



**Australian Government**

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**Department of the Environment and Energy**

Assessment of the  
**Queensland Mud Crab Fishery**

**MAY 2019**

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#### **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 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 or the Australian Government.

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## EXECUTIVE SUMMARY OF THE ASSESSMENT OF THE QUEENSLAND MUD CRAB FISHERY

On 21 August 2018, the Queensland Department of Agriculture and Fisheries (QDAF) submitted an application to the Department of the Environment and Energy for assessment of the Queensland Mud Crab Fishery (the fishery) as an approved wildlife trade operation (WTO) under provisions of Part 13 (protected species) and Part 13A (wildlife trade) of the EPBC Act.

The Department of the Environment and Energy assessed this application against the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries – 2nd Edition*. Public consultation was undertaken on the application between 29 August and 28 September 2018. One comment was received.

### The fishery

The Queensland Mud Crab Fishery is a commercial fishery that targets Giant Mud Crabs (*Scylla olivacea*) and Orange Mud Crabs (*S. serrata*) using C1 crab fishing licences, in all tidal waters along the coast of Queensland, including Commonwealth waters, in accordance with the Queensland *Fisheries Act 1994* and the Fisheries Regulation 2008. Giant Mud Crabs constitute 99 per cent of Queensland's commercial mud crab catch and 22 percent of the total recreational fishing harvest.

The fishery is managed through input controls including size limits, spatial closures, licence and gear restrictions, limited entry, single sex harvest regulation (no take of female crabs), and a prohibition on the take of Spanner Crab and non-crab species. No output controls such as quota or total allowable catch are in place for the fishery. Commercial catch is by means of baited dillies (except for inverted dillies) and crab pots (with rigid or collapsible frames).

### Target stocks

The Status of Australian Fish Stocks (SAFS) currently classifies Queensland's mud crab stocks as sustainable. Stocks are assessed as two management units: East Coast and Gulf of Carpentaria. However, commercial catch has declined in recent years while effort has remained high; many commercial fishing operators state that mud crab catch rates are no longer viable and a black market has emerged. The recreational sector has also shown similar declines. Protection of female crabs and minimum size limits are the main tools for stock management. Status indicators include catch effort, catch rate and fishing mortality, although this information is based primarily on commercial logbooks. Conditions proposed in Section 4 of this assessment report are expected to deliver a sustainable outcome, in-line with the Queensland Government's proposed fishery reforms.

### Byproduct and bycatch

Mud Crab fishers are permitted to retain all species of crab except Spanner Crab. A recent Level 1 ecological risk assessment (ERA) assessed the risk to byproduct from the fishery as intermediate/high and QDAF will progress this issue to a Level 2 ERA ([Jacobsen and Walton 2019](#)).

The 2019 ERA considered bycatch (mainly of small fin fish but also some sharks and rays) to be at intermediate risk from the fishery and noted that risks to bycatch will be further investigated through the *Fisheries Queensland Monitoring and Research Plan* ([Jacobsen and Walton 2019](#)).

### Protected species and ecosystems

Queensland Government Marine wildlife strandings annual reports ([QDES, 2017](#)) have identified crab fisheries as a source of interaction with, and mortality of, EPBC Act-listed protected species, including Dugong, marine turtles and inshore dolphins. However, it is difficult to identify which crab fisheries or fishing sectors are responsible for these interactions. A recent ERA ([Jacobsen and Walton 2019](#)) indicated that most protected species are likely to be at low risk from the fishery. Species and processes at higher risk, such as marine turtles,

will be further assessed via a Level 2 ERA, and batoids (sawfish) will be further investigated via the *Fisheries Queensland Monitoring and Research Plan* ([Jacobsen and Walton 2019](#)). Commercial fishers are required to report all interactions with protected species in their logbooks. While reported interactions have increased in recent years, there are concerns that not all interactions are being reported. There are no threatened ecological communities in the area of the fishery, and the impact of fishing on the broader marine ecosystem is considered minimal due to the areas fished. However, lost or abandoned pots have the potential to impact the broader marine ecosystem by 'ghost fishing'. Ecosystem processes are at low risk from the fishery, but marine habitats are at intermediate or high risk. These marine habitats will be investigated via the *Fisheries Queensland Monitoring and Research Plan* ([Jacobsen and Walton 2019](#)).

## Conclusion

There have been no changes to management of the fishery since the most recent assessment (2015). The Department recognises that major reforms are underway as part of the Queensland Government's *Sustainable Fisheries Strategy 2017–2027*. These reforms are expected to significantly improve the management of the fishery and address many of the issues identified in the Department's assessment. This includes providing a more strategic management framework and greater means to collect and validate important fishery data, greater enforcement capacity, and better assessment and management of fishery performance to ensure ecological risks are managed effectively. These important reforms are reflected in conditions associated with proposed approvals in Section 4 of this report. These conditions include:

- Refining ecological risk assessments (ERAs) and implementing appropriate risk mitigation strategies.
- Implementing harvest strategies that monitor and manage impacts on target, byproduct and bycatch (including protected species).
- Implementing reforms to support the collection of accurate and reliable data to monitor and assess the fishery's impact on target and non-target species, including protected species.

Subject to these conditions, the Department recommends that the fishery be granted export approval for three years, until 27 May 2022, by declaring the fishery an approved wildlife trade operation and amending the list of exempt native specimens under the EPBC Act.

The Department also recommends re-accrediting the fishery's management regime under Part 13 of the EPBC Act subject to revised conditions detailed in Section 4 of this report.

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 QUEENSLAND MUD CRAB FISHERY 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	4 of 9	2 of 9	3 of 9	<p>Although the management of the fishery is well documented, consultative, and informed by regular stock assessments, there is currently no formal process in place for reviewing management performance or for managing ecological risk. This is expected to be addressed over the next three years (2019–2021), when QDAF complete ecological risk assessments, and develop and implement a harvest strategy for the fishery. The harvest strategy is expected to contain strategic objectives and performance criteria by which the effectiveness of the management arrangements can be measured.</p> <p>Ongoing assessment, monitoring and management of risk will depend on having quality information. The Department considers it important that a system to ensure robust information is available is implemented, and that risks be identified and managed in a precautionary manner as soon as possible. Risk mitigation measures should be consistent with all relevant threat abatement plans, recovery plans, the National Policy on Fisheries Bycatch and bycatch action strategies.</p>
Principle 1 (target stocks)	1 of 9 (2 N/A)	7 of 9	1 of 9	<p>The most recent (2015) stock assessment found that overall, commercial catches were likely to be sustainable and unlikely to be impairing recruitment. Protection of female crabs and minimum size limits are the main tools for stock management, but there is clear evidence of overfishing (localised depletion and excess effort), extreme pressure on the remainder of available stock and the appearance of a black market. Noting these concerns, QDAF may need to consider measures to manage the risk of localised depletion, as well as overall population decline.</p> <p>QDAF is seeking to address these issues with reforms that will help to maintain stocks at a sustainable level, such as the introduction of traceable tags for commercially caught crabs that will reduce black marketing, and an Individual Transferable Quota System and total allowable commercial catch limits. A harvest strategy is being developed which will include specific targets for Mud Crabs and aim to restore stocks to a 60 per cent of their unfished biomass by 2027.</p> <p>All retained commercial catch of Blue Swimmer Crab and mud crabs must be reported using logbooks, but there is little or no provision for reporting byproduct species. There is also no information collected on discarded catch in logbooks for either species.</p> <p>It is important that all sources of mortality are accounted for in determining sustainable harvest levels for all sectors, and the subsequent management of allowable catch for the commercial fishery. The sustainability of any harvest of byproduct species should be monitored and managed to ensure it remains sustainable.</p>

Principle 2 (bycatch and TEPS)	1 of 12 (2 N/A)	6 of 12	3 of 12	<p>With the exception of protected species (Species of Conservation Interest/SOCI) no information is collected on bycatch or discarded catch in the fishery. A Level 1 ecological risk assessment completed in 2019 identified most SOCI as being at Low risk from the fishery and no further action will be taken (<a href="#">Jacobsen and Walton 2019</a>). Threatened species identified as being at higher risk will be progressed through Level 2 ecological risk assessments and the <i>Fisheries Queensland Monitoring and Research Plan</i> as deemed appropriate. Risk mitigation is expected to be managed under a harvest strategy to be developed and implemented over the next three years (2019–2021).</p> <p>Ongoing assessment, monitoring and management of risk will depend on having quality information. The Department considers it important that a system to ensure availability of robust information is implemented, and that risks be identified and managed in a precautionary way as soon as possible. Risk mitigation measures should be consistent with all relevant threat abatement plans, recovery plans, the National Policy on Fisheries Bycatch, and bycatch action strategies.</p>
Principle 3 (ecosystem impacts)		3 of 5	2 of 5	<p>No threatened ecological communities have been identified in the area of the fishery. A Level 1 ecological risk assessment identified ecosystem processes to be at low risk and marine habitats to be at intermediate/high risk; assessment of marine habitats will be progressed through the <i>Fisheries Queensland Monitoring and Research Plan</i> (<a href="#">Jacobsen and Walton 2019</a>). Risk mitigation is expected to be managed under a harvest strategy, which is due to be completed by the end of 2019 for implementation in 2020. The Department considers it important that a system to ensure robust information is available is implemented, and that risks be identified and managed in a precautionary way as soon as possible.</p>
<b>EPBC requirements</b>				
Part 12	<b>Meets requirements</b> Subject to conditions specified at Section 4 of this report. The fishery overlaps with the North and Temperate East Marine Regions. The Marine Bioregional Plans for the North Marine Region and Temperate East Marine Region are therefore applicable to the area of the Queensland Mud Crab Fishery.			
Part 13	<b>Meets requirements</b> Owing to the fishing method employed, interactions with most EBPC Act–protected species identified by a QDAF Level 1 ecological risk assessment were considered to be low risk. Others will be progressed through Level 2 ERAs or the <i>Fisheries Queensland Monitoring and Research Plan</i> .			
Part 13A	<b>Meets requirements</b> Subject to conditions specified at Section 4 of this report. The fishery is consistent with the Objects of Part 13A. Declaration of the fishery as a Wildlife Trade Operation for three years, until 27 May 2022, is recommended, subject to conditions detailed in Section 4 of this report.			
Part 16	<b>Meets requirements</b> subject to conditions specified in Section 4 of this report. The fishery is managed in a precautionary manner. Appropriate precautionary measures are in place to prevent serious or irreversible environmental damage being caused by the fishery.			

## Notes:

### Assessment history:

Information on previous assessments for the Queensland Mud Crab Fishery is available on the Department's website at <https://www.environment.gov.au/marine/fisheries/qld/mud-crab>.

1<sup>st</sup> assessment finalised August 2004 (WTO) – 15 recommendations.

2<sup>nd</sup> assessment finalised August 2007 (LENS) – 6 recommendations.

3<sup>rd</sup> assessment finalised October 2015 (WTO) – 4 conditions, 2 recommendations.

### Fishery reporting:

Annual reports for the fishery are available on the QDAF website:

<https://www.daf.qld.gov.au/resources/documents/fisheries/sustainable-fisheries2/sustainable-fisheries/Queensland-Fisheries-Summary-Report.pdf>.

SOCI reports are submitted annually to the Department of the Environment and Energy.

- Progress Report – QLD Mud Crab Fishery, 2012–2014
- Annual Status Report – QLD Mud Crab Fishery, 2011
- Annual Status Report – QLD Mud Crab Fishery, 2012
- Annual Status Report – QLD Mud Crab Fishery, 2013

Department of the Environment Assessment Report of the QLD Mud Crab Fishery 2007.

### Key links:

Fishery information

– <http://fish.gov.au/report/155-MUD-CRABS-2018>

– <https://www.daf.qld.gov.au/business-priorities/fisheries/monitoring-compliance/data/sustainability-reporting/stock-status-assessment>

Enforcing legislation

Queensland Fisheries Act 1994 <https://www.legislation.qld.gov.au/view/html/inforce/current/act-1994-037>

Queensland Marine Parks Act 2004 <https://www.legislation.qld.gov.au/view/html/inforce/current/act-2004-031>

Great Barrier Reef Marine Park Act 1975 <https://www.legislation.gov.au/Details/C2018C00453>

Queensland Fisheries Regulation 2008 <https://www.legislation.qld.gov.au/view/pdf/published.exp/sl-2008-0083>

Harvest strategy

– <http://spire.environment.gov.au/spire/886644/246810/338/QLD%20-%20Mud%20Crab%20Fishery%20-%202014-2019/Submission%20-%20QLD%20Mud%20Crab%20-%20Draft%20Statement%20of%20Management%20Arrangements%20for%20Crab%20Fishery%20Sept%2014.pdf>

Ecological Risk Assessment

– [https://www.daf.qld.gov.au/\\_data/assets/pdf\\_file/0018/62532/ERA-Queensland-Crab-Fisheries.pdf](https://www.daf.qld.gov.au/_data/assets/pdf_file/0018/62532/ERA-Queensland-Crab-Fisheries.pdf)

– Level 1 ERA 2019 - <http://era.daf.qld.gov.au/id/eprint/6965/>

Stock assessments

– <https://www.daf.qld.gov.au/business-priorities/fisheries/monitoring-compliance/data/sustainability-reporting/stock-status-assessment>

Responsible crabbing brochure

[https://www.daf.qld.gov.au/\\_data/assets/pdf\\_file/0019/72802/Responsible-crabbing-in-Qld-DL-flyer.pdf](https://www.daf.qld.gov.au/_data/assets/pdf_file/0019/72802/Responsible-crabbing-in-Qld-DL-flyer.pdf)



**SECTION 2: DETAILED ANALYSIS OF THE QUEENSLAND MUD CRAB FISHERY 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 fishery is managed under the Queensland <i>Fisheries Act 1994</i> <a href="https://www.legislation.qld.gov.au/view/html/inforce/current/act-1994-037">https://www.legislation.qld.gov.au/view/html/inforce/current/act-1994-037</a> and Queensland Fisheries Regulation 2008 <a href="https://www.legislation.qld.gov.au/view/pdf/published.exp/sl-2008-0083">https://www.legislation.qld.gov.au/view/pdf/published.exp/sl-2008-0083</a>, which apply throughout Queensland waters and are considered to be effective.</p>
Be developed through a consultative process providing opportunity to all interested and affected parties, including the general public.	<p><b>Meets</b></p> <p>Management arrangements are developed in consultation with a range of stakeholders. Consultation involves publication of discussion papers, public consultation and regular meetings of the <a href="#">Crab Fishery Working Group</a> and <a href="#">Sustainable Fisheries Expert Panel</a>.</p> <p>The Crab Fishery Working Group provides operational advice in relation to the fishery, and the Sustainable Fisheries Expert Panel provides independent expert advice on best practice fisheries management and implementation of the Sustainable Fisheries Strategy. It also reviews key outputs, such as harvest strategies, from fishery working groups such as the Crab Fishery Working Group.</p> <p>Terms of reference, members and communiques are published for both the working group and the expert panel on the QDAF website.</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>The <a href="#">Crab Fishery Working Group</a> is chaired by QDAF and currently includes both commercial and recreational fishers and a representative from the Great Barrier Reef Marine Park Authority. QDAF refreshes membership every two years to allow for rotation of different representatives and development of new industry leaders.</p> <p>The <a href="#">Sustainable Fisheries Expert Panel</a> currently includes members with expertise in fish biology, stock assessment, fisheries management and resource allocation, threatened species, and environmental, social and economic sciences.</p>

<p>Be strategic, containing objectives and performance criteria by which the effectiveness of the management arrangements are measured.</p>	<p><b>Does not meet</b></p> <p>There is currently no process in place for reviewing management performance.</p> <p>The Queensland Government's <a href="#">Sustainable Fisheries Strategy 2017-2027</a> includes a commitment to develop harvest strategies for all commercial fisheries in Queensland. These harvest strategies are expected to contain strategic objectives and performance criteria by which the effectiveness of the management arrangements can be measured. QDAF expects that the harvest strategy for the Mud Crab and Blue Swimmer Crab fisheries will be developed and implemented by the end of 2019.</p>
<p>Be capable of controlling the level of harvest in the fishery using input and/or output controls.</p>	<p><b>Partially meets</b></p> <p>Although there are no restrictions on the total catch of mud crabs in the fishery, commercial harvest is controlled through various input controls, such as restrictions on the types and quantities of fishing gear that can be used, the maximum size of boats that can be used, protection for female crabs and minimum size limits for male crabs, and areas that are closed to fishing.</p> <p>A harvest strategy is also being developed for the fishery which is expected to include target and limit reference points that will trigger management actions, including limits beyond which the stocks should not be taken. This harvest strategy is expected to be developed by the end of 2019 for implementation in the 2020 fishing season.</p> <p>Reforms proposed by the Crab Fishing Working Group include introduction of an individual transferable quota system, total allowable commercial catch limits and catch tagging to aid traceability and reduce black marketing.</p>
<p>Contain the means of enforcing critical aspects of the management arrangements.</p>	<p><b>Meets</b></p> <p>The scale of the fishery is likely to present a significant challenge for compliance enforcement. QDAF uses a fishery Compliance Risk Assessment framework to develop state and regional operational plans to deliver its compliance program. An overview of this program is available on the <a href="#">QDAF website</a>.</p> <p>Widespread declines in catches of mud crabs have been reported by commercial as well as non-commercial sectors. The high price of mud crab has led to widespread black marketing by all sectors; such illegal sales undermine the sustainability of mud crab stocks and the economic viability of the commercial fishery (<a href="#">QDAF 2018</a>). Proposed Queensland fishery management reforms are considered sufficient to address and mitigate these issues.</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>Does not meet</b></p> <p>While catch and other information is periodically assessed by QDAF, there is no formal process for monitoring or managing fishery performance.</p> <p>A harvest strategy is being developed for the fishery, which is expected to contain strategic objectives and performance criteria by which the effectiveness of the management arrangements can be measured. This is expected to be implemented by the end of 2019.</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>Partially meets</b></p> <p>A Level 1 ecological risk assessment of the fishery, including an assessment of protected species, was completed in 2019 (<a href="#">Jacobsen and Walton 2019</a>). As yet there is no system in place for monitoring, avoiding, remedying or mitigating the potential adverse impacts identified in the ecological risk assessment. However, the risk to most components of the Level 1 ERA was found to be low. Level 2 assessments will be completed for species of conservation concern (including marine turtles), target, byproduct and bycatch species by the end of 2020.</p> <p>Ongoing assessment, monitoring and management of risk will depend on the availability of quality information. A system to ensure robust information is available will therefore be important. The Department also considers it important that identified risks be managed in a precautionary manner as soon as possible.</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>Does not meet</b></p> <p>The management arrangements do not explicitly require fishers to comply with relevant threat abatement plans, recovery plans, the National Policy on Fisheries Bycatch, and bycatch action strategies developed under the policy. QDAF has advised that management arrangements are in place for Great White Sharks, Grey Nurse Sharks, sawfish and spartooth sharks which are all listed as no-take species. Mandatory reporting on species of conservation interest (SOCl) is also required for these species.</p> <p>Relevant threat abatement and recovery plans may include the:</p> <ul style="list-style-type: none"> <li>• <a href="#">Threat Abatement Plan for the impacts of marine debris on the vertebrate wildlife of Australia's coasts and oceans</a></li> <li>• <a href="#">Conservation Management Plan for the Blue Whale - A Recovery Plan under the <i>Environment Protection and Biodiversity Conservation Act 1999</i></a></li> <li>• <a href="#">Gould's Petrel (<i>Pterodroma leucoptera leucoptera</i>) Recovery Plan</a></li> <li>• <a href="#">Recovery Plan for Marine Turtles in Australia</a></li> <li>• <a href="#">Recovery Plan for the Grey Nurse Shark (<i>Carcharias taurus</i>)</a></li> <li>• <a href="#">Recovery Plan for the White Shark (<i>Carcharodon carcharias</i>)</a></li> <li>• <a href="#">Sawfish and River Sharks Multispecies Recovery Plan</a></li> </ul>

<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.	
<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.	
<b>Information requirements</b>	
<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 fishery-dependent research and monitoring.</p>	<p><b>Partially meets</b></p> <p>Commercial fishers are required to report all retained catch (total weight, but not size or number of individuals), fishing effort (trap lifts) and interactions with protected species using approved logbooks. Logbooks must be completed by the end of each fishing day and submitted no more than 15 days after the month that the fishing occurred in.</p> <p>Vessel Monitoring Systems were introduced on all boats from 1 January 2019 and provide independent information on vessel locations which can provide insight into the areas fished, and also aid enforcement activities.</p> <p>There is no other fishery-independent data collection program at this time. However, QDAF is investigating the use of electronic monitoring as part of its Sustainable Fisheries Strategy 2017–2027. Electronic monitoring has been shown to significantly improve the quality and reliability of fisher-dependent data in other Australian fisheries and elsewhere in the world and has potential to enhance the confidence, timeliness and quality of data in the fishery.</p>
<b>Assessment</b>	

**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.

**Partially meets**

QDAF undertakes annual stock status assessments to support its management of the Mud Crab Fishery. Outcomes are reported on the [QDAF](#) and the FRDC's websites ([Grubert et al. 2018](#)).

Two species of mud crab are found in Australian waters: Giant Mud Crab (*Scylla serrata*) and Orange Mud Crab (*S. olivacea*). The former constitutes more than 99 per cent of the commercial catch of mud crabs in Queensland and the Northern Territory. Approximately 83 per cent of the commercial harvest of the east coast Giant Mud Crab biological stock and 90 per cent of the Gulf of Carpentaria Giant Mud Crab biological stock is taken by the Queensland Mud Crab Fishery.

Evidence suggests that there are at least two biological stocks of Giant Mud Crab in Australian waters: one to the west and another to the south-east of Torres Strait. Although its life history and biology in Queensland and the Northern Territory are well documented, there are no published accounts on the biology of Orange Mud Crab in Australian waters. Giant Mud Crabs exhibit rapid growth and high fecundity, and females in northern Australia migrate up to 95 km offshore to release their eggs. The species has a planktonic larval stage that can last for several weeks. These factors may facilitate significant gene flow between areas.

The male-only harvest policy in Queensland seeks to maximise the number of female Giant Mud Crabs available to spawn. Although female mud crabs cannot be retained if caught, they may be handled and released many times during their life and so some incidental damage and discard mortality is likely. Protection of some sexually mature male crabs in Queensland is afforded by a minimum size limit which is above the size at first maturity. The size distribution of male crabs suggests that fishing mortality is not evenly spread across eastern Queensland, with localised depletion in some areas and low to moderate fishing mortality in others.

In 2017, the commercial catch volume and catch rate from the east coast component of the Queensland Mud Crab Fishery were respectively 16 and 18 per cent lower than the 10-year average. Conversely, in the Gulf of Carpentaria component of the fishery, the 2017 catch volume was the highest in three years, and the catch rate was 25 per cent greater than the 10-year average. This increase followed several years of poor monsoon rainfall in the eastern Gulf which contributed to 2016 having the lowest catch volume and catch rate in a decade. Notwithstanding, the increase suggests that the population of Giant Mud Crabs within the Gulf of Carpentaria component of the fishery is rebuilding rapidly, and is resilient to these environmental impacts.

Fishing effort in the east coast component of the fishery increased by 12 per cent between 2008 and 2017, but the catch rate declined by 7 per cent. The effect of this increase in effort on the crab population is unknown, but the reduced catch per unit effort suggests a decline in abundance. In the Gulf of Carpentaria component of the fishery, fishing effort decreased by 16 per cent over the same period.

Overall, available information suggests that the biomass is unlikely to be depleted to unsustainable levels, the current level of fishing is unlikely to cause the stock to become recruitment impaired, and the Queensland Mud Crab Fishery is likely to be sustainable ([Grubert et al. 2018](#)).

The Queensland Government has committed to undertake stock assessments (annually or at least every two years) for key stocks including mud crabs, and to assess the stock status against target and limit reference points which will be identified in harvest strategies under their Sustainable Fisheries Strategy 2017–2027.

<p><b>1.1.3</b> The distribution and spatial structure of the stock(s) has been established and factored into management responses.</p>	<p><b>Partially meets</b></p> <p>Fishery status reports and the Status of Australian Fish Stocks reports provide information on the distribution and spatial structure for mud crabs taken in the fishery. Evidence suggests that there are at least two biological stocks of Giant Mud Crab in Australian waters: one to the west and another south-east of Torres Strait. These areas are considered separately in stock status assessments (<a href="#">QDAF 2018</a>), but are managed as a single stock (management is not tailored to either area). The size distribution of male crabs suggests that fishing mortality is not evenly spread across eastern Queensland at least, with localised depletion in some areas and low to moderate fishing mortality in others.</p>
<p><b>1.1.4</b> 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.</p>	<p><b>Partially meets</b></p> <p>Commercial fishers are required to report all retained catch of mud crabs using approved fishery logbooks and information on non-commercial catch is collected through periodic surveys. The lack of annual catch estimates for recreational and Indigenous fishers means that the stock status in the most recent stock status assessment is based primarily on commercial logbook data up to 2008 (<a href="#">Grubert et al. 2018</a>).</p> <p>The only simultaneous estimates of the recreational and Indigenous harvest are for the east coast component of Queensland’s Mud Crab Fishery and these estimates are now more than a decade old. The results do however indicate that the combined take by these sectors once exceeded 50 per cent of the total catch within the eastern component of the fishery. More recent surveys (e.g. <a href="#">Statewide Recreational Fishing Survey 2013–14</a>) confirm the ongoing significance of the non-commercial harvest, at around 24 per cent of the overall take. A recreational fishing survey is being undertaken and results are expected to be released in late 2020.</p> <p>The sustainability of any harvest of byproduct species should also be monitored and managed to ensure it remains sustainable. Reporting of byproduct is not currently facilitated on commercial fishing logbooks.</p> <p>In addition, the impact of fishing on female and undersized male crabs, which must be released if caught, is unclear. Indirect evidence of potential post-release mortality in Queensland comes from an analysis of female size frequency distributions inside and outside parts of the Moreton Bay Marine Park, with larger females being more prevalent in the catch in areas closed to fishing for 12 years compared to those where fishing is still allowed, even though female harvest is prohibited in both areas. However, female crabs may be handled and released many times during their life and so some incidental damage and discard mortality is likely.</p> <p>It is important that all sources of mortality are accounted for in determining sustainable harvest levels for all sectors, and subsequently managing the allowable catch for the commercial fishery.</p>

<p><b>1.1.5</b> There is a sound estimate of the potential productivity of the fished stock/s and the proportion that could be harvested.</p>	<p><b>Meets</b></p> <p>Two species of mud crab are found in Australian waters: Giant Mud Crab (<i>Scylla serrata</i>) and Orange Mud Crab (<i>S. olivacea</i>). The former constitutes more than 99 per cent of the commercial catch of mud crabs in Queensland and the Northern Territory. Although the life history and biology of Giant Mud Crab in Queensland and the Northern Territory are well documented, there are no published accounts on the biology of Orange Mud Crab in Australian waters (<a href="#">Grubert et al. 2018</a>).</p> <p>QDAF assesses the status of mud crab stocks (<i>S. serrata</i> and <i>S. olivacea</i>) annually to support its management of the fishery. Outcomes of these assessments are reported on the <a href="#">QDAF website</a>. The Fisheries Research and Development Corporation (FRDC) also undertakes biennial assessments which are published on their <a href="#">Status of Australian Fish Stocks website</a>. The most recent stock status assessment was undertaken in 2018 (<a href="#">Grubert et al. 2018</a>). The stocks supporting the fishery have been classified as sustainable since 2014 in years when stocks have been assessed (<a href="#">Queensland Government (b)</a>). The current management regime assumes restrictions, catch limits and no-take zones will maintain productivity. While there are no current limits on the total catch that can be taken from the fishery, QDAF is considering implementing catch limits via a harvest strategy for the fishery, as part of the Queensland Government's Sustainable Fisheries Strategy 2017–2027.</p> <p>Catch and catch rate fluctuate according to monsoonal rainfall; male-only catch and a minimum legal size limit (above size at first maturity) ensure that approximately 50 per cent of males reach sexual maturity before harvest. The mud crab population is therefore expected to recover quickly in this population under favourable environmental conditions, and overfishing is considered unlikely. 'No take' zones along the Queensland east coast provide additional protection to <i>Scylla</i> spp., particularly males, and result in higher densities and larger mean sizes within protected areas, as well as spillover of crabs into adjacent fished areas. However, the benefits of these closures have not been quantified: local benefits can be significant but cumulative benefits on mud crab spawning biomass are unlikely to be great when other protective measures are considered.</p>
<p><b>Management responses</b></p>	
<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>Does not meet</b></p> <p>There are no reference points, management triggers, individual or total catch limits applicable to the Queensland Mud Crab Fishery. A harvest strategy is being developed for the fishery which is expected to include target and limit reference points that will trigger management actions, including limits beyond which the stocks should not be taken. The harvest strategy is expected to be completed by the end of 2019 for implementation in the 2020 fishing season.</p> <p>The most recent estimate of fishing mortality in the East Coast Management Unit (MU), based on commercial data, was 24 per cent above the estimated natural mortality for <i>S. serrata</i> (based on NT data). Size distribution of male crabs indicates that mortality is unevenly distributed, with localised depletion in some areas and low to moderate fishing mortality in others. Both annual fishing effort and catch rate have increased since 2008, although their effects on male crabs are unknown. Catch and catch rate of mud crabs in the East Coast MU in 2015 were among the highest on record, despite average or below average rainfall over much of the state's eastern seaboard during the preceding two calendar years.</p>

<p><b>1.1.7</b> There are management strategies in place capable of controlling the level of take.</p>	<p><b>Partially meets</b></p> <p>The level of harvest is controlled through restrictions on the number of fishing licences, the types and quantities of fishing gear that can be used, the maximum size of boats that can be used, protection for female crabs and minimum size limits for male crabs, as well as areas that are closed to fishing.</p> <p>There are currently no limits on the quantity of mud crabs that can be harvested. However, a harvest strategy is being developed for the fishery which is expected to include target and limit reference points that will trigger management actions, including limits beyond which the stocks should not be taken. This harvest strategy is expected to be developed by the end of 2019 for implementation in the 2020 fishing season.</p> <p>Reforms proposed by the Crab Fishing Working Group include introduction of an individual transferable quota system, total allowable commercial catch limits, and catch tagging to aid traceability and reduce black marketing.</p>
<p><b>1.1.8</b> Fishing is conducted in a manner that does not threaten stocks of byproduct species.</p>	<p><b>Partially meets</b></p> <p>Byproduct consists of crab species, other than Spanner Crabs (<i>Ranina ranina</i>), such as Coral Swimmer Crabs (<i>Charybdis feriatus</i>), Three-spot Crabs (<i>Portunus sanguinolentus</i>) and Hairyback Crabs (<i>Charybdis natator</i>) (<a href="#">Jacobsen and Walton 2019</a>). The ecological risk assessment states that only moderate amounts of byproduct are retained in the fishery, with non-target species frequently making up less than 10 tonnes of the total annual catch (<a href="#">Jacobsen and Walton 2019</a>). It is unclear how these estimates are determined given there is no independent data collection and no provision for fishers to report byproduct in their logbooks. There are also no estimates of potential productivity or estimates of sustainable harvest levels for these species.</p> <p>It is important that all sources of mortality, including mortality associated with the various commercial and non-commercial fisheries, be accounted for in determining sustainable harvest levels for all sectors, and subsequently managing allowable catch levels for the Mud Crab Fishery. The sustainability of any harvest of byproduct species should be monitored and managed to ensure it remains sustainable.</p> <p>QDAF is undertaking ecological risk assessments to guide their management of the fishery. A Level 1 risk assessment completed in 2019 examined the effects of lost or discarded gear, risks to protected species, bycatch and byproduct species, as well as potential mortality of mud crabs owing to impacts associated with capture and release, and habitat degradation (<a href="#">Jacobsen and Walton 2019</a>). The assessment found that the risk to byproduct species from overharvesting was intermediate/high and will be progressed to a Level 2 ERA.</p> <p>The second (Level 2) risk assessment for the fishery is due to be completed by late 2020 and is expected to inform the management of ecological risks through the harvest strategy.</p> <p>The harvest strategy is expected to be finalised by the end of 2019 for implementation in the 2020 fishing season. While it will likely focus on key target species, the harvest strategy will also include management arrangements for other species, including byproduct species, through a tiered monitoring and management approach. With appropriate data collection, data monitoring and enforcement, these measures should ensure all stocks remain sustainable. Conditions proposed in Section 4 of this assessment report are designed to address this requirement.</p>
<p>(Guidelines 1.1.1 to 1.1.7 should be applied to byproduct species to an appropriate level)</p>	



<p><b>1.1.9</b> The management response, considering uncertainties in the assessment and precautionary management actions, has a high chance of achieving the objective.</p>	<p><b>Partially meets</b></p> <p>Although the most recent stock status assessment suggests that current management arrangements are likely to be at ecologically sustainable levels, there are risks of localised depletion and overall population decline that warrant further investigation.</p> <p>The Department considers that data collection and stock assessment requirements for the fishery should be reviewed in conjunction with the review of ecological risk assessments and development of a harvest strategy for the Mud Crab Fishery.</p>
<p><b>If overfished, go to Objective 2:</b> <b>If not overfished, go to PRINCIPLE 2:</b></p>	
<p><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.</p>	
<p><b>Management responses</b></p>	
<p><b>1.2.1</b> 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.</p>	<p><b>N/A</b></p> <p>No stock has been identified as overfished.</p>
<p><b>1.2.2</b> 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.</p>	<p><b>N/A</b></p> <p>No stock has been identified as overfished.</p>
<p><b>PRINCIPLE 2</b> - Fishing operations should be managed to minimise their impact on the structure, productivity, function and biological diversity of the ecosystem.</p>	
<p><b>Objective 1</b> - The fishery is conducted in a manner that does not threaten bycatch species.</p>	
<p><b>Information requirements</b></p>	

<p><b>2.1.1</b> Reliable information, appropriate to the scale of the fishery, is collected on the composition and abundance of bycatch.</p>	<p><b>Partially meets</b></p> <p>The majority of bycatch in the fishery consists of inshore fin fish and smaller invertebrates accessing the bait placed in the trap. Bycatch from crab fishing has been known to include fin fish such as bream, catfish, Gold Spot Grouper (<i>Epinephelus coioides</i>), Queensland Groper (<i>Epinephelus lanceolatus</i>), Sleepy Cod (<i>Oxyeleotris lineolata</i>), mullet, sweetlip, grunter, and Squire (<i>Pagrus auratus</i>) with sharks, rays and eels caught with less frequency. While fishers are not permitted to retain product other than crabs under their crab fishery licences, anecdotal evidence suggests that a portion of the non-target catch is used to re-bait pots. The extent to which bycatch is used to re-bait pots is unknown but QDAF has stated that the quantities of bycatch taken from the fishery suggests that this represents more of a compliance risk than a sustainability risk (<a href="#">Jacobsen and Walton 2019</a>). Given there is no independent data collection and no provision for fishers to report bycatch, it is unclear how these estimates of bycatch are determined.</p>
<p><b>Assessment</b></p>	
<p><b>2.1.2</b> There is a risk analysis of the bycatch with respect to its vulnerability to fishing.</p>	<p><b>Partially meets</b></p> <p>The most recent ecological risk assessment considered bycatch to be at intermediate risk from the fishery (<a href="#">Jacobsen and Walton 2019</a>). The assessment also noted there were key knowledge gaps regarding risks to bycatch. QDAF has undertaken to address these gaps through its <i>Fisheries Queensland Monitoring and Research Plan</i> and is updating its ecological risk assessments to better guide ecological risk management in the fishery.</p> <p>The Department considers it important that risks be identified and managed in a precautionary manner as soon as possible. Ongoing assessment, monitoring and management of risk will also depend on having quality information. A system to ensure robust information is available should also be implemented.</p>
<p><b>Management responses</b></p>	
<p><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>	<p><b>Does not meet</b></p> <p>QDAF has published a guide to responsible crabbing (<a href="#">QDAF, 2010</a>) however this is primarily aimed at recreational fishers and does not mandate any measures that reduce risks to bycatch. QDAF is considering mandating the use of traps fitted with escape vents to reduce the bycatch of teleost fish and undersized crabs. Trials have been well-received by commercial fishers, but QDAF has advised these measures are still being considered and have not yet been progressed. QDAF will continue discussions with the Crab Fishery Working Group and other stakeholders in relation to the use of bycatch reduction devices, such as escape vents, in the commercial and recreational crab sectors.</p>

<p><b>2.1.4</b> An indicator group of bycatch species is monitored.</p>	<p><b>Does not meet</b></p> <p>No indicator species are monitored in the Mud Crab Fishery. It is possible that the new harvest strategy being developed by QDAF will include such monitoring. The Level 1 ERA completed in 2019 states that it is 'often difficult to identify measurable indicators or marine ecosystem processes' (<a href="#">Jacobsen and Walton 2019</a>) and does not nominate a suitable indicator group. The Level 2 ecological risk assessment for this fishery is expected to be completed by the end of 2020 and the harvest strategy is expected to be developed by the end of 2019 for implementation in the 2020 fishing season.</p>
<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>	<p><b>Does not meet</b></p> <p>No indicator species are being monitored in the Mud Crab Fishery and there are therefore no associated management triggers. It is possible that higher level ecological risk assessments and the harvest strategy still being developed will include triggers for indicator species. The Level 2 ecological risk assessment is expected to be completed by the end of 2020 and the harvest strategy is expected to be developed by the end of 2019 for implementation in the 2020 fishing season.</p>
<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>	<p><b>Partially meets</b></p> <p>The most recent (2019) ecological risk assessment for the fishery considered the risk to bycatch species as intermediate and will progress this issue through a Monitoring and Research Plan. Previous assessments by the Department recommended that QDAF investigate measures to allow escape of bycatch and reduce the risk of ghost fishing when gear is lost. QDAF has advised these measures are still being considered, but have not yet been progressed.</p> <p>Measures scheduled as part of the Queensland Government's Sustainable Fisheries Strategy 2017–2027 are expected to improve capacity and confidence in the management of bycatch.</p>
<p><b>Objective 2</b> - 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.</p>	
<p><b>Information requirements</b></p>	

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

### **Partially meets**

Commercial fishers are required to report all interactions with protected species using approved logbooks. Reported interactions are published in the Queensland Government's [Species of Conservation Interest \(SOCI\) quarterly reports from 2006](#). These reports show the following listed threatened species have interacted with pot and trap fishing gear since 2006, but do not differentiate interactions by fishery, so some may be attributable to other Queensland fisheries which use the same gear.

- Dugong (Marine- and Migratory-listed species)
- unspecified pelican and cormorant species (may include Marine-listed species)
- Saltwater and other unspecified crocodile species (Marine- and Migratory-listed species)
- Green and Hawksbill Turtle species (Vulnerable; Marine- and Migratory-listed species)
- Loggerhead Turtles (Endangered; Marine- and Migratory-listed species)
- unspecified freshwater and saltwater turtles (may include Vulnerable, Endangered, Marine- and Migratory-listed species)
- White-throated Snapping Turtle (Critically Endangered)
- unspecified sea snake species (may include Critically Endangered and Marine-listed species)
- Humpback Whale (Vulnerable; cetacean; Migratory-listed species)
- Short-finned Pilot Whale (cetacean)
- Freshwater (Largetooth) and Green Sawfish species (Vulnerable; Migratory-listed species).

Information is also published in Queensland Government marine wildlife strandings annual reports ([QDES 2017](#)). These reports show that in the period 19 October 2017 to 19 May 2018 there was at least one interaction with a mother Dugong and its calf, and at least 28 interactions reported with Green and other unidentified turtle species (GBRMPA unpublished excerpt from [Strandnet](#) database, February 2019).

The persistence of lost crabbing gear in the marine environment is also unquantified, although anecdotal information from fishers suggests it is at a low level ([QDAF, 2009](#)). Not all lost gear persists in the environment and fishers also suggest that, on average, lost pots would be unlikely to continue fishing after approximately one month due to degradation and sanding/weeding up of pots ([QDAF, 2009](#)). The most recent ERA indicated that risks to most categories of threatened species were low, with the exception of marine turtles, batoids (sawfishes). 'Marine habitats' were also considered at intermediate or high risk ([Jacobsen and Walton 2019](#)). Marine turtles, together with target and byproduct species, will be progressed to a Level 2 ERA to be completed by the end of 2020. Bycatch species, batoids and marine habitats will be progressed to a Monitoring and Research Plan ([Jacobsen and Walton 2019](#)).

It is important that there is confidence in the accuracy and reliability of fishery data used to manage ecological sustainability, and that all sources of mortality are accounted for. QDAF is investigating the use of electronic

monitoring solutions, which if implemented could help ensure an accurate record of all interactions. QDAF also has a compliance program which is capable of investigating and responding to any alleged misreporting. No threatened ecological communities have been identified in the area of the fishery.

**Assessments**

<p><b>2.2.2</b> There is an assessment of the impact of the fishery on endangered, threatened or protected species.</p>	<p><b>Meets</b></p> <p>Ecological risk assessments completed in 2006, 2009 and 2019 found marine turtles to be the protected species group most at risk from the Mud Crab Fishery (<a href="#">QDAF 2009</a>; <a href="#">Jacobsen and Walton 2019</a>). This was due to potential for entanglement in ropes or lines and possibility of direct capture in pots. These risks relate to gear that is in use, and gear that has been lost or discarded.</p> <p>Entanglement is considered to be a greater risk than direct capture, and Green Turtles are considered more at risk of entanglement than other turtle species. This is due to the Green Turtle's</p> <ul style="list-style-type: none"> <li>• greater abundance in the fishery area (and hence higher likelihood of interactions)</li> <li>• late reproductive maturity (26–40 years) compared to the other species</li> <li>• past evidence of interactions with crab pots.</li> </ul> <p>Although there were thought to be relatively low levels of interactions with turtles throughout the fishery, the total number of interactions can be greater in areas of high fishing effort, for example Moreton Bay.</p> <p>The consequence of capture through crab fishing on the Green Turtle population was considered to be high (QDAF 2009). Green Turtles may also be attracted to algae build-up on lost gear as algae is a part of their diet.</p> <p>The scale of gear loss and subsequent persistence in the environment is unquantified, but anecdotal information from fishers suggests it is at a low level. Gear is more likely to be lost in estuarine/mangrove areas where Green Turtle abundance is thought to be low.</p> <p>Given the low number of Green Turtle mortalities in most areas of the fishery the consequence on the population from these areas was thought to be negligible. However, in areas where greater levels of mortality or interaction have been recorded, such as Moreton Bay, a detectable change in population size and/or growth rate may be evident.</p> <p>QDAF is undertaking a series of ecological risk assessments to guide ecological risk management in the fishery. A Level 1 assessment completed in 2019 found that the risk to marine turtles was high, and will progress it to a Level 2 ERA (<a href="#">Jacobsen and Walton 2019</a>). A series of level 2 assessments will be completed by the end of 2020.</p> <p>The Department considers it important that risks be identified and managed in a precautionary manner as soon as possible. Ongoing assessment, monitoring and management of risk will also depend on the availability of quality information. A system to ensure robust information is available should also be implemented.</p> <p>Completion of the risk assessment and implementation of appropriate risk mitigation strategies to reduce interactions with protected species identified as being at risk must remain a priority for completion.</p> <p>QDAF is investigating the use of electronic monitoring solutions as part of its Sustainable Fisheries Strategy 2017–2027. If implemented electronic monitoring could help validate logbook records and ensure an accurate record of all interactions.</p>
<p><b>2.2.3</b> There is an assessment of the impact of the fishery on threatened ecological communities.</p>	<p><b>Not applicable</b></p> <p>No EPBC Act-listed threatened ecological communities were identified in the area of the fishery.</p>

<b>Management responses</b>	
<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>Partially meets</b></p> <p>Although fishers are allowed to use up to 100 pots, traps or dillies on each trip, these traps cannot be connected in groups of more than 10 at a time. This is likely to reduce the risk of entanglement for some bycatch species such as cetaceans.</p> <p>There do not appear to be any other measures used to reduce risks to protected species in the fishery, during fishing or in the event that fishing gear is lost. Entanglement of marine turtles in polyethylene mesh traps and bycatch of small teleost fishes, especially Yellowfin Bream, are unresolved issues in the Queensland MCF. QDAF has published a guide to responsible crabbing aimed at recreational and commercial fishers (<a href="#">QDAF, 2010</a>). There is currently no requirement for fishers to use traps fitted with escape vents in the Queensland MCF, although their introduction is being considered. Mortalities in non-commercial MCF sectors are possibly under-reported.</p> <p>A Level 1 ecological risk assessment for crab fisheries was completed in 2019. Level 2 assessments will be progressed for marine turtles and should provide better understanding of the risks and risk mitigation requirements for the fishery.</p> <p>The Department considers it important that risks be identified and managed in a precautionary way as soon as possible. A system to ensure robust information is available should also be implemented.</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>No EPBC Act-listed threatened ecological communities were identified in the area of the fishery.</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>Partially meets</b></p> <p>A Level 1 ecological risk assessment completed in 2019 found marine turtles to be at high risk (<a href="#">Jacobsen and Walton 2019</a>). Marine turtles will be progressed to a Level 2 ERA, which is due for completion by 2020. The planned Level 2 assessments for marine turtles and marine habitats should provide better understanding of the risks and risk mitigation requirements for the fishery.</p> <p>The Department considers it important that risks be identified and managed in a precautionary manner as soon as possible. A system to ensure robust information is available should also be implemented. Conditions outlined in Section 4 of this report are expected to address this issue and ensure the management arrangements have a high chance of avoiding mortality of, or injuries to, endangered, threatened or protected species, and avoiding or minimising impacts on threatened 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>Does not meet</b></p> <p>No ongoing information is collected on the fishery's impact on the ecosystem or environment generally, apart from ongoing clean-ups of discarded fishing gear, such as crab pots.</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> <p>1. Impacts on ecological communities</p> <ul style="list-style-type: none"> <li>• Benthic communities</li> <li>• Ecologically related, associated or dependent species</li> <li>• Water column communities</li> </ul> <p>2. Impacts on food chains</p> <ul style="list-style-type: none"> <li>• Structure</li> <li>• Productivity/flows</li> </ul> <p>3. Impacts on the physical environment</p> <ul style="list-style-type: none"> <li>• Physical habitat</li> <li>• Water quality</li> </ul>	<p><b>Partially meets</b></p> <p>No ongoing information is collected on the fishery's impact on the ecosystem or environment generally. A Level 1 ecological risk assessment completed in 2019 considered risks to ecosystem components, including risks associated with lost or discarded gear, ecological communities, physical habitats and water quality (<a href="#">Jacobsen and Walton 2019</a>). Risks to marine habitats were deemed intermediate/high and will be progressed to a Monitoring and Research Plan; risks to ecosystem processes were found to be low and will not be progressed further (<a href="#">Jacobsen and Walton 2019</a>).</p> <p>The Department considers it important that risks be managed in a precautionary manner as soon as possible.</p>
<p><b>Management responses</b></p>	
<p><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.</p>	<p><b>Partially meets</b></p> <p>Current management arrangements are likely to be sufficient to minimise impacts on the ecosystem more broadly, but progressing the Level 2 ecological risk assessments and implementing any necessary risk mitigation strategies should remain a priority for completion.</p>



<p><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.</p>	<p><b>Does not meet</b></p> <p>No ecological indicators have been identified and there is no harvest strategy, no assessment of risk to the ecosystem (other than for protected species), and no ecological risk management strategy or other framework for monitoring and responding the ecological impacts.</p> <p>A Level 1 risk assessment was published for this fishery in 2019 and Level 2 ERAs will be progressed for completion by the end of 2020 where they have been deemed necessary (QDAF 2019). These assessments will inform risk management measures that will be implemented via a harvest strategy which is expected to be finalised by the end of 2019 and implemented for the 2020 fishing season.</p>
<p><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.</p>	<p><b>Partially meets</b></p> <p>The management arrangements are likely to be sufficient to minimise the impact of fishing operations on the ecosystem but completion of Level 2 ecological risk assessments, the harvest strategy and other reforms scheduled under the Queensland Sustainable Fisheries Strategy 2017–2027 should remain a high priority to improve confidence in this capacity.</p>

### SECTION 3: ASSESSMENT OF THE QUEENSLAND MUD CRAB FISHERY 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

Section 176 Bioregional Plans	Comment
(5) Minister must have regard to relevant bioregional plans	<p>The Marine Bioregional Plan for the North Marine Region 2012 identifies the following key ecological features in the area of the Mud Crab Fishery: the Gulf of Carpentaria Basin, plateaus, submerged coral reefs and the coastal zone. The Plan lists the Gulf of Carpentaria Basin and coastal zone as regional priorities. 'Extraction of living resources' and 'physical habitat modification' are identified as pressures of potential concern to these key ecological features. Physical habitat modification is considered to be 'of concern' in relation to protected species such as Australian Snubfin, Indo-Pacific Bottlenose and Indo-Pacific Humpback Dolphins. Bycatch from commercial fisheries is also 'of potential concern' in relation to these dolphin species as well as to Dugongs, Flatback, Loggerhead and Olive Ridley Turtles.</p> <p>The Marine Bioregional Plan for the Temperate East Marine Region 2012 identifies three key ecological features in the southern part of the fishery: the upwelling off Fraser Island, the canyons on the eastern continental slope and the Tasmantid seamount chain. Extraction of living resources by commercial fishing was identified as a pressure of potential concern operating on these three key ecological features. However, the marine bioregional plan notes that the assessment was conservative in the context of active fisheries management. Bycatch by commercial fishing was also identified as a pressure of potential concern operating on the three key ecological features, with bycatch of marine turtles and Dugong also listed as a regional concern.</p> <p>Improving data collection and data validation in the fishery is considered important for managing potential risks to the North and Temperate East marine bioregions. The conditions proposed in Section 4 of this report seek to address these issues by requiring QDAF to improve data collection, risk assessment, monitoring and management of target and non-target species, including protected species.</p>

Part 13

<b>Accreditable plan, regime or policy (Division 1, Division 2, Division 3, Division 4)</b>	<b>Comment</b>
<p>s. 208A (1) (a-e), s.222A (1) (a-e), s.245 (1) (a-e), s.265 (1) (a-e) Does the fishery have an accreditable plan of management, regime or policy?</p>	<p><b>Yes</b> The Queensland Mud Crab Fishery is managed under the Queensland <i>Fisheries Act 1994</i> and the Fisheries Regulation 2008.</p>
<b>Division 1 Listed threatened species, Section 208A Minister may accredit plans or regimes</b>	<b>Comment</b>
<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></p> <p>Commercial fishers are required to report all interactions with listed threatened species to QDAF within a month of completing each fishing trip. This allows QDAF to monitor and respond to any emerging issues.</p> <p>Interactions have been reported between pot and trap fishing gears and the following listed threatened species:</p> <ul style="list-style-type: none"> <li>• Green and Hawksbill Turtle species (Vulnerable)</li> <li>• Loggerhead Turtles (Endangered)</li> <li>• unspecified freshwater and saltwater turtle species (may include Vulnerable and Endangered species)</li> <li>• White-throated Snapping Turtle (Critically Endangered)</li> <li>• unspecified sea snake species (may include Critically Endangered species)</li> <li>• Humpback Whale (Vulnerable)</li> <li>• Freshwater (Largetooth) and Green Sawfish species (Vulnerable).</li> </ul> <p>In the period 19 October 2017 to 19 May 2018 there were 28 interactions reported with Green and other unidentified turtle species (GBRMPA unpublished excerpt from <a href="#">Strandnet</a> database, February 2019).</p> <p>A recent ecological risk assessment found that overall the risk to listed threatened species was low (<a href="#">Jacobsen and Walton 2019</a>). Exceptions are marine turtles and batoids (sawfish), which will be subject to further QDAF assessment and management.</p> <p>Given the available information, the Department considers that all reasonable steps are being taken to prevent the killing or injury of listed threatened species. However, the Department considers that identified risks should be managed in a precautionary manner as soon as possible. Ongoing assessment, monitoring and management of risk will also depend on having quality information. A system to ensure robust information is available should also be implemented.</p>

	The conditions proposed in Section 4 of this report require QDAF to improve data collection, risk assessment, monitoring and management for species, including listed threatened species. The Department expects this will help clarify whether reported interactions with listed threatened species are accurate, and whether steps taken to mitigate death and injury to these species are sufficient.
(g) And, is the fishery likely to adversely affect the survival or recovery in nature of the species?	<b>No</b> The risk to listed threatened species is considered low except to marine turtles and batoids (sawfish), which will be subject to further QDAF assessment and management. Given the available information, the fishery is unlikely to adversely affect the survival or recovery in nature of any listed threatened species. Existing management measures, coupled with the conditions proposed in Section 4 of this assessment report are expected to manage risks to listed threatened species during the course of the proposed approval.
<b>Division 2 Migratory species, Section 222A 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 migratory species are not killed or injured as a result of the fishing?	<b>Yes</b> Commercial fishers are required to report all interactions with listed migratory species to QDAF within a month of completing each fishing trip. This allows QDAF to monitor and respond to any emerging issues. Interactions have been reported between pot and trap fishing gears and the following listed migratory species: <ul style="list-style-type: none"> <li>• Dugong</li> <li>• Saltwater Crocodile</li> <li>• Green and Hawksbill Turtle species</li> <li>• Loggerhead Turtles</li> <li>• unspecified freshwater and saltwater turtle species</li> <li>• Humpback Whale</li> <li>• Freshwater (Largetooth) and Green Sawfish species.</li> </ul> In the period 19 October 2017 to 19 May 2018 there was one interaction reported with a mother Dugong and its calf, and 28 interactions reported with Green and other unidentified turtle species (GBRMPA unpublished excerpt from <a href="#">Strandnet</a> database, February 2019). A recent ecological risk assessment found that overall the risk to listed migratory species was low ( <a href="#">Jacobsen and Walton 2019</a> ). Exceptions are marine turtles and batoids (sawfish), which will be subject to further QDAF assessment and management. Given the available information, the Department considers that all reasonable steps are being taken to prevent the killing or injury of listed threatened species. However, the Department considers that identified risks should be managed in a precautionary manner as soon as possible. Ongoing assessment, monitoring and management of

	<p>risk will also depend on having quality information. A system to ensure robust information is available should also be implemented.</p> <p>The conditions proposed in Section 4 of this report require QDAF to improve data collection, risk assessment, monitoring and management for species, including listed threatened species. The Department expects this will help clarify whether reported interactions with listed threatened species are accurate, and whether steps taken to mitigate death and injury to these species are sufficient.</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><b>No</b></p> <p>The risk to listed migratory species is considered low except to marine turtles and batoids (sawfish), which will be subject to further QDAF assessment and management. Given the available information, the fishery is unlikely to adversely affect the survival or recovery in nature of any listed migratory species. Existing management measures, coupled with the conditions proposed in Section 4 of this assessment report are expected to manage risks to listed migratory species during the course of the proposed approval.</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></p> <p>Commercial fishers are required to report all interactions with whales or other cetaceans to QDAF within a month of completing each fishing trip. This allows QDAF to monitor and respond to any emerging issues.</p> <p>Interactions have been reported between pot and trap fishing gears and Humpback and Short-finned Pilot Whales. However a recent ecological risk assessment determined that the fishery posed a low risk to cetaceans (<a href="#">Jacobsen and Walton 2019</a>).</p> <p>Given the available information, the Department considers that all reasonable steps are being taken to prevent the killing or injury of cetaceans. Ongoing assessment, monitoring and management of risk will however, depend on having quality information. A system should also be implemented to ensure robust information is available.</p> <p>The conditions proposed in Section 4 of this report require QDAF to improve data collection, risk assessment, monitoring and management for species, including whales or other cetaceans. The Department expects this will help clarify whether reported interactions with whales or other cetaceans are accurate and whether steps taken to mitigate death and injury to these species are sufficient.</p>
(g) And, is the fishery likely to adversely affect the conservation status of a species of cetacean or a population of that species?	<p><b>No</b></p> <p>The fishery is unlikely to adversely affect the survival or recovery in nature of any species of whale or other cetacean. Existing management measures, coupled with the conditions proposed in section 4 of this assessment report are expected to manage risks to whales or other cetaceans during the course of the proposed approval.</p>
<b>Division 4 Listed marine species, Section 265 Minister may accredit plans or regimes</b>	<b>Comment</b>

<p>(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>	<p><b>Yes</b></p> <p>Commercial fishers are required to report all interactions with listed marine species to QDAF within a month of completing each fishing trip. This allows QDAF to monitor and respond to any emerging issues.</p> <p>Interactions have been reported between pot and trap fishing gears and the following listed marine species:</p> <ul style="list-style-type: none"> <li>• Dugong</li> <li>• unspecified pelican and cormorant species (may include Marine listed species)</li> <li>• Saltwater and other unspecified crocodile species</li> <li>• Green and Hawksbill Turtle species</li> <li>• Loggerhead Turtles</li> <li>• unspecified freshwater and saltwater turtle species (may include Marine listed species)</li> <li>• unspecified sea snake species.</li> </ul> <p>In the period 19 October 2017 to 19 May 2018 there was one interaction reported with a mother Dugong and its calf, and 28 interactions reported with Green and other unidentified turtle species (GBRMPA unpublished excerpt from <a href="#">Strandnet</a> database, February 2019).</p> <p>In 2019 QDAF completed a Level 1 ecological risk assessment to guide ecological risk management in the fishery. Most categories of risk were found to be low and higher risk categories, such as marine turtles, will be refined through Level 2 assessments and the <i>Fisheries Queensland Monitoring and Research Plan</i> over the next three years (2019–2021).</p> <p>Given the available information, the Department considers that all reasonable steps are being taken to prevent the killing or injuring listed marine species. However, the Department considers that risks should be identified and managed in a precautionary manner as soon as possible. Ongoing assessment, monitoring and management of risk will also depend on having quality information. A system to ensure availability of robust information should also be implemented.</p> <p>The conditions proposed in Section 4 of this report require QDAF to improve data collection, risk assessment, monitoring and management for species, including listed marine species. The Department expects this will help clarify whether reported listed marine species interactions are accurate and whether adequate steps are being taken to mitigate death and injury to these species.</p>
<p>(g) And, is the fishery likely to adversely affect the conservation status of a listed marine species or a population of that species?</p>	<p><b>No</b></p> <p>The fishery is unlikely to adversely affect the survival or recovery in nature of any listed marine species.</p> <p>Existing management measures, coupled with the conditions proposed in section 4 of this assessment report are expected to manage risks to listed marine species during the course of the proposed approval.</p>

Section 303AA Conditions relating to accreditation of plans, regimes and policies	Comment
(1) This section applies to an accreditation of a plan, regime or policy under section 208A, 222A, 245 or 265.	The Department recommends the re-accreditation of the Mud Crab Fishery's management regime under sections 208A, 222A, 245 and 265.
(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: (a) during a particular period; or (b) while certain circumstances exist; or (c) while a certain condition is complied with. In such a case, the instrument of accreditation is to specify the period, circumstances or condition.	<p>The Department considers that the accreditation of the Queensland Blue Swimmer Crab Fishery management regime remains valid under sections 208A, 222A, 245 and 265, but should be re-made, subject to the following conditions:</p> <p><b>Condition 1</b>  The Queensland Department of Agriculture and Fisheries to:</p> <ol style="list-style-type: none"> <li>a. Develop risk mitigation strategies for marine turtles (identified as 'high' risk in the Level 1 assessment completed in 2019) by January 2021. Mitigation strategies to be implemented in parallel with the development of a harvest strategy for the fishery.</li> <li>b. Develop and publish Level 2 ERAs according to the Queensland Government ERA guidelines, and implement appropriate risk mitigation strategies.</li> </ol> <p>All precautionary risk management strategies should be developed and implemented in consultation with relevant experts and stakeholders, and performance should be monitored and reported annually to the Department of Environment and Energy.</p> <p><b>Condition 2</b>  Queensland Department of Agriculture and Fisheries to continue to work with crab fishery stakeholders to:</p> <ol style="list-style-type: none"> <li>a. Implement the relevant plans under Queensland's Sustainable Fisheries Strategy 2017–2027 to improve monitoring and reporting of protected species interactions by fishers in the commercial sector; and</li> <li>b. Implement a system to independently validate commercial fishery interactions with protected species.</li> </ol>
(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**

- (1) The objects of this Part are as follows:
- (a) to ensure that Australia complies with its obligations under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the Biodiversity Convention;
  - (b) to protect wildlife that may be adversely affected by trade;
  - (c) to promote the conservation of biodiversity in Australia and other countries;
  - (d) to ensure that any commercial utilisation of Australian native wildlife for the purposes of export is managed in an ecologically sustainable way;
  - (e) to promote the humane treatment of wildlife;
  - (f) to ensure ethical conduct during any research associated with the utilisation of wildlife; and
  - (h) to ensure the precautionary principle is taken into account in making decisions relating to the utilisation of wildlife.

<b>Section 303 CG Minister may issue permits (CITES species)</b>	<b>Comment</b>
<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> <li>(ii) the recovery in nature of any taxon to which the specimen belongs; or</li> <li>(iii) any relevant ecosystem (for example, detriment to habitat or biodiversity); and</li> </ul> </li> </ul>	<p><b>Not applicable</b></p> <p>The fishery is not permitted to harvest or trade in species listed under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). While the fishery is known to interact with some these species, the Department considers that the fishery will not be detrimental to their survival given existing management arrangements to monitor and manage impacts on these species in the fishery, and the conditions proposed in section 4 of this assessment report. Therefore, no assessment of the fishery’s impact on specimens listed under CITES has been conducted.</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><b>Applicable</b></p> <p>The Department recommends that specimens that are or are derived from fish or invertebrates taken in the Queensland Mud Crab Fishery, as defined in the management regime in force under the <i>Fisheries Act 1994</i> (Queensland) and Fisheries Regulation 2008 (Queensland), but not including:</p> <p>a. specimens that belong to eligible listed threatened species, as defined under section 303BC of the EPBC Act, or</p> <p>b. specimens that belong to taxa listed under section 303CA of the EPBC Act (Australia's CITES List)</p> <p>be included in the list of exempt native specimens subject to the following conditions:</p> <p>c. the specimen, or the fish or invertebrate from which it is derived, was taken lawfully; and</p> <p>d. the specimens are covered by the declaration of an approved wildlife trade operation under section 303FN of the EPBC Act in relation to the fishery.</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 for the reassessment of the Queensland Mud Crab Fishery Wildlife Trade Operation approval under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> from QDAF was made available on the Department's website from 28 August 2018 until 29 September 2018. One comment was received.</p>

Section 303FN Approved wildlife trade operation	Comment
(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.	The fishery is eligible for declaration as an approved wildlife trade operation.
(3) The Minister must not declare an operation as an approved wildlife trade operation unless the Minister is <b>satisfied</b> that:  (a) the operation is consistent with the objects of Part 13A of the Act; and	<b>Meets</b> The operation of the fishery is consistent with Objects of 13A – see assessment against the Guidelines (Section 2).
(b) the operation will not be detrimental to: (i) the survival of a taxon to which the operation relates; or (ii) the conservation status of a taxon to which the operation relates; and  (ba) the operation will not be likely to threaten any relevant ecosystem including (but not limited to) any habitat or biodiversity; and	<b>Meets</b> The fishery 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.
(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	<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.
(d) such other conditions (if any) as are specified in the regulations have been, or are likely to be, satisfied.	<b>Not applicable</b> No other conditions are specified in relation to commercial fisheries in the EPBC Regulations.

<p>(4) In deciding whether to declare an operation as an approved wildlife trade operation the Minister must have regard 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 fishery will not have a significant impact on any relevant ecosystem within the period of the new export declaration, given the management measures in place, which include the arrangements described above at s303FN 3(b).</p> <p>The management arrangements include; limited entry, spatial closures, gear restrictions and are introducing total allowable commercial catch limits.</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 fishery, as outlined 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 regard 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 fishery will be managed under the Queensland <i>Fisheries Act 1994</i> and the Queensland Fisheries Regulation 2008, which apply throughout Queensland waters and is considered 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 fishery is a commercial fishery.</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> <ul style="list-style-type: none"> <li>(a) setting out the proposal to make the declaration; and</li> <li>(b) setting out sufficient information to enable persons and organisations to consider adequately the merits of the proposal; and</li> <li>(c) inviting persons and organisations to give the Minister, within the period specified in the notice, written comments about the proposal.</li> </ul> <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 fishery an approved wildlife trade operation was released for public comment on 28 August 2018 until 29 September 2018, a total of 22 business days. One comment was received.</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><b>Meets</b></p> <p>One public comment was received and considered in preparation of this assessment report. The submission claimed that the assessment of the fishery failed to address the impact it would have on maintenance of Indigenous fishing practices. QDAF felt that the issues raised related to a perceived deficiency in the EPBC Act and therefore were the responsibility of the Department of the Environment and Energy. The Department assesses only the fishery's sustainability and whether all sources of mortality have been considered in managing the commercial sector. The Department does not manage the non-commercial sector and does not seek to influence sharing or allocation of resources among sectors.</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 fishery 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  (b) while certain circumstances exist; or  (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 Guidelines.</li> </ul> <p>The wildlife trade operation instrument for the Queensland Mud Crab Fishery specifies the standard and any additional conditions applied.</p>
<p>(8) A condition may relate to reporting or monitoring.</p>	<p><b>Meets</b>  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>
<p>(11) A copy of an instrument under section 303FN, or this section is to be made available for inspection on the internet.</p>	<p><b>Meets</b>  The wildlife trade operation instrument for the Queensland Mud Crab Fishery 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.</p>

## 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>The precautionary principle was applied in the assessment of the fishery. The Department considers further progress is required to address uncertainty around status of some stocks and impacts of localised fishing effort. Reforms, underway as part of the Queensland Government's Sustainable Fishery Strategy 2017–2027, are expected to significantly improve capacity to identify and manage risks. Conditions recommended in section 4 of this assessment reflect the need to progress these reforms.</p>

## SECTION 4: QUEENSLAND MUD CRAB FISHERY – SUMMARY OF ISSUES REQUIRING CONDITIONS, MAY 2019

### Part 13A

Issue	Condition
<p><b><u>General Management</u></b></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 to the management regime and assess whether 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 Queensland Mud Crab Fishery will be carried out in accordance with the management regime in force under the <i>Fisheries Act 1994</i> (Queensland) and Fisheries Regulations 2008 (Queensland).</p> <p><b>Condition 2</b></p> <p>The Queensland Department of Agriculture and Fisheries to inform the Department of the Environment and Energy of any intended material changes to the Queensland Mud Crab Fishery management arrangements that may affect the assessment against which <i>Environment Protection and Biodiversity Conservation Act 1999</i> decisions are made.</p>
<p><b><u>Annual Reporting</u></b></p> <p>It is important that annual reports be submitted to the Department to allow monitoring and assessment of the fishery's performance, progress in implementing the conditions and recommendations in this report, and other managerial commitments, throughout the life of the declaration. Annual reports should follow Appendix B to the <i>Guidelines for the 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 and recommendations. Electronic copies of the guidelines are available from the Department's website at <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 Queensland Department of Agriculture and Fisheries 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><b><u>Ecological Risk Assessment and Risk Mitigation</u></b></p> <p>An ecological risk assessment of the Mud Crab Fishery was undertaken in 2006, and updated to include an assessment of protected species in 2009. A Level 1 ERA completed in 2019 also considered protected species, as well as risks associated with lost or discarded fishing gear, bycatch species, byproduct species, the environment and ecosystems (<a href="#">Jacobsen and Walton 2019</a>). The 2019 Level 1 ERA identified low or intermediate risks to most protected species affected by the fishery. Level 2 ERAs will be progressed for higher risk categories, such as marine turtles and marine habitats. Batoids (sawfish) and marine habitats will be progressed through the <i>Fisheries Queensland Monitoring and Research Plan</i> (<a href="#">Jacobsen and Walton 2019</a>).</p> <p>QDAF has committed to undertake and publish ecological risk assessments for all fisheries according to the following Queensland government’s ecological risk assessment guidelines (<a href="https://www.daf.qld.gov.au/business-priorities/fisheries/sustainable/sustainable-fisheries-strategy/ecological-risk-assessment-guidelines">https://www.daf.qld.gov.au/business-priorities/fisheries/sustainable/sustainable-fisheries-strategy/ecological-risk-assessment-guidelines</a>):</p> <ul style="list-style-type: none"> <li>• Level 2 ERA (species of conservation concern including protected species and identified shark species) by December 2019</li> <li>• Level 2 ERA (target and byproduct species) during 2019–2020</li> <li>• Level 2 ERA (bycatch species) during 2020–2021.</li> </ul> <p>The guidelines seek to refine risk ratings through progressive assessments, differentiate between ‘real’ and ‘potential’ risks, and address risks through harvest strategies and fisheries working groups.</p> <p>The Department considers it crucial that all ‘real’ and ‘potential’ risks be managed in a precautionary manner throughout the process, based on the best available information. These precautionary risk management strategies should be developed and implemented in consultation with relevant experts and stakeholders, and performance monitored and reported annually to the Department. Risk mitigation measures should be consistent with all relevant threat abatement plans, recovery plans, the National Policy on Fisheries Bycatch and bycatch action strategies.</p> <p>Ongoing assessment, monitoring and management of risk will also depend on having quality information. A system to ensure robust information is available should also be implemented. This is addressed under <b><u>Condition 6</u></b>.</p>	<p><b>Condition 4</b></p> <p>The Queensland Department of Agriculture and Fisheries to develop and publish Level 2 ecological risk assessments (ERA) according to the Queensland Government ERA guidelines, and implement appropriate risk mitigation strategies by 2021.</p> <p>All precautionary risk management strategies should be developed and implemented in consultation with relevant experts and stakeholders, and performance should be monitored and reported annually in accordance with <b>Condition 3</b>.</p>



Issue	Condition
<p><b><u>Harvest Strategies</u></b></p> <p>The Queensland <i>Fisheries Act 1994</i> and Fisheries Regulation 2008 (the Regulation) set out the overarching objectives and guidance for managing fisheries, including authorities to take fish and various input and output controls for fisheries.</p> <p>Harvest strategies provide a transparent, evidence-based framework to avoid overfishing, recover overfished stocks and ensure fisheries remain sustainable. In doing so, harvest strategies provide the Australian community with confidence that commercial fisheries are being managed for long-term biological sustainability and economic profitability, and provide the fishing industry with a more certain operating environment.</p> <p>The Queensland Government's Harvest Strategy Policy and associated Guidelines require harvest strategies for Queensland fisheries to account for all sources of mortality on species, and address the fishing activities of all sectors; commercial, recreational and traditional (<a href="https://www.daf.qld.gov.au/business-priorities/fisheries/sustainable/sustainable-fisheries-strategy/harvest-strategy">https://www.daf.qld.gov.au/business-priorities/fisheries/sustainable/sustainable-fisheries-strategy/harvest-strategy</a>). This includes management of fishing-related risks to target, byproduct and bycatch species, threatened, endangered and protected species, and habitats, identified through ecological risk assessments. Risk management actions may include fishing catch or effort quotas, spatial closures or gear restrictions. QDAF anticipates developing and implementing a harvest strategy for the Mud Crab Fishery by the end of 2019, for implementation in 2020, and anticipates that the harvest strategy will provide for individual transferable quotas and total allowable commercial catch limits for mud crabs in the fishery.</p> <p>The Department considers it important that the harvest strategy includes decision rules and reference points that trigger management actions to mitigate risks to target and non-target species and in particular protected species that have been identified as high risk in the ecological risk assessment process.</p> <p>The Department also considers it important that the harvest strategy, or suitable interim measures be implemented as soon as possible, to ensure that species are not subject to overfishing, and that any stocks that have been assessed as overfished are recovered to ecologically sustainable levels as soon as practicable. Where possible, reference points, triggers and timeframes for recovery should be specified and triggers for harvest controls should consider all sources of mortality on a stock.</p> <p>Where appropriate the harvest strategy should consider any risks associated with localised depletion and overall population decline.</p> <p>Ongoing assessment, monitoring and management of risk will depend on having quality information. The Department considers it important that a system to ensure robust information is available is implemented, and that risks be identified and managed in a precautionary way as soon as possible. Risk mitigation measures should be consistent with all relevant threat abatement plans, recovery plans, the National Policy on Fisheries Bycatch, and bycatch action strategies. This is addressed under <b><u>Condition 6</u></b>.</p>	<p><b>Condition 5</b></p> <p>The Queensland Department of Agriculture and Fisheries to implement a harvest strategy that monitors and manages impacts associated with the Mud Crab Fishery on target, byproduct and bycatch (including protected species), by the end of 2019, for implementation in 2020.</p> <p>The harvest strategy must include decision rules and reference points that trigger management actions to ensure the fishery remains ecologically sustainable. Performance against this strategy must be included in annual reports specified at <b>Condition 3</b>.</p>

Issue	Condition
<p><b><u>Reliable fisheries data collection, validation and monitoring</u></b></p> <p>Accurate identification and reporting of retained and discarded catch is crucial to ensure the impacts of fishing can be assessed, monitored and managed sustainably.</p> <p>Commercial fishers are required to report all retained commercial catch of Mud Crabs and Blue Swimmer Crabs using logbooks. However, there is little or no provision for reporting byproduct species and, other than protected species interactions, no information is collected on discarded catch. The Department notes that there is also currently no independent data collection undertaken for this fishery.</p> <p>Work has commenced under the Queensland Government’s Sustainable Fisheries Strategy 2017–2027 to help ensure sufficient information is collected, to monitor and assess the fishery’s impact on target and non-target species (including protected species), with a high degree of confidence. Actions under the strategy include:</p> <ul style="list-style-type: none"> <li>• Develop a fisheries monitoring and research plan to outline standards for improved data collection and guide the identification of data needs, resources and priorities to support the implementation of this strategy (Action 1.1).</li> <li>• Undertake additional monitoring of key biological stocks to better understand fishery performance and support management actions in a more timely way (Action 1.2).</li> <li>• Develop partnerships to trial the use of novel technologies for fisheries monitoring, such as apps, robotic vision, spatial interfaces and mapping, social media and citizen science (Action 1.3).</li> <li>• Develop and implement a data validation plan to provide: <ul style="list-style-type: none"> <li>○ mechanisms to independently validate data on catch and interactions with protected species</li> <li>○ education programs to improve submission of accurate catch data (include promoting a move to electronic logbooks)</li> <li>○ robust systems for checking and forensically analysing incoming data (Action 1.4).</li> </ul> </li> </ul> <p>The timeline and mechanism for introducing electronic or other monitoring programs remains unclear and will be informed by Queensland’s ongoing trials.</p> <p>The Department considers that accurate identification, data collection and reporting is important to ensure there is appropriate data to assess, monitor and manage fishery impacts on all retained and discarded species, as well as interactions with protected species.</p> <p>It is important that all sources of mortality are accounted for in determining sustainable harvest levels for all sectors, and to subsequently manage the allowable catch for the commercial fishery. The sustainability of any harvest of byproduct species should also be monitored and managed to ensure it remains sustainable.</p>	<p><b>Condition 6</b></p> <p>By January 2020 the Queensland Department of Agriculture and Fisheries to implement foundational reforms (actions 1.1-1.4) identified in the Queensland Government’s Sustainable Fisheries Strategy 2017–2027 for the Mud Crab Fishery, and collect sufficient accurate and reliable data to monitor and assess the fishery’s impact on target and non-target species, including protected species, with a high degree of confidence.</p> <p><b>Condition 7:</b></p> <p>The Queensland Department of Agriculture and Fisheries progress the development and implementation of an independent data collection and validation program including:</p> <ol style="list-style-type: none"> <li>a. Assess feasibility and complete proof of concept trials for electronic monitoring by December 2019.</li> <li>b. Implement an independent data collection and validation program in the Mud Crab Fishery from January 2021 (this may include electronic monitoring or alternative interim solutions).</li> </ol>

Issue	Condition
<p><b><u>Improve monitoring and mitigation measures for protected species</u></b></p> <p>Entanglements of species such as Dugong, marine turtles and inshore dolphins occur with crabbing gear and have the potential to increase in frequency. Current licence conditions require commercial fishers to record interactions with protected species in logbooks (SOCl logbooks). However, mortalities in non-commercial Mud Crab Fishery sectors are possibly under-reported.</p> <p>Previous ecological risk assessments for the fishery (2009) allocated a 'moderate' risk rating to fishing activity and gear loss as the primary risk to protected species. Recent measures which include zoning restrictions on C1 licences may reduce this risk. A Level 1 ecological risk assessment (ERA) completed in 2019 allocated a 'low', 'intermediate' or 'low/intermediate' risk rating to most categories of protected species; marine turtles were the only category of threatened species to be deemed 'high' risk (<a href="#">Jacobsen and Walton 2019</a>).</p> <p>The Department acknowledges the significant progress QDAF has made through the <i>Queensland Sustainable Fisheries Strategy 2017–2027</i> to improve monitoring and mitigation measures for the fishery. These measures include:</p> <ul style="list-style-type: none"> <li>• Commencing the ecological risk assessment process for the Mud Crab Fishery to investigate its impact on target and non-target species. Level 2 assessments are due for completion in 2020.</li> <li>• A published monitoring and research plan.</li> <li>• A published data validation plan.</li> <li>• Introduction of vessel tracking (VMS) for all Mud Crab Fishery vessels from 1 January 2019.</li> <li>• Proof of concept trials to assess feasibility for electronic monitoring across all gear types in crab fisheries (this has been started for the Spanner Crab fishery).</li> </ul> <p>QDAF has noted in their progress against the previous conditions they will continue to work with the Crab Fisheries Working Group to identify options for mitigating the risk of interactions with protected species.</p> <p>The Department considers it important that QDAF identify any underreporting of interactions with, and mortality of, EPBC Act-listed protected species through the data validation and independent monitoring process, and incorporate any findings into the crab fisheries management arrangements.</p>	<p><b>Condition 1</b></p> <p>The Queensland Department of Agriculture and Fisheries to:</p> <ol style="list-style-type: none"> <li>a. Develop risk mitigation strategies for marine turtles (identified as 'high' risk in the Level 1 assessment completed in 2019) by January 2021. Mitigation strategies to be implemented in parallel with the development of a harvest strategy for the fishery.</li> <li>b. Develop and publish Level 2 ecological risk assessments (ERA) according to the Queensland Government ERA guidelines, and implement appropriate risk mitigation strategies.</li> </ol> <p>All precautionary risk management strategies should be developed and implemented in consultation with relevant experts and stakeholders, and performance should be monitored and reported annually to the Department of Environment and Energy.</p> <p><b>Condition 2</b></p> <p>Queensland Department of Agriculture and Fisheries to continue to work with crab fishery stakeholders to:</p> <ol style="list-style-type: none"> <li>a. Implement the relevant plans under Queensland's Sustainable Fisheries Strategy 2017–2027 to improve monitoring and reporting of protected species interactions by fishers in the commercial sector; and</li> <li>b. Implement a system to independently validate commercial fishery interactions with protected species.</li> </ol>

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