daily logbooks and reported publicly in the <i>Status reports of the fisheries and aquatic resources of Western Australia, 2016/17</i> .

<b>Assessment</b>	
<b>2.1.2</b> There is a risk analysis of the bycatch with respect to its vulnerability to fishing.	<p><b>Meets</b></p> <p>A risk analysis relating to vulnerability of bycatch is reported through the <i>WA Status Reports of the Fisheries and Aquatic Resources of Western Australia</i> (2016/2017, see p. 177 link accessible in Section 1: Notes). The 2018 fishery application submission, indicates that the fishery operations (and potential impacts on bycatch species) pose a '<b>low risk</b>' to the ongoing sustainability of bycatch species.</p> <p>The 2005 ESD risk assessment assessed all impacts on stocks of bycatch species as '<b>low risk</b>'. The WA DPIRD will be undertaking an Ecological Risk Assessment (ERA) in 2019 which will replace the current ESD report. Until the ERA is in place, risk analysis will continue to be reported through the <i>Status reports of the fisheries and aquatic resources of Western Australia, 2016/17</i>.</p>
<b>Management responses</b>	
<b>2.1.3</b> Measures are in place to avoid capture and mortality of bycatch species unless it is determined that the level of catch is sustainable (except in relation to endangered, threatened or protected species). Steps must be taken to develop suitable technology if none is available.	<p><b>Meets</b></p> <p>The risk level to bycatch species is assessed as '<b>low</b>'. See the <i>Status Reports of the Fisheries and Aquatic Resources of Western Australia</i> (2016/2017, see p. 177 and 179 link available in the summary section above).</p>
<b>2.1.4</b> An indicator group of bycatch species is monitored.	<p><b>Meets</b></p> <p>There is no bycatch indicator species group as the entire catch (target, byproduct, bycatch and TEPS) is monitored as part of recent opportunistic on-board observer sampling. The risk to bycatch species in the fishery has been assessed as '<b>low</b>' through the ESD process.</p>
<b>2.1.5</b> There are decision rules that trigger additional management measures when there are significant perturbations in the indicator species numbers.	<p><b>Not applicable</b></p> <p>There is no bycatch indicator species group. Risk to bycatch species in the fishery, has been assessed as '<b>low</b>' through the ESD process.</p>
<b>2.1.6</b> The management response, considering uncertainties in the assessment and precautionary management actions, has a high chance of achieving the objective.	<p><b>Meets</b></p> <p>The fishery is conducted in a way that does not threaten bycatch species. Various management measures have been implemented to assist in reducing the impacts of fishing on bycatch species.</p>



**Objective 2** - The fishery is conducted in a manner that avoids mortality of, or injuries to, endangered, threatened or protected species and avoids or minimises impacts on threatened ecological communities.

**Information requirements**

**2.2.1** Reliable information is collected on the interaction with endangered, threatened or protected species and threatened ecological communities.

**Meets**

Recording and monitoring of protected species interactions is conducted through statutory daily catch returns. Past targeted on-board research programs were conducted until 2004. During 1994 to 1999, observed rates of protected species (captures) were considered low throughout the fisheries.

Interactions are reported publicly in the *WA Status reports of the fisheries and aquatic resources of Western Australia, 2016/17* (link accessible in Section 1: Notes). Interactions reported, include the status of the species caught and released. Species level reporting for hammerhead sharks would be beneficial to determine ongoing sustainability for protected species.

The WA DPIRD is also involved in ongoing research projects that include research on protected species that occur in the fisheries (along with byproduct, bycatch and target species research). The Department notes that following previously conducted research uncertainty around the stock status of Australian Sea Lion populations still remains. In order to obtain more reliable estimates and baseline data, to improve predictability of Australian Sea Lion encounters, the WA DPIRD are continuing research into the Australian Sea Lion populations.

There are no EPBC Act listed threatened ecological communities in the area of the fisheries.

**Assessments**

**2.2.2** There is an assessment of the impact of the fishery on endangered, threatened or protected species.

#### **Meets**

Protected species interactions in the fishery, include Australia Sea Lions (*Neophoca cinerea*), various shark species, dolphins, Manta Rays, seabirds, sawfish, seals and marine turtles. Ongoing recording of protected species interactions in these fisheries is monitored through daily logbooks and reported publicly in the *Status reports of the fisheries and aquatic resources of Western Australia*.

The WA *Status Reports of the Fisheries and Aquatic Resources of Western Australia, 2016/17* p.179, link accessible in Section 1: Notes) states that the risk to protected species is considered '**negligible-low**', with the following interactions (catching and releasing) during 2015-2016:

- Grey Nurse Sharks = 15 dead, 11 alive
- Turtle = 1 alive, 3 dead
- White Sharks = 11 alive.

#### Australian Sea Lions

The 2018 fishery application submission (link accessible in Section 1: Notes), states that since the 2015 fishery export approval assessment, there have been no reported interactions by fishers, relating to Australian Sea Lions. DPIRD commenced an FRDC funded two year pilot project to trial the use of cameras on remote Australian Sea Lions colonies in the south coast and west coast areas. The colonies will be monitored for 18 months. Importantly, this project will assist with future monitoring and assessment of Australian sea lion colonies and their status, and help inform future management decisions for the fishery.

The conservation of Australian Sea Lions is identified as a regional priority in the *Marine Bioregional Plan for the South-west Marine Region 2012*. The potential risk to Australian Sea Lions has been identified as the key protected species issue in WA, as this species is susceptible to fatal interactions with demersal gillnets (these nets can be difficult to detect). Results from published studies suggest that the Australian Sea Lions have 'extreme' natal site-fidelity, meaning that female recruitment only occurs within the colony. This means that the removal of female sea lions could potentially cause localised extinction of smaller breeding colonies.

#### Sharks

CITES listed Hammerhead Shark (family Sphyrnidae) catch occurs in the fisheries and is reported to family level (amendments to statutory logbooks is underway, to include reporting to species level). Ongoing harvest is within the levels considered by the 2014 non detriment finding made by the Australian CITES Scientific Authority for hammerhead shark species harvested in Australia and is not considered to represent a significant impact to the species.

There is an ongoing low catch of Grey Nurse Sharks (*Carcharias taurus*), with approximately 38 to 69 recorded as being released alive annually, and approximately 16 to 27 mortalities recorded annually since 2006/07. Low numbers of White Sharks (*Carcharodon carcharias*) are also recorded, with the majority of these reported as being released alive.

**2.2.3** There is an assessment of the impact of the fishery on threatened ecological communities.

**Not applicable**

There are no EPBC Act listed threatened ecological communities in the area of the fishery. The WA Temperate Demersal Gillnet and Demersal Longline Fisheries represent a 'low' level risk to the habitat and ecosystem generally.

The revision of the ERA assessment for the WA Temperate Demersal Gillnet and Demersal Longline Fisheries has been rescheduled, while the transition to new management arrangements and legislation/regulations, are being finalised (as outlined in the 2018 fishery application submission).

***Management responses***

<p><b>2.2.4</b> There are measures in place to avoid capture and/or mortality of endangered, threatened or protected species.</p>	<p><b>Meets</b></p> <p>Interactions in the fishery with Grey Nurse Sharks, White Sharks, Sawfish and marine turtles are recorded in logbooks and reported publicly, along with the life status of each individual following the interaction. Current evidence suggests that these interactions are minimal under the existing arrangements.</p> <p><u>Australian Sea Lions</u></p> <p>In June 2018, the WA DPIRD implemented a network of gillnet exclusion zones around the 33 known Australian Sea Lion breeding colonies. The exclusion zones are intended protect foraging Australian Sea Lions by minimising the risk of potential encounters of Australian Sea Lions with demersal gillnets. The design of the exclusion zones has taken into account the vulnerability of individual breeding colonies with more vulnerable colonies given a greater relative exclusion area.</p> <p>The exclusion zones covered in the area of the WA Temperate Demersal Gillnet and Demersal Longline Fisheries, cover a total area of: <b>17,390.9 km<sup>2</sup></b> including <b>493km</b> of coastline:</p> <ul style="list-style-type: none"> <li>• WCDGDLF - a total area of 6,725.2km<sup>2</sup> including 127.4km of coastline.</li> <li>• JASGDLF – a total area of 10,655.7km<sup>2</sup> including 365.6km of coastline* (distances generated for the JASGDLF include five newly identified colonies on the South Coast).</li> </ul> <p>Given the coverage from the 2018 gillnet exclusion zones is considered unlikely to cover the full foraging range of Australian Sea Lions the effectiveness of the zones should be reviewed by DPIRD within the approval period of the WTO.</p> <p>While the number of simulated encounters is expected to decrease substantially given the sizes of the closures (across all colonies), it is not yet known how the spatial distribution of fishing will change in response to the management measures. Given this, it is not possible to predict the levels of reduction of simulated encounters at this time.</p> <p>It is noted that results from the model used in the design of the exclusion zones showed substantial variation in the number of simulated encounters for individual colonies from year to year. When examining results from future model simulations, it is important this fact be considered and not to expect particular levels of reduction for individual colonies.</p> <p>DPIRD commenced an FRDC funded two year pilot project to trial the use of cameras on remote Australian Sea Lions colonies in the south coast and west coast areas. The colonies will be monitored for 18 months. Importantly, this project will assist with future monitoring and assessment of Australian sea lion colonies and their status, and help inform future management decisions for the fishery.</p>
<p><b>2.2.5</b> There are measures in place to avoid impact on threatened ecological communities.</p>	<p><b>Not applicable</b></p> <p>There are no EPBC Act listed threatened ecological communities in the area of the fishery. The WA Temperate Demersal Gillnet and Demersal Longline Fisheries represent a ‘<b>low</b>’ level risk to the habitat and ecosystem generally.</p>

<p><b>2.2.6</b> The management response, considering uncertainties in the assessment and precautionary management actions, has a high chance of achieving the objective.</p>	<p><b>Meets</b></p> <p>With the inclusion of conditions relating to the management of protected species and conservation dependent species, the fishery operations are likely to be effective in avoiding impacts to protected species and ecological communities.</p>
<p><b>Objective 3</b> - The fishery is conducted, in a manner that minimises the impact of fishing operations on the ecosystem generally.</p>	
<p><b>Information requirements</b></p>	
<p><b>2.3.1</b> Information appropriate for the analysis in 2.3.2 is collated and/or collected covering the fishery's impact on the ecosystem and environment generally.</p>	<p><b>Meets</b></p> <p>The <i>Status reports of the fisheries and aquatic resources of Western Australia</i> collates information on fishery impacts on the ecosystem and the environment generally. Any changes to risk levels posed by fishery operations (which could potentially affect the ecosystem) are considered through the WA DPIRD's planning processes and through the development of appropriate management measures.</p>
<p><b>Assessment</b></p>	
<p><b>2.3.2</b> Information is collected and a risk analysis, appropriate to the scale of the fishery and its potential impacts, is conducted into the susceptibility of each of the following ecosystem components to the fishery.</p> <ol style="list-style-type: none"> <li>1. Impacts on ecological communities <ul style="list-style-type: none"> <li>• Benthic communities</li> <li>• Ecologically related, associated or dependent species</li> <li>• Water column communities</li> </ul> </li> <li>2. Impacts on food chains <ul style="list-style-type: none"> <li>• Structure</li> <li>• Productivity/flows</li> </ul> </li> <li>3. Impacts on the physical environment <ul style="list-style-type: none"> <li>• Physical habitat</li> <li>• Water quality</li> </ul> </li> </ol>	<p><b>Partially meets</b></p> <p>The Ecologically Sustainable Development (ESD) report completed in 2005 gave a comprehensive overview of the Western Australian Temperate Demersal Gillnet and Demersal Longline Fisheries and provided detailed performance measures for the fisheries.</p> <p>The WA DPIRD have advised that an Ecological Risk Assessment (to replace existing 2005 ESD) will be undertaken in 2019. The <i>Status Reports of the Fisheries and Aquatic Resources of Western Australia, 2016/17</i> (p.177, link accessible in Section 1: Notes) states that the risk levels are:</p> <ul style="list-style-type: none"> <li>• Habitat – '<b>negligible-low</b>'.</li> <li>• Ecosystem – '<b>low</b>'.</li> </ul>

<b>Management responses</b>	
<b>2.3.3</b> Management actions are in place to ensure significant damage to ecosystems does not arise from the impacts described in 2.3.1.	<b>Partially meets</b> Management measures are in place, (indicated in the <i>WA State of the Fisheries and Aquatic Resources report, 2016/2017</i> ) and considered appropriate overall, to mitigate risk of significant impacts on the ecosystem. The Harvest Strategy for the fisheries, to be developed in 2019, will formally address this matter.
<b>2.3.4</b> There are decision rules that trigger further management responses when monitoring detects impacts on selected ecosystem indicators beyond a predetermined level, or where action is indicated by application of the precautionary approach.	<b>Partially meets</b> Overall, impacts on the ecosystem are generally considered to be 'low' and as per 2.3.3. The Harvest Strategy for the fisheries, to be developed in 2019, will formally address this matter.
<b>2.3.5</b> The management response, considering uncertainties in the assessment and precautionary management actions, has a high chance of achieving the objective.	<b>Partially meets</b> The management responses appear likely to be effective overall, in minimising the impact of the fishery on the ecosystem. A new ERA and a formal Harvest Strategy (both scheduled to be developed in 2019) will formally address this matter.

### SECTION 3: ASSESSMENT OF THE WESTERN AUSTRALIAN (WA) TEMPERATE DEMERSAL GILLNET AND DEMERSAL LONGLINE FISHERIES AGAINST THE REQUIREMENTS OF THE EPBC ACT

The table below is not a complete or exact representation of the EPBC Act. It is intended to show that the relevant sections and components of the EPBC Act have been taken into account in the formulation of advice on the fishery in relation to decisions under Part 13 and Part 13A.

#### Part 12

<b>Section 176 Bioregional Plans</b>	<b>Comment</b>
(5) Minister must have regard to relevant bioregional plans	<b>Meets</b> The <i>Marine Bioregional Plan for the South-west Marine Region 2012</i> has identified that there are key ecological features present in the area of these fisheries, including the Commonwealth marine environments surrounding the Recherche Archipelago and the Houtman Abrolhos Islands and the demersal slope and associated fish communities of the Central Western Province.  However, there is no evidence to suggest any systematic change to species diversity or richness caused by these fisheries. This indicates fishing effort is not having a material impact on the food chain or trophic structure. The physical impact of the fishing gear is low, with gillnets and longlines estimated to have a combined footprint that would contact the bottom in less than 5% of the area of the fisheries.  The conservation of Australian Sea Lions is identified as a regional priority in the <i>Marine Bioregional Plan for the South-west Marine Region 2012</i> . The potential risk to Australian Sea Lions has been identified as the key protected species issue in WA, as this species is susceptible to fatal interactions with demersal gillnets (these nets can be difficult to detect). In June 2018 the WA Department of Primary Industries and Regional Development implemented a network of gillnet exclusion zones to assist in reducing the risk of interactions with foraging Australian Sea Lions.

## Part 13

Accreditable plan, regime or policy (Division 1, Division 2, Division 3, Division 4)	Comment
<p>s. 208A (1) (a-e) , s.222A (1) (a-e), s.245 (1) (a-e), s.265 (1) (a-e)</p> <p>Does the fishery have an accreditable plan of management, regime or policy?</p>	<p><b>Yes</b>, there is an accreditable management regime. The regime was last accredited under Part 13 in 2015 and this accreditation remains valid.</p> <p>A new management plan is currently being developed for the WA Southern Demersal Gillnet and Demersal Longline Fishery. The new management arrangements are scheduled to be gazetted on 1 December 2018, and commence on 1 January 2019. No significant changes to the operation of the fishery are expected.</p>
Division 1 Listed threatened species, Section 208A Minister may accredit plans or regimes	Comment
<p>(f) Will the plan, regime or policy require fishers to take all reasonable steps to ensure that members of listed threatened species (other than conservation dependent species) are not killed or injured as a result of the fishing?</p>	<p><b>Yes</b>, Fishers are required to report all protected species interactions. Gillnet exclusion zones have recently been implemented to minimise the fishery's impact on foraging Australian Sea Lions.</p> <p>Interactions occur with a number of other listed threatened species, including Grey Nurse Sharks, White Sharks, Sawfish and marine Turtles. Interactions with these species are recorded in logbooks and reported publicly, along with the life status of each individual following the interaction. Current evidence suggests that these interactions are minimal under the existing arrangements.</p> <p>There are Part 13 conditions in place aimed at monitoring and reducing bycatch of protected species. This includes a condition to conduct a review of the gillnet exclusion zones to assess their effectiveness in reducing interactions with Australian Sea Lions.</p>
<p>(g) And, is the fishery likely to adversely affect the survival or recovery in nature of the species?</p>	<p><b>No</b>, Subject to a review assessing the effectiveness of the gillnet exclusion zones, as required by <b>Condition A</b> (Section 4) in the approval period of the WTO, the Department considers that the management regimes of the WA Temperate Demersal Gillnet and Demersal Longline Fisheries continue to require persons fishing in accordance with the plan to take all reasonable steps to ensure listed threatened species are not killed or injured as a result of fishing.</p> <p>There is also a Part 13A condition in place for DPIRD to conduct a review and update of the ESD report and it is expected this will include an assessment of impacts on protected and migratory species.</p>

Division 2 Migratory species, Section 222A Minister may accredit plans or regimes	Comment
<p>(f) Will the plan, regime or policy require fishers to take all reasonable steps to ensure that members of listed migratory species are not killed or injured as a result of the fishing?</p>	<p><b>Yes</b>, the management arrangements that relate to listed migratory species have not significantly changed, and continue to require persons engaged in fishing under the management regime to take all reasonable steps to ensure that listed migratory species are not killed or injured as a result of fishing.</p> <p>The fisheries interact with a number of listed migratory species, including White Sharks, seabirds and marine turtles. Interactions with these species are recorded in logbooks and reported publicly, along with the life status of each individual following the interaction. Current evidence suggests that these interactions are minimal under the existing arrangements.</p> <p>There is a Part 13A condition in place for DPIRD to conduct a review and update of the ESD report and it is expected this will include an assessment of impacts on protected and migratory species.</p>
<p>(g) And, is the fishery likely to adversely affect the conservation status of a listed migratory species or a population of that species?</p>	<p><b>No</b>, given the current measures in place in these fisheries, the Department considers the operation of the WA Temperate Demersal Gillnet and Demersal Longline Fisheries, is not likely to adversely affect the conservation status of a listed migratory species or a population of that species.</p>



<b>Division 3 Whales and other cetaceans, Section 245 Minister may accredit plans or regimes</b>	<b>Comment</b>
(f) Will the plan, regime or policy require fishers to take all reasonable steps to ensure that cetaceans are not killed or injured as a result of the fishing?	<p><b>Yes</b>, the management arrangements that relate to cetaceans have not significantly changed and continue to require persons engaged in fishing under the management regime to take all reasonable steps to ensure that cetaceans are not killed or injured as a result of fishing.</p> <p>The WA Temperate Demersal Gillnet and Demersal Longline Fisheries have occasional interactions with dolphins. These interactions are recorded in logbooks and reported publicly, along with the life status of each dolphin following the interaction. Current evidence suggests that these interactions are minimal under the existing arrangements.</p>
(g) And, is the fishery likely to adversely affect the conservation status of a species of cetacean or a population of that species?	<b>No</b> , the fishery is not likely to adversely affect the conservation status of a species of cetacean or a population of that species.
<b>Division 4 Listed marine species, Section 265 Minister may accredit plans or regimes</b>	<b>Comment</b>
(f) Will the plan, regime or policy require fishers to take all reasonable steps to ensure that members of listed marine species are not killed or injured as a result of the fishing?	<p><b>Yes</b>, under the fishery's current management arrangements, fishers are not permitted to take protected marine species, and all interactions with protected species must be reported. Specific management measures are in place to minimise the fishery's impact on protected species, including time and effort limits, gear restrictions, spatial closures and satellite based monitoring.</p>
(g) And, is the fishery likely to adversely affect the conservation status of a listed marine species or a population of that species?	<b>No</b> , the fishery is not likely to adversely affect the conservation status of a species of listed marine species, or a population of that species.
<b>Section 303AA Conditions relating to accreditation of plans, regimes and policies</b>	<b>Comment</b>
(1) This section applies to an accreditation of a plan, regime or policy under section 208A, 222A, 245 or 265.	The Department recommends that the accreditation of the fishery's management regime remain valid under sections 208A, 222A, 245 and 265.
<p>(2) The Minister may accredit a plan, regime or policy under that section even though he or she considers that the plan, regime or policy should be accredited only:</p> <p>(a) during a particular period; or</p> <p>(b) while certain circumstances exist; or</p> <p>(c) while a certain condition is complied with.</p> <p>In such a case, the instrument of accreditation is to specify the period, circumstances or condition.</p>	<p>The Department considers that accreditation of the fishery should be subject to the following Part 13 condition:</p> <p>Following the recent implementation of the Australian Sea Lion gillnet exclusion zones, the Western Australian Department of Primary Industries and Regional Development to:</p> <p>a) monitor and review the gillnet exclusion zones (and associated spatial effort changes) by 2021.</p> <p>b) conduct further research on Australian Sea Lion populations, to obtain more reliable population estimates.</p>
(7) The Minister must, in writing, revoke an accreditation if he or she is satisfied that a condition of the accreditation has been contravened.	<b>Not applicable</b>

## Part 13A

Section 303BA Objects of Part 13A	
<p>(1) The objects of this Part are as follows:</p> <ul style="list-style-type: none"> <li>(a) to ensure that Australia complies with its obligations under CITES and the Biodiversity Convention;</li> <li>(b) to protect wildlife that may be adversely affected by trade;</li> <li>(c) to promote the conservation of biodiversity in Australia and other countries;</li> <li>(d) to ensure that any commercial utilisation of Australian native wildlife for the purposes of export is managed in an ecologically sustainable way;</li> <li>(e) to promote the humane treatment of wildlife;</li> <li>(f) to ensure ethical conduct during any research associated with the utilisation of wildlife; and</li> <li>(h) to ensure the precautionary principle is taken into account in making decisions relating to the utilisation of wildlife.</li> </ul>	
Section 303 CG Minister may issue permits (CITES species)	Comment
<p>(3) The Minister must not issue a permit unless the Minister is satisfied that:</p> <ul style="list-style-type: none"> <li>(a) the action or actions specified in the permit will not be detrimental to, or contribute to trade which is detrimental to: <ul style="list-style-type: none"> <li>(i) the survival of any taxon to which the specimen belongs; or</li> </ul> </li> </ul>	<p><b>Meets</b></p> <p>Given the management arrangements in place to monitor and control the level of harvest of CITES species, and noting the non-detriment finding for the CITES listed hammerhead sharks, the Department considers that fishing activity will not be detrimental to the survival of any taxon to which the CITES specimen belongs.</p> <p>A condition on the WTO declaration includes annual reporting requirements, which will allow the Department to monitor CITES specimens harvested in the fishery.</p>
<ul style="list-style-type: none"> <li>(ii) the recovery in nature of any taxon to which the specimen belongs; or</li> </ul>	<p><b>Meets</b></p> <p>Smooth Hammerhead and Scalloped Hammerhead Sharks harvested in the fishery are not considered to be overfished in WA. Management arrangements in place include limited fishing effort and identified target catch ranges, to assist in ensuring continued ecologically sustainable harvest.</p>
<ul style="list-style-type: none"> <li>(iii) any relevant ecosystem (for example, detriment to habitat or biodiversity); and</li> </ul>	<p><b>Meets</b></p> <p>Recognising the nature of harvest and gear used in the fishery (e.g. demersal gillnets and lines), the potential for the fisheries to impact unacceptably and unsustainably on any relevant ecosystem generally is considered quite low. The Department is satisfied that these fisheries are conducted in a manner that minimises the impact of fishing operations on the ecosystem generally.</p>

Section 303DC Minister may amend list (non CITES species)	Comment
<p>(1) The Minister may, by legislative instrument, amend the list referred to in section 303DB [list of exempt native specimens] by:</p> <p>(a) doing any of the following:</p> <p>(i) including items in the list;</p> <p>(ii) deleting items from the list;</p> <p>(iii) imposing a condition or restriction to which the inclusion of a specimen in the list is subject;</p> <p>(iv) varying or revoking a condition or restriction to which the inclusion of a specimen in the list is subject; or</p> <p>(b) correcting an inaccuracy or updating the name of a species.</p>	<p>The Department <b>recommends</b> that specimens derived from species harvested in the WA Temperate Demersal Gillnet and Demersal Longline Fisheries, but not including:</p> <ul style="list-style-type: none"> <li>specimens that belong to eligible listed threatened species, as defined under section 303BC of the EPBC Act, or</li> <li>specimens that belong to taxa listed under section 303CA of the EPBC Act (Australia's CITES List),</li> </ul> <p>be included in the list of exempt native specimens while the fishery is subject to a declaration as an approved wildlife trade operation.</p>
<p>(1A) In deciding to amend the LENS, the Minister must rely primarily on outcomes of Part 10, Div. 1 or 2 assessment</p>	<p><b>Not applicable</b></p> <p>The fishery is not managed by the Commonwealth.</p>
<p>(1C) The above does not limit matters that may be considered when deciding to amend LENS.</p>	<p><b>Meets</b></p> <p>The Department considers that it has taken into account all matters relevant to making an informed decision to amend the list of exempt native specimens to include product taken in this fishery.</p>
<p>(3) Before amending the LENS, the Minister must consult:</p> <p>(a) other Minister or Ministers as appropriate; and</p> <p>(b) other Minister or Ministers of each State and self-governing Territory as appropriate; and</p> <p>(c) other persons and organisations as appropriate.</p>	<p><b>Meets</b></p> <p>The submission from the WA Department of Primary Industries and Regional Development, was made available on the Department's website from <b>6 July 2018</b> until <b>7 August 2018</b>. Two comments were received.</p>
Section 303FN Approved wildlife trade operation	Comment
<p>(2) The Minister may, by instrument published in the <i>Gazette</i>, declare that a specified wildlife trade operation is an <b>approved wildlife trade operation</b> for the purposes of this section.</p>	<p>The WA Temperate Demersal Gillnet and Demersal Longline Fisheries is eligible for declaration as an approved wildlife trade operation.</p>
<p>(3) The Minister must not declare an operation as an approved wildlife trade operation unless the Minister is <b>satisfied</b> that:</p> <p>(a) the operation is consistent with the objects of Part 13A of the Act; and</p>	<p><b>Meets</b></p> <p>The operation of the fishery is consistent with Objects of 13A – see above assessment against the Guidelines (Section 2).</p>
<p>(b) the operation will not be detrimental to:</p> <p>(i) the survival of a taxon to which the operation relates; or</p> <p>(ii) the conservation status of a taxon to which the operation relates; and</p> <p>(ba) the operation will not be likely to threaten any relevant ecosystem including (but not limited to) any habitat or biodiversity; and</p>	<p><b>Meets</b></p> <p>Operation of the fisheries will not be detrimental to the survival or conservation status of a taxon to which it relates, nor will it threaten any relevant ecosystem, within the period of the new export declaration, given the management measures currently in place, which include; limited effort, spatial closures and gillnet exclusion zones, size limits for appropriate species, gear restrictions, and vessel monitoring.</p>

<p>(c) if the operation relates to the taking of live specimens that belong to a taxon specified in the regulations – the conditions that, under the regulations, are applicable to the welfare of the specimens are likely to be complied with; and</p>	<p><b>Not applicable</b> The Environment Protection and Biodiversity Conservation Regulations 2000 (EPBC Regulations) do not specify Crustacea or fish as a class of animal in relation to the welfare of live specimens.</p>
<p>(d) such other conditions (if any) as are specified in the regulations have been, or are likely to be, satisfied.</p>	<p><b>Not applicable</b> No other conditions are specified in relation to commercial fisheries in the EPBC Regulations.</p>
<p>(4) In deciding whether to declare an operation as an approved wildlife trade operation the Minister must have <b>regard</b> to:</p> <p>(a) the significance of the impact of the operation on an ecosystem (for example, an impact on habitat or biodiversity); and</p>	<p><b>Meets</b> The WA Temperate Demersal Gillnet and Demersal Longline Fisheries will not have a significant impact on any relevant ecosystem within the period of the new export declaration, given the management measures currently in place, which include limited effort, spatial closures, gillnet exclusion zones and gear restrictions.</p>
<p>(b) the effectiveness of the management arrangements for the operation (including monitoring procedures).</p>	<p><b>Meets</b> The management arrangements that will be employed for the WA Pilbara Fish Trawl (Interim) Managed Fishery, as outlined in in the assessment against the Guidelines (above), are likely to be effective.</p>
<p>(5) In deciding whether to declare an operation as an approved wildlife trade operation the Minister must have <b>regard</b> to:</p> <p>(a) whether legislation relating to the protection, conservation or management of the specimens to which the operation relates is in force in the State or Territory concerned; and</p> <p>(b) whether the legislation applies throughout the State or Territory concerned; and</p> <p>(c) whether, in the opinion of the Minister, the legislation is effective.</p>	<p><b>Meets</b> The WA Temperate Demersal Gillnet and Demersal Longline Fisheries will be managed under the <i>WA Fish Resources Management Act 1994</i>, and the <i>WA Fish Resources Management Regulations 1995</i>.  The <i>WA Fish Resources Management Act 1994</i> applies throughout WA waters. The Department considers that the legislation is likely to be effective.</p>
<p>(10) For the purposes of section 303FN, an operation is a wildlife trade operation if, and only if, the operation is an operation for the taking of specimens and:</p> <p>(a) the operation is a commercial fishery.</p>	<p><b>Meets</b> The WA Temperate Demersal Gillnet and Demersal Longline Fisheries is a commercial fishery.</p>
<p>(10A) In deciding whether to declare that a commercial fishery is an approved wildlife trade operation for the purposes of this section, the Minister must rely primarily on the outcomes of any assessment in relation to the fishery carried out for the purposes of Division 1 or 2 of Part 10.</p>	<p>No assessment of the WA Temperate Demersal Gillnet and Demersal Longline Fisheries has been carried out under Part 10 of the EPBC Act, as it is not a Commonwealth managed fishery.</p>
<p>(10B) Subsection (10A) does not limit the matters that may be taken into account in deciding whether to declare that a fishery is an approved wildlife trade operation for the purposes of this section.</p>	

Section 303FR Public consultation	Comment
<p>(1) Before making a declaration under section 303FN, the Minister must cause to be published on the Internet a notice:</p> <p>(a) setting out the proposal to make the declaration; and</p> <p>(b) setting out sufficient information to enable persons and organisations to consider adequately the merits of the proposal; and</p> <p>(c) inviting persons and organisations to give the Minister, within the period specified in the notice, written comments about the proposal.</p> <p>(2) A period specified in the notice must not be shorter than 20 business days after the date on which the notice was published on the Internet.</p>	<p><b>Meets</b></p> <p>A public notice, which set out the proposal to declare the WA Temperate Demersal Gillnet and Demersal Longline Fisheries an approved wildlife trade operation, and included the application from the WA Department of Primary Industries and Regional Development, was released for public comment on 6 July 2018 for a minimum of 20 business days.</p>
<p>(3) In making a decision about whether to make a declaration under section 303FN, the Minister must consider any comments about the proposal to make the declaration that were given in response to the invitation in the notice.</p>	<p>Two public comments were received from; the Humane Society International and the Australian Marine Conservation Society (combined submission) and the Wilderness Society (WA).</p> <p>This submissions raised ongoing concerns for; the potential impact on the Australian Sea Lion colonies and foraging Australian Sea Lions, the need for a review and update of the ESD, a revised stock assessment of indicator Shark species (particularly Dusky and Sandbar Sharks), and mitigation of protected species bycatch.</p> <p>The Department's assessment has considered the public comments received on the submission. Conditions have been set to address; shark management measures, the need for continued monitoring of Australian Sea Lions (including a review the recent gillnet exclusion zones), a review and update the ESD report, and the development of a formal Harvest Strategy (with a view to implementation in 2020).</p> <p>These conditions are outlined in Section 4 of this assessment.</p>
Section 303FT Additional provisions relating to declarations	Comments
<p>(1) This section applies to a declaration made under section 303FN, 303FO or 303FP.</p>	<p>A declaration for the WA Temperate Demersal Gillnet and Demersal Longline Fisheries will be made under section 303FN.</p>
<p>(4) The Minister may make a declaration about a plan or operation even though he or she considers that the plan or operation should be the subject of the declaration only:</p> <p>(a) during a particular period; or</p> <p>(b) while certain circumstances exist; or</p> <p>(c) while a certain condition is complied with.</p> <p>In such a case, the instrument of declaration is to specify the period, circumstances or condition.</p>	<p>The standard conditions applied to commercial fishery wildlife trade operations include:</p> <ul style="list-style-type: none"> <li>• operation in accordance with the management regime</li> <li>• notifying the Department of changes to the management regime, and</li> <li>• annual reporting in accordance with the requirements of the Australian Government <i>Guidelines for the Ecologically Sustainable Management of Fisheries – 2nd Edition</i>.</li> </ul> <p>The wildlife trade operation instrument for the WA Temperate Demersal Gillnet and Demersal Longline Fisheries specifies the standard and any additional conditions applied.</p>
<p>(8) A condition may relate to reporting or monitoring.</p>	<p>One of the standard conditions relates to reporting.</p>
<p>(9) The Minister must, by instrument published in the <i>Gazette</i>, revoke a declaration if he or she is satisfied that a condition of the declaration has been contravened.</p>	<p><b>Not applicable.</b></p>

(11) A copy of an instrument under section 303FN, or this section is to be made available for inspection on the internet.	The instrument for the WA Temperate Demersal Gillnet and Demersal Longline Fisheries made under sections 303FN and the conditions under section 303FT will be registered as a notifiable instrument and made available through the Department's website.
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**Part 16**

<b>Section 391 Minister must consider precautionary principle in making decisions</b>	<b>Comment</b>
<p>(1) Minister must take account of the precautionary principle in making a decision, to the extent that the decision is consistent with other provisions under this Act.</p> <p>(2) The precautionary principle is that lack of full scientific certainty should not be used as a reason for postponing a measure to prevent degradation of the environment where there are threats of serious or irreversible environmental damage.</p>	<p><b>Meets</b></p> <p>Given the various management arrangements including; limited effort, spatial closures, gillnet exclusion zones and gear restrictions, precautionary measures are considered to be in place to prevent serious or irreversible environmental damage being caused by this fishery.</p>

**SECTION 4: WA TEMPERATE DEMERSAL GILLNET AND DEMERSAL LONGLINE FISHERIES – SUMMARY OF ISSUES REQUIRING CONDITIONS, AUGUST 2018**

Issue	Condition
<p><u>General Management</u></p> <p>Export decisions relate to the arrangements in force at the time of the decision. To ensure that these decisions remain valid and export approval continues uninterrupted, the Department of the Environment and Energy needs to be advised of any changes that are made to the management regime and make an assessment that the new arrangements are equivalent or better, in terms of ecological sustainability, than those in place at the time of the original decision. This includes operational and legislated amendments that may affect sustainability of the target species or negatively impact on byproduct, bycatch, EPBC Act protected species or the ecosystem.</p>	<p><b>Condition 1:</b></p> <p>Operation of the Western Australian Temperate Demersal Gillnet and Demersal Longline Fisheries will be carried out in accordance with the Western Australian <i>Fish Resources Management Act 1994</i> and the Western Australian Fish Resources Management Regulations 1995.</p> <p><b>Condition 2:</b></p> <p>The Western Australian Department of Primary Industries and Regional Development, to inform the Department of the Environment and Energy, of any intended material changes to the Western Australian Temperate Demersal Gillnet and Demersal Longline Fisheries management arrangements that may affect the assessment against which <i>Environment Protection and Biodiversity Conservation Act 1999</i> decisions are made.</p>
<p><u>Annual Reporting</u></p> <p>It is important that reports be produced and presented to the Department annually, in order for the performance of the fishery and progress in implementing the conditions in this report, and other managerial commitments, to be monitored and assessed throughout the life of the declaration. Annual reports should follow Appendix B to the Guidelines for the <i>Ecologically Sustainable Management of Fisheries - 2nd Edition</i> and include a description of: the fishery management arrangements in place; research and monitoring outcomes; recent catch data for all sectors of the fishery; status of target stock; interactions with EPBC Act protected species; impacts of the fishery on the ecosystem in which it operates; and progress in implementing the Department's conditions. Electronic copies of the Guidelines are available from the Department's website at</p> <p><a href="http://www.environment.gov.au/resource/guidelines-ecologically-sustainable-management-fisheries">http://www.environment.gov.au/resource/guidelines-ecologically-sustainable-management-fisheries</a>.</p>	<p><b>Condition 3:</b></p> <p>The Western Australian Department of Primary Industries and Regional Development, to produce and present reports to the Department of the Environment and Energy annually, as per Appendix B of the <i>Guidelines for the Ecologically Sustainable Management of Fisheries - 2nd Edition</i>.</p>

Issue	Condition
<p><u>Sharks – Stock and bycatch management</u></p> <p>The Department understands that the Western Australian Department of Primary Industries and Regional Development, has undertaken annual fishery independent longline surveys since 2001 (in north western Australia), for Sandbar and Dusky Shark breeding stocks. The biological stock of these shark species is indicated as being in 'transitional-recovering'. As the rebuilding of these species to 'acceptable' levels will take some years given their life history characteristics the precautionary management approach by the WA DPIRD to these species (incorporating careful monitoring of catch and effort data to ensure fishing levels are consistent with recovery) should continue.</p> <p>The Department acknowledges that the WA DPIRD, will be developing a formal Harvest Strategy during the approval period of the WTO, which will include input from fishers. It is expected that the Harvest Strategy will incorporate relevant management measures regarding the recovery of these species as appropriate.</p>	<p><b>Condition 4:</b></p> <p>The Western Australian Department of Primary Industries and Regional Development to:</p> <ol style="list-style-type: none"> <li>a) continue to assess the recovery status of breeding stocks working towards moving from 'transitional-recovering' to 'acceptable' stock status level.</li> <li>b) develop a formal Harvest Strategy with the view to implementation by early 2020.</li> </ol>
<p><u>Review and update the Ecologically Sustainable Development report (ESD)</u></p> <p>The Ecologically Sustainable Development (ESD) report completed in 2005 gave a comprehensive overview of the Western Australian Temperate Demersal Gillnet and Demersal Longline Fisheries and provided detailed performance measures for the fisheries. The fisheries are assessed against these annually in the <i>Status reports of the fisheries and aquatic resources of Western Australia</i>. The status reports also provide up to date cumulative risk status for each of the ecological resource assets within relevant WA marine bioregions. Therefore it is important that the ESD contains up-to-date data, specifically relating to target, byproduct, and bycatch (including protected species) species, and impacts on the marine environment.</p> <p>To assist in ensuring the Western Australian Temperate Demersal Gillnet and Demersal Longline Fisheries remain ecologically sustainable, and maintain up-to-date precautionary management principles the Department expects that the WA DPIRD will progress the a review and update of the ESD report (which has not been reviewed since 2005) within the new WTO approval period.</p>	<p><b>Condition 5:</b></p> <p>The Western Australian Department of Primary Industries and Regional Development to review and update the ESD report, for the Western Australian Temperate Demersal Gillnet and Demersal Longline Fisheries.</p> <p>The updated report should apply to:</p> <ul style="list-style-type: none"> <li>- target species</li> <li>- byproduct species</li> <li>- bycatch species (including protected species)</li> <li>- impacts on the marine environment.</li> </ul>



Issue	Condition
<p><u>Meeting CITES requirements for Hammerhead Sharks</u></p> <p>In recent years the Western Australian Temperate Demersal Gillnet and Demersal Longline Fisheries have recorded take of approximately 60–70 tonnes of Hammerhead Sharks (recorded to Family level (Family Sphyrnidae). A study from 1994–2007 identified the majority of retained Hammerheads in these fisheries as Smooth Hammerheads (<i>Sphyrna zygaena</i>), with 1.5 % identified as Scalloped Hammerheads (<i>S. lewini</i>).</p> <p>The non-detriment finding for the harvest of Hammerhead Sharks in Australia made by the CITES Scientific Authority in 2014 recommended that there be improvements made to the logbook reporting to include species level reporting. Following on from the recommendations the (then) Western Australian Department of Fisheries modified logbooks to include a facility to record Hammerhead Sharks to species level. However, due to similarities in morphology between Hammerhead Shark species identification (to species level) at sea was expected to remain problematic. The Department considers it important to provide additional education to fishers, as appropriate, for species identification and reporting of discards.</p> <p>To assist in improved species identification and reporting at sea, the WA DPIRD has indicated in their 2018 fishery application submission that they are working towards the development of electronic logbooks. It is intended that this will replace existing commercial fishing daily trip return sheets used by the fishers, and the electronic logbooks will include several species codes for Hammerhead Sharks. The publication of a field identification guide to <i>Western Australian Sharks and Shark-like Rays</i> (Fisheries Occasional Publications No.1), will further assist in improved species identification.</p>	<p><b>Condition 6:</b></p> <p>The WA Department of Primary Industries and Regional Development to:</p> <ul style="list-style-type: none"> <li>a) continue work towards the development of electronic logbooks for future implementation in the fisheries</li> <li>b) deliver further education to fishers as appropriate, if reporting from logbooks indicates this as necessary.</li> </ul>

Issue	Condition (Part 13)
<p><u>Monitoring of Australian Sea Lion colonies</u></p> <p>The boundaries of the Western Australian Temperate Demersal Gillnet and Demersal Longline Fisheries, overlap extensively with the range of Australian Sea Lion populations in Western Australia. Australian Sea Lions are listed as vulnerable under the EPBC Act and are highly susceptible to fatal interactions with gillnets, based on research in the Commonwealth-managed Southern and Eastern Scalefish and Shark Fishery (Goldsworthy <i>et al.</i>, 2010; Hamer <i>et al.</i>, 2013). The species' unusual life history characteristics make the already small populations in Western Australia particularly susceptible to even low levels of interaction in these fisheries. Even small reductions in the number of breeding females may lead to the extinction of small breeding colonies.</p> <p>The Department acknowledges the positive step taken by the WA DPIRD in implementing gillnet exclusion zones. The implemented exclusion zones around the 33 known breeding colonies are intended to assist in reducing the risk of interactions with foraging Australian Sea Lions. The Department understands the zones were developed based on the most recent data available on the Australian Sea Lion colonies. Given the resulting coverage from the gillnet exclusion zone is considered unlikely to cover the full foraging range of Australian Sea Lions, the Department considers it remains important for the WA DPIRD to monitor and review the gillnet exclusion zones.</p> <p>The Department notes the continuing concerns about the Australian Sea Lion populations, and the unpredictable breeding pattern of this species. Given the high vulnerability of the population to even small reductions in numbers risking eventual extinction, the Department expects the WA DPIRD to continue research into the Australian Sea Lion population, and obtain more reliable estimates and baseline data, to be able to improve predictability of Australian Sea Lion encounters, and estimating mortalities. This is considered particularly important, to assess the effectiveness of the gillnet exclusion zones in protecting the Australian Sea Lion colonies and foraging Sea Lions.</p>	<p><b>Condition A:</b></p> <p>Following the recent implementation of the Australian Sea Lion gillnet exclusion zones, the Western Australian Department of Primary Industries and Regional Development to:</p> <ul style="list-style-type: none"> <li>a) monitor and review the gillnet exclusion zones (and associated spatial effort changes) by 2021.</li> <li>b) conduct further research on Australian Sea Lion populations, to obtain more reliable population estimates.</li> </ul>

## REFERENCES

DSEWPAC (2012) *Marine bioregional plan for the South-west Marine Region*. DSEWPAC, Canberra, viewed 20 August

2018, <http://www.environment.gov.au/system/files/pages/a73fb726-8572-4d64-9e33-1d320dd6109c/files/south-west-marine-plan.pdf>.

Goldsworthy SD, Page B, Shaughnessy PD & and Linnane A (2010). Mitigating seal interactions in the SRLF and the Gillnet Sector SESSF in South Australia. Report to the Fisheries Research and Development Corporation. South Australian Research and Development Institute (Aquatic Sciences). Adelaide.

Hamer DJ, Goldsworthy SD, Costa DP, Fowler S, Page B, and Sumner M. (2013). The endangered Australian sea lion regularly becomes bycatch in and extensively overlaps with the demersal shark gillnet fishery in South Australia. *Biological Conservation* 157, 386–400.

McAuley R. 2017. *Developing novel remote camera approaches to assess and monitor the population status of Australian sea lions*. FRDC 2017-119.

McAuley R, Newbound D, and Ashworth R. (2002) *Field identification guide to Western Australian Sharks and Shark-like Rays* (Fisheries Occasional Publications No.1).