

ENVIRONMENTAL MANAGEMENT SYSTEM

NORTHERN TERRITORY

Mud Crab Fishery

ENVIRONMENTAL
MANAGEMENT
SYSTEM

A VOLUNTARY,
INDUSTRY DRIVEN,
ENVIRONMENTAL
INITIATIVE



This EMS was developed by the
Northern Territory Mud Crab Fishery in 2012

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INTRODUCTION

An Environmental Management System, or EMS, is a formal process used for addressing the issues or risks with potential to affect the environmental sustainability of an activity. The EMS model is based on a philosophy of continuous improvement – that is, recognising current performance measured against set requirements, and then working towards realistic and achievable improvements for the future.

The benefit for commercial fisheries in developing an EMS is that it provides an organised, documented and coordinated approach to both improving and demonstrating environmental responsibility. Other benefits that can be gained from having an EMS, include: reduced operating costs, higher product prices from having a clean, green image, ability to portray a positive public image of the industry, capacity within industry to improve compliance levels across operators, and most importantly, helping to ensure the long term sustainability of the fishery by reducing or preventing identified negative impacts on the environment.

Mud Crab Fishery operators have an interest in maintaining pristine ecosystems, working responsibly and maintaining economic benefits by avoiding activities that contribute to product loss. They have practically demonstrated their commitment by voluntarily participating in this formal EMS process.

This EMS is available to download from the Northern Territory Seafood Council (NTSC) website:

www.ntsc.com.au

VISION

To responsibly conduct the harvesting of resources in the Northern Territory Mud Crab Fishery on behalf of the community to ensure continued resource and ecological sustainability, and economic viability.

GOALS

- To identify and assess potential environmental impacts and risks concerning the fishery, their likelihood of occurrence and predicted consequences.
- To identify and assess aspects of the fishery with the potential to lead to negative public perceptions regarding its environmental sustainability.
- To provide fishery operators with a defined set of actions to reduce those risks and improve the fishery.
- To provide an ongoing process for the EMS and the environmental performance of the fishery to be continually reviewed and improved.
- To improve public perception of the fishery and promote the environmental responsibility of the industry.



OBJECTIVES

- Ensure compliance with relevant legislation.
- Minimise wastage of retained species and ensure sustainability of the fishery.
- Minimise interactions with and impacts on non-retained species.
- Minimise interactions with wildlife and protected species.
- Minimise impacts on the environment.
- Be aware of, and where possible, manage external risks to the fishery.



DEVELOPMENT

This EMS is based on a risk analysis of the Northern Territory Mud Crab Fishery. The EMS identifies risks, ranks them as low, moderate or high and sets out potential control measures and actions to reduce or remove the risk. This EMS complements and strengthens the fishing industry Code of Conduct and the Northern Territory Mud Crab Fishery Code of Practice.

IMPLEMENTATION

The EMS organisation (NTSC and SeaNet) will work with an annually elected EMS team in assisting in the adoption and continued adherence to the EMS, including informing industry of risk management measures and identifying and recording contraventions.



REVIEW

In accordance with the concept of continuous improvement, the performance of this EMS will be reviewed annually and improved as required. The review will:

- Be conducted by the EMS organisation in consultation with the EMS team.
 - Seek feedback from individual fishers, relevant Government agencies and other stakeholder groups with an interest in the fishery.
 - Develop an annual report template for use at annual industry meetings.
 - Include information on instances of fishery operators not complying with the EMS and formulate a response to the non-compliance.
 - Provide an annual EMS summary report to be distributed to all NT Mud Crab Licensee Committee members and made available to other stakeholders, including all current NT Mud Crab licence lessees.
- Take into consideration any change which might have affected the fishery since the implementation of the EMS or any previous review. This could include changes in management, new scientific information, new techniques or technologies to improve fishing practices, and new risks threatening the environmental sustainability of the fishery.



THE MUD CRAB FISHERY

The Northern Territory Mud Crab Fishery operates in tidal waters between the West Australian and Queensland borders, with most activity concentrated in the Gulf of Carpentaria. Commercial crabbing is not permitted in Darwin Harbour and in most creeks adjoining Shoal Bay, Leaders Creek, the waterways of Kakadu National Park and sacred sites.

The fishery targets the Mud Crab *Scylla serrata*. After capture, live mud crabs are generally transported to Darwin, graded, packed and then flown directly to Australian and international markets.

Many commercial fishers work from remote locations under difficult environmental conditions and limited, if any, infrastructure. Crab pots are baited with fresh meat or fish, and set in estuarine or coastal waters. The majority of crab fishers work from 5 to 6.2 metre outboard powered dinghies and have permanent or semi-permanent land-based camps where live crabs are stored prior to transport to Darwin.



The fishery is operational all year round, however due to weather conditions, very little commercial crabbing occurs during January and February. To assist in maintaining a sustainable fishery, size restrictions are in place for both male and female crabs in addition to a ban on taking females with eggs.

Commercially Unsuitable Crabs or CUCs (“empty” crabs or those with a low meat content) are not allowed to be taken to reduce mortality during transport and to help maintain the reputation and high market value of NT Mud Crabs.

There is little byproduct and bycatch in the Mud Crab Fishery due to the highly selective gear used to target large Mud Crabs.



The NT Mud Crab Fishery has been assessed by the Commonwealth Department of Sustainability, Environment, Water, Population and Communities as being ecologically sustainable for export, under Australian guidelines based on the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

The assessment demonstrated that the fishery was managed in a manner that does not lead to overfishing, and that the fishing operations have minimal impact on the structure, productivity, function and biological diversity of the ecosystem. The fishery is reassessed periodically by the Department's Sustainable Fisheries Section.



RISK IDENTIFICATION AND ACTION PLAN

This EMS is based on a risk analysis of the fishery. In a risk analysis, threats are identified, their likelihood of occurrence is estimated, and the consequences predicted. Each risk can then be ranked as low, moderate or high based on the likelihood and occurrence. A further step can be taken by identifying potential control measures and actions that could be taken to reduce the risk. This gives industry a defined set of strategies to improve the fishery and demonstrate the benefits of self-regulation.

Risks can be divided into internal and external. Risks which industry members have a direct influence over are internal risks and can be managed to improve the fishery. External risks will be more difficult for industry to manage alone.

This risk identification and analysis not only considers the actual risks to the environment, but also considers the perceived risks an action or threat may have on public opinion about the fishery. A threat, which may have a low risk when considered purely scientifically, could end up being ranked moderate or high due to the influence of public perception.

The following table, Risk Identification and Action Plan, briefly outlines the risks identified by industry as having the potential to adversely affect the environment and/or negatively influence public opinion regarding the environmental impacts of the industry. A more detailed assessment is given in the Risk Analysis section starting on page 25.



TABLE 1: RISK IDENTIFICATION AND ACTION PLAN

Risk	Justification for inclusion of risk, and potential control measures and actions required to reduce the risk	Person or agency responsible to help reduce the risk
Legislation		
Non-compliance with regulations	<p>Although English is a second language for many operators in the fishery, awareness of legislation is very high.</p> <p>When non-compliance does occur it can significantly impact on public opinion and lead to actions by decision makers, with negative consequences for the fishery.</p> <p>ACTIONS:</p> <ul style="list-style-type: none"> • Crabbers and general public to report non compliance. • Ensure all new entrants and former crabbers re-entering the fishery go through a formal induction process that outlines legislative and industry responsibilities. • Licence owners should advise lessees of regulations annually and of changes to regulations as they occur. • Licence lessees should ensure they continue to have access to information regarding the fishery and the rights and responsibilities of crabbers. 	<ul style="list-style-type: none"> • All Crabbers • Licence owners • Traders/Processors • NTSC • SeaNet NT • NT Fisheries / Compliance • General Public

- NT Fisheries consider broadening mailing list to include trader/processors in mail outs relating to relevant legislative information.
- Information to be delivered to industry in an appropriate manner.
- Ensure the Code of Practice and the Environmental Management System (EMS), designed to encourage good fishing practices, are widely distributed across industry, other stakeholders and decision makers.

NTSC:
*Northern Territory
Seafood Council*

Risk

Justification for inclusion of risk, and potential control measures and actions required to reduce the risk

Person or agency responsible to help reduce the risk

Retained Species

Unsustainable depletion of target and/or by-product species as a result of commercial over fishing *

Environmental factors have the most influence on abundance of mud crabs in the fishery. However industry has supported and instigated numerous measures to minimise the chance of overfishing of target and non target species in the fishery.

ACTIONS:

- Ensure industry has a lead role in the assessment and decision making processes that determine fishery management arrangements.
- Lead industry initiated and supported Research, Development and Extension (RD&E), especially research that can better identify environment/abundance links.
- Ensure that the most up to date environmental, fishing and handling practices are extended across industry by widely distributing the Code of Practice and EMS.
- Promote industry-led initiatives such as the Code of Practice and EMS to other stakeholders and decision makers to demonstrate the environmental responsibility of the fishery.

- All Crabbers
- Licence Owners
- Traders/Processors
- NTSC
- SeaNet NT
- NT Fisheries

* **Note** Fisheries management arrangements are the responsibility of NT Fisheries, however industry has a role in the management process, to provide accurate data and influence public opinion.

- Support and provide information on Commercially Unsuitable Crab (CUC) provisions and other measures to continue to improve survivability of Mud Crabs along the supply chain.
- Support and assist the development of pot modifications in the fishery to improve environmental performance.
- Utilise legal catch taken in bait nets to avoid wastage.

RD&E:
*Research,
Development and
Extension*

Risk

Justification for inclusion of risk, and potential control measures and actions required to reduce the risk

Person or agency responsible to help reduce the risk

*Retained Species (continued)***Loss of catch due to poor handling practices**

Industry-led handling measures and fishing practices have been implemented to maximise Mud Crab and by-product quality as well as increase economic return to industry and the community. Measures such as the Commercially Unsuitable Crab (CUC) provisions, outlined in the Code of Practice, have reduced industry losses along the supply chain. The recreational sector could benefit from similar information and education.

ACTIONS:

- Adhere to the Mud Crab Fishery Code of Practice to ensure live mud crabs reach the market in the best possible condition.
- Ensure that the most up to date fishing and handling practices are extended across industry.
- Widely distribute the Code of Practice and EMS to improve industry performance and the perceptions of the general public and decision makers.
- Lead industry initiated and supported RD&E to maximise product quality and economic return.

- All Crabbers
- Licence Owners
- Traders/Processors
- NTSC
- SeaNet NT
- RD&E Providers

Non-Retained Species

Death of bycatch before or after release

The commercial fishery has negligible bycatch and has been developed as such through gear, operational and regulatory controls. Bycatch is avoided for both ecological and economical reasons. Wasted bycatch also contributes to negative public perception of the fishery.

ACTIONS:

- Adhere to the Mud Crab Fishery Code of Practice.
- Set gear in areas and at times to minimise bycatch.
- Support and assist the development of modifications of pots in the fishery to improve environmental performance.
- Release any unwanted bycatch quickly to maximise its chances of survival.

- All Crabbers
- Licence Owners, NTSC and SeaNet NT to monitor and adjust the CoP and EMS to continually improve industry performance



Interactions with Wildlife

Interactions with protected species

The fishery has negligible interactions with protected species and has been developed as such through gear, operational and regulatory controls. Northern Territory commercial crab pots are highly selective and designed to avoid any wildlife interactions. Bait net designs, fishing methods and legislation governing their use are designed to avoid wildlife interactions.

ACTIONS:

- Support and assist the development of modifications of pots in the fishery, including those used in the recreational sector, to improve environmental performance.
- Report interactions and record in logbooks.
- In the unlikely event of interaction with wildlife, follow best practice guidelines as outlined in the *Protected Species Awareness Information* sheets (available from the NTSC office or website).

- All Crabbers
- Licence Owners, NTSC and SeaNet NT to monitor and adjust the CoP and EMS to continually improve industry performance
- NTSC to ensure *Protected Species Awareness Information* sheets are readily available to fishers and licensees

Impacts on the Environment by the Fishery

Lost or discarded fishing equipment or other marine debris, including debris or waste originating from camps

Commercial operators can lose pots due to large tides poor weather or boat strike. Pots lost at sea are designed to break down in a short period of time.

Marine debris originating from elsewhere or other sectors can mistakenly be attributed to the local industry and lead to negative perceptions by the general public and decision makers.

ACTIONS:

- Adhere to the Mud Crab Fishery Code of Practice.
- Retrieve lost gear where possible.
- Dispose of unusable crab pots, bait nets and other rubbish appropriately at camp or proper disposal sites.
- Retrieve 'ghost nets' or other marine rubbish if possible or report to Fishwatch if unable to retrieve (1800 891 136).
- Maintain camps in good condition and avoid the accumulation of discarded fishing equipment, other wastes and debris.
- At season's end, camps should be made sound, or removed, to minimise environmental impacts from the loss of gear or debris into the environment.

- All Crabbers

Risk

Justification for inclusion of risk, and potential control measures and actions required to reduce the risk

Person or agency responsible to help reduce the risk

*Impacts on the Environment by the Fishery (continued)***Spread of introduced marine and other pests within the NT**

There are currently no known introduced marine pests within NT coastal waters, but there is always the possibility of marine pests being introduced by vessels coming from other areas.

Other pests in the form of feral animals and plants can cause significant ecological impacts that affect estuarine and marine environments.

ACTIONS:

- Follow the Best Practice Guidelines outlined by the National System for the Prevention and Management of Marine Pest Incursions.
- Use local seafood product for bait.
- Use feral animals (donkeys, horse, buffalo, pig) for bait to assist feral animal reduction programs.
- Report any suspected marine pests to NT Aquatic Biosecurity.

- All Crabbers

Damage to water quality from chemical or fuel spill

Chemicals are generally not used in the fishery. The Code of Practice covers the safe and appropriate handling and storage of chemicals and fuel.

- All Crabbers
- Transporters

ACTIONS:

- Adhere to the Mud Crab Fishery Code of Practice.
- Store chemicals, fuel and oil safely and securely.
- Maintain vessels to prevent pollution from fuel use.
- Collect used oil for disposal at onshore facilities.
- Follow safe fuel transfer procedures when refuelling, and maintain a spill kit for emergencies.

Impacts on seabed or substrate

Due to the benign gear and methods used in the fishery there is limited interaction with the seabed or substrate.

- All Crabbers

ACTIONS:

- Conduct fishing operations to ensure substrate damage is avoided.
- Use responsible boating practices to minimise impacts.
- Assess environmental performance and modify gear or practices if necessary.



Risk

Justification for inclusion of risk, and potential control measures and actions required to reduce the risk

Person or agency responsible to help reduce the risk

External Risks with Potential to Impact the Fishery

Although difficult to control, external factors have the potential to affect health of the marine environment that supports the Mud Crab Fishery, or to influence management decisions regarding resource access and allocation. External factors are largely beyond the control of Mud Crab Fishery operators, however the actions identified are still an important guide to best practice for the fishery and other stakeholders.

Area closures*

Commercial fishing is perceived as having a significant impact on marine resources, regardless of good management, and this can lead to loss of access for commercial fishers.

ACTIONS:

- Ensure that any area reduction programs are conditional on appropriate effort reduction (not redistribution) in the fishery.
- Improve the profile of the industry within the wider community.
- Follow good fishing practices as outlined in the Code of Practice and EMS.
- Avoid negative interactions with other stakeholders.

- All Crabbers
- NTSC
- SeaNet NT
- NT Fisheries
- Marine Planning agencies
- Indigenous Land Councils

* **Note** Area closures are generally the responsibility of NT and Federal Agencies.

Illegal fishing and marketing

The illegal marketing of crab from unlicensed fishers is believed to occur, however volumes and levels of occurrence are unknown.

ACTIONS:

- Improve traceability of legally produced Mud Crab.
- Encourage compliance with seafood labelling legislation.
- Encourage industry and the general public to report suspected illegal sales or activity to authorities.

- All Crabbers
- Seafood Wholesalers and Retailers
- NT Fisheries / Compliance
- General Public

Climate change

The impacts of climate change on the fishery are unknown, but the literature suggests that possible changes could be significant for some species in some areas. Opportunities may also occur through changes in the distribution of Mud Crabs, potentially extending their range further south.

ACTIONS:

- Be aware of and monitor potential impacts of climate to identify risks and opportunities.

- All Crabbers
- Licence Owners
- NTSC
- Government Agencies

Risk

Justification for inclusion of risk, and potential control measures and actions required to reduce the risk

Person or agency responsible to help reduce the risk

*External Risks with Potential to Impact the Fishery (continued)***Destructive activities by other sectors or industries**

The impacts of destructive gear or activities by other sectors or industries on the fishery are unknown, but degradation of the environment, such as seagrass or mangrove degradation or loss, installation of barrages, chemical leaks or heavy metal build ups, could lead to catastrophic impacts on the habitat and/or the fishery.

ACTIONS:

- Provide comment regarding any proposed activities that could negatively impact on the ecosystem and resources that the Mud Crab Fishery relies on.
- Monitor potential impacts of other fishing activity (recreational or otherwise) and other industry activities.
- Advise authorities immediately of any concerns regarding polluting or destructive activities.

- Licence Owners
- All Crabbers
- NTSC
- SeaNet NT
- Government Agencies
- General Public

RISK ANALYSIS

This section further analyses the risks identified in the previous section by ranking them as low, moderate or high, based on their likelihood of occurrence and the real or perceived consequences of them occurring.

Rankings are adjusted based on industry undertaking mitigating actions. Importantly, this analysis also considers public opinion when assigning a rank to a risk.

Likelihood

1. Rare, but not impossible
2. Unlikely, but has been known to occur
3. Possible, it may occur
4. Occasional, it may occur
5. Likely, expected to occur

Consequence if the risk does occur

- A. Negligible, very insignificant impact, unlikely to be measurable
- B. Minor, possibly detectable but minimal impact
- C. Maximum acceptable level of impact, recovery measured in months or years; or significant impact on public perception of the fishery
- D. Serious impact, recovery measured in years to decades; or highly significant impact on public perception of the fishery
- E. Catastrophic, widespread and permanent damage, recovery unlikely

Consequence

Likelihood	A	B	C	D	E	Risk category (Likelihood x Consequence)
1						
2						Low risk (LOW)
3						Moderate risk (MOD)
4						High risk (HIGH)
5						



Legislation

Non-compliance with regulations

Initial risk ranking: **HIGH**

Likelihood: **3**

Consequence: **D**

Improved risk ranking: **MOD**

Likelihood: **2**

Consequence: **D**

Although English is a second language for many operators in the fishery, awareness of legislation is very high and crabbers are conscious of the high penalties for non-compliance. High penalties and peer pressure can act as a deterrent to illegal activity. The level of non-compliance across the fishery is considered to be generally low, but may be higher in some areas than others. When non-compliance occurs it can significantly impact on public opinion and lead to unwanted actions by decision makers, with negative consequences for the fishery.

ACTIONS

Crabbers and the general public are encouraged to report any non-compliance to the relevant authorities.

All new entrants and former crabbers re-entering the fishery must go through a formal induction process that outlines legislative and industry responsibilities.

Licence owners should advise lessees of regulations annually and of changes as they occur. To ensure crabbers are aware of the latest developments, licence owners are encouraged to forward any relevant information to crabbers. Licence lessees should also ensure they continue to have access to information regarding the fishery and the rights and responsibilities of crabbers.

NT Fisheries is requested to broaden the mailing list to include trader/processors in any mail out relating to relevant legislative information. Information delivery needs to be adapted to best reach industry members in an appropriate manner.

The Code of Practice and the Environmental Management System (EMS) are designed to encourage good fishing practices. Wide distribution of these across industry, other stakeholders and decision makers will highlight these practices, and the effort industry is making to encourage compliance.

Retained Species

Unsustainable depletion of target, bycatch and/or by-product species as a result of commercial over-fishing

Initial risk ranking: **LOW**

Likelihood: **1**

Consequence: **D**

Improved risk ranking: **LOW**

Likelihood: **1**

Consequence: **C**

Based on logbook data and some fishery independent information, NT Fisheries undertake periodic stock reviews as well conducting annual reviews of the fishery to assess harvest levels. Crab abundance, and therefore catch rates, are primarily environmentally driven. Research has found that rainfall, river flow and temperature have a significant influence on Mud Crab abundance and catch rates. Catch rates are an unreliable indicator of stock size in this fishery as operators move often to maintain high catch rates. Notwithstanding this, industry has supported and instigated numerous management and operational measures to minimise the chance of overfishing of target and non-target species in the fishery.

In some areas there are local variations in abundance that could be linked to fishing effort in

ACTIONS

Industry needs to ensure that it takes a lead role in the assessment and decision making processes that determine fishery management arrangements to ensure that facts, not perceptions, drive any further management changes. This is to be supported by industry-initiated and supported RD&E, especially research that can better identify environment/abundance links.

The extension of the most up to date environmental, fishing and handling practices across industry through the Code of Practice and EMS can improve performance within the fishery and also be used to demonstrate environmental responsibility to the general public and decision makers. They should therefore be promoted and made available to other stakeholders to improve perceptions of industry.

that particular area, but could equally be caused by poor recruitment following less rainfall in that area.

The NT Mud Crab Fishery is accredited under the relevant protected species provisions of the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The accreditation endorses the export of product from the fishery for a period of years, after which it is reassessed. The assessment demonstrates that the fishery is managed in a manner that does not lead to over-fishing, and that fishing operations have a minimal impact on the structure, productivity, function and biological diversity of the ecosystem.

Negative publicity from commercial fisheries around the world tends to drive people's opinion of the local industry. General public awareness of regulations and requirements placed on professional fishers is also low.

Industry-led handling and fishing practices measures have been implemented to optimise target (live Mud Crab) and non target species survivability, as well as economic return to industry.

Actions (continued)

The implementation of Commercially Unsuitable Crab (CUC) provisions, handling/release protocols, legislation, and pot design (including escape vents), improves Mud Crabs' survivability and sustainability. Industry should continue to support and assist any such measures to improve the sustainability of the fishery and value of the product.

Support and assist the development of pot modifications in the fishery to improve environmental performance.

Utilise legal catch taken in bait nets to avoid wastage.



Retained Species (continued)

Loss of catch due to poor handling practices

Initial risk ranking: **MOD**

Likelihood: **3**

Consequence: **C**

Improved risk ranking: **LOW**

Likelihood: **1**

Consequence: **B**

Understanding of the factors contributing to crab mortality along the supply chain is improving constantly and most operators understand the need to provide buyers with the best quality product possible. Industry-led handling and fishing practices have been implemented to maximise Mud Crab and byproduct quality and increase economic return to industry and the community. Recent research on the optimal post harvest handling conditions for live mud crab from capture to sale have been incorporated into the Northern Territory Mud Crab Fishery Code of Practice and rolled out to industry.

Measures such as the Commercially Unsuitable Crab (CUC) provisions, outlined in the Code of Practice, have reduced industry losses along the supply chain. The recreational sector could benefit from similar information and education regarding identifying CUC Mud Crabs

ACTIONS

Adhere to the Mud Crab Fishery Code of Practice to ensure crabs reach the market in the best possible condition. Ensure that the most up to date fishing and handling practices are extended across industry. Widely distribute the Code of Practice and EMS to improve industry performance and the perceptions of the general public and decision makers.

Industry will continue to be involved in, and initiate, research, development and extension that improves survivability, product quality and economic return to industry. Optimising survivability and reducing product wastage also increases the sustainability of the industry and ensures it maintains a high level of environmental responsibility.

Non-Retained Species

Death of bycatch before or after release

Initial risk ranking: **LOW**
Likelihood: **1**
Consequence: **A**

Improved risk ranking: **LOW**
Likelihood: **1**
Consequence: **A**

The fishery has negligible bycatch and has been developed as such through gear, operational and regulatory controls. Bycatch is avoided for both ecological and economic reasons. Wasted bycatch also contributes to negative public perception of the fishery. Crabbers must therefore always be aware of how fishing activities may be perceived by the general public, other stakeholders and decision makers, and conduct their fishing operations accordingly. Industry should also continue to improve gear and fishing methods where possible.

ACTIONS

Adhere to the Mud Crab Fishery Code of Practice. Set gear in areas and at times to minimise bycatch.

Support and assist the development of modification of pots in the fishery to improve environmental performance. For example, the use of escape vents in pots will further reduce the catch of undersized crabs. Release any bycatch quickly to maximise its chances of survival.



Interactions with wildlife

Interactions with protected species - crab pots

Initial risk ranking: **LOW**

Likelihood: **1**

Consequence: **A**

Improved risk ranking: **LOW**

Likelihood: **1**

Consequence: **A**

The primary gear type used by the fishery has negligible interactions with protected species. Northern Territory commercial crab pots are highly selective and designed to avoid any wildlife interactions.

ACTIONS

Support and assist the development of modifications of pots in the fishery, including those used by the recreational fishing sector, to improve environmental performance.

Report interactions and record in logbooks. In the unlikely event of an interactions follow best practice guidelines outlined in the *Protected Species Awareness Information* sheets (available from the NTSC office or website).

Interactions with protected species - bait nets

Initial risk ranking: **MOD**

Likelihood: **2**

Consequence: **D**

Improved risk ranking: **LOW**

Likelihood: **1**

Consequence: **B**

Bait nets can potentially interact with protected species, but reported interactions are negligible. The legal requirement to attend bait nets at all times (i.e. not set and leave) means that any protected species that happen to interact with gear can be readily removed. As well as the environmental impacts of interactions with protected or vulnerable species, interactions can lead to severe negative reactions from other stakeholders and decision makers.

Legitimate concerns however can be addressed by industry, as exemplified by the industry lead closures in the Borrooloola area to avoid potential dugong interactions.

ACTIONS

Report interactions and record in logbooks. In the unlikely event of an interactions follow best practice guidelines outlined in the *Protected Species Awareness Information* sheets (available from the NTSC office or website).

Impacts on the Environment by the Fishery

Lost or discarded fishing equipment or other marine debris (rubbish)

Initial risk ranking: **LOW**

Likelihood: **3**

Consequence: **B**

Improved risk ranking: **LOW**

Likelihood: **2**

Consequence: **B**

Commercial operators can lose pots due to the effects of large tides, poor weather or boat strike (especially in areas of high boating traffic). Damaged and unusable pots, bait nets, rubbish or waste need to be disposed of in an appropriate manner at camp or transported to appropriate disposal sites. Pots are designed to break down in a short period of time if lost at sea.

Marine debris originating from elsewhere or other sectors can mistakenly be attributed to the local industry and lead to negative perceptions of local industry by the general public and decision makers.

ACTIONS

Adhere to the Mud Crab Fishery Code of Practice. Retrieve lost gear where possible. All crab pots and bait nets that are no longer useable are to be disposed of appropriately at camp or transported to proper disposal sites.

Retrieve 'ghost nets' or other marine rubbish if possible or report to Fishwatch on 1800 891 136.

Crabbers should maintain camps in good condition and avoid the accumulation of discarded fishing equipment and other wastes and debris.

Rubbish and waste originating from camps

Initial risk ranking: **MOD**

Likelihood: **3**

Consequence: **C**

Improved risk ranking: **LOW**

Likelihood: **2**

Consequence: **C**

Crabbers set up camps close to their fishing area. Some of the camps are permanent and others are seasonal. The camps are used to store fishing equipment and other gear associated with crabbing. If camps are not well maintained or removed at season's end, wet season conditions can lead to debris and gear being washed or blown into the general environment. In addition, poorly maintained camps are an eye sore and lead to the general public's negative perceptions of the professionalism and behaviour of crabbers.

ACTIONS

Adhere to the Mud Crab Fishery Code of Practice. All effort must be made to maintain neat and tidy camps during the season, and at season's end, camps should be made sound, or removed, to minimise environmental impacts from the loss of gear or debris into the environment.

Impacts on the Environment by the Fishery (continued)

Spread of introduced marine and other pests within the Northern Territory

Initial risk ranking: **LOW**

Likelihood: **1**

Consequence: **B**

Improved risk ranking: **LOW**

Likelihood: **1**

Consequence: **B**

There are currently no known introduced marine pests within NT coastal waters, but there is always the possibility of marine pests being introduced by vessels coming from other areas.

Other pests in the form of feral animals and plants can cause significant ecological impacts that affect estuarine and marine environments.

ACTIONS

Follow Best Practice Guidelines outlined by the National System for the Prevention and Management of Marine Pest Incursions. Crabbers use locally caught or supplied bait to minimise the threat of introducing marine pests. In addition, using feral animals (donkeys, horse, buffalo, pig) as bait can assist feral animal reduction programs.

Any suspected marine pests are to be reported to NT Aquatic Biosecurity.

Damage to water quality from chemical or fuel spill

Initial risk ranking: **LOW**

Likelihood: **2**

Consequence: **A**

Improved risk ranking: **LOW**

Likelihood: **1**

Consequence: **A**

Chemicals are generally not used in the fishery. The Code of Practice covers the safe and appropriate handling and storage of chemicals and fuel. Safety and business economics ensure vessel motors are maintained at a high standard and upgraded regularly.

ACTIONS

Adhere to the Mud Crab Fishery Code of Practice. Store chemicals, fuel and oil safely and securely, and only use as directed. Maintain vessels to prevent pollution from fuel use. Collect used oil for disposal at onshore facilities.

Small fuel leaks could take place during fuel transfer, but the chances of this occurring are reduced when crabbers follow safe fuel transfer procedures and maintain a spill kit for emergencies.

Impacts on the Environment by the Fishery (continued)

Impacts on seabed or substrate

Initial risk ranking: **LOW**

Likelihood: **1**

Consequence: **A**

Improved risk ranking: **LOW**

Likelihood: **1**

Consequence: **A**

Due to the benign gear and methods used in the fishery there is limited negative interaction with the seabed or substrate. Any minor interactions would not be noticeable after one tidal movement in the high energy zones utilised in the fishery.

ACTIONS

Conduct fishing operations to ensure substrate damage is avoided. Use responsible boating practices to minimise impacts.

Crabbers and licensees to assess environmental performance and modify gear or practices if necessary.

Greenhouse gas emissions from the fishery

Initial risk ranking: **LOW**

Likelihood: **4**

Consequence: **C**

Improved risk ranking: **LOW**

Likelihood: **4**

Consequence: **B**

The fishery is small scale, using dinghies, and the overall greenhouse gas emissions would be low. The desire for increased profitability and efficiency is an incentive to minimise fuel use which in turn leads to a reduction in emissions. Commercial crabbers use highly efficient motors, including 4 stroke or next generation 2 strokes, which are regularly serviced and updated to reduce fuel use.

Industry needs to maintain awareness of issues surrounding carbon pricing to best position themselves to minimise any negative impacts.

ACTIONS

Maintain motors to reduce fuel use and maximise efficiency. Continue to improve the efficiency of the fishery through changes to fishing operations or regulatory requirements (i.e. the introduction of unitised entitlements has led to improved efficiency and reduced fuel use).

External risks with potential to impact the fishery

Although difficult to control, external factors have the potential to affect the health of the marine environment which supports the Mud Crab Fishery, or to influence management decisions regarding resource access and allocation. External factors are largely beyond the control of Mud Crab Fishery operators and so are not allocated an improved risk ranking. However, the actions identified are still an important guide to best practice for the fishery and other stakeholders.

Area closures

Risk ranking: **HIGH**

Likelihood: **4**

Consequence: **D**

Commercial fishing is perceived as having a significant impact on marine resources, regardless of good management. As such there is continuing pressure by other sectors to reduce commercial fishing areas. In addition, closures are being sought through the establishment of marine protected areas.. There are also unknown outcomes from court cases that could impact on access. Any area closures without appropriate real effort reductions can lead to overfishing in other areas and possible localised depletion of stocks.

Valuable data needed to manage the fishery is also lost once commercial fishing logbook data is no longer provided for an area.

ACTIONS

Ensure that any area reduction programs are conditional on appropriate effort reduction (not redistribution) in the fishery. Improve the profile of the fishing industry within the wider community and ensure fishing operations are conducted according to the Code of Practice and EMS. Avoid negative interactions with other stakeholders.

Illegal fishing and marketing

Risk ranking: **HIGH**
Likelihood: **4**
Consequence: **D**

The illegal marketing of crab from unlicensed fishers is believed to occur, however quantities and levels of occurrences are unknown. Illegal fishing has the potential to impact negatively on resource sustainability (especially in areas close to communities and/or where commercial operations don't take place; i.e. Darwin Harbour) and the economics of the commercial sectors.

ACTIONS

Improve traceability of legally produced Mud Crab, encourage compliance with seafood labelling legislation, and support greater enforcement.

Encourage industry and the general public to report suspected illegal sales or activity to authorities – this would require recreational sector dinghy registration or some other means of being able to identify and report suspected illegal activity.

External risks with potential to impact the fishery (continued)

Climate change

Risk ranking: **MOD**

Likelihood: **3**

Consequence: **C**

The impacts of climate change on the fishery are unknown, but the literature suggests that possible changes could be significant for some species in some areas, and could also lead to administrative or regulatory changes that seek to address real or perceived outcomes arising from change. Opportunities may also occur through changes in the distribution of Mud Crabs, potentially extending their range further south.

ACTIONS

Industry needs to be aware of and monitor potential impacts of climate to identify risks and opportunities that may arise.

Use of destructive gear or activities in other sectors or industries

Risk ranking: **HIGH**
Likelihood: **3**
Consequence: **E**

The impacts of destructive gear or activities by other sectors or industries on the fishery are unknown but degradation of the environment, such as seagrass or mangrove degradation or loss, installation of barrages, chemical leaks or heavy metal build ups, could lead to catastrophic impacts on the habitat and/or the fishery.

ACTIONS

Provide comment on any proposed activities that could negatively impact on the ecosystem and resources that the crab fishery relies on.

Monitor potential impacts of other fishing activity (recreational or otherwise) and other industry activities.

Advise authorities immediately of any concerns regarding polluting or destructive activities.

CONTACT LIST - Marine Ranger Groups

	Location	Telephone
Anindilyakwa Sea Rangers	Groote Eylandt	(08) 8987 4040
Bulgul Land and Sea Rangers	Western Wagait	(08) 8932 2497
Dhimurru Aboriginal Corporation	Gove Peninsula	(08) 8987 3992
Djelk Rangers	Maningrida	(08) 8979 5803
Garngi Rangers	Croker Island	(08) 8979 0299
Gumurr Marthakal Rangers	Elcho Island	(08) 8970 5516
Larrakia Rangers	Darwin	(08) 8948 3733
Lianthawirryarra Sea Rangers	Borrooloola	(08) 8975 8824
Mardbulk Rangers	Goulburn Island	(08) 8979 0211
Numbulwar Numburindi Amalahgayag Inyung Rangers	Numbulwar	(08) 8975 4005
Thamarrurr Rangers	Wadeye	(08) 8978 2979
Tiwi Marine Rangers	Tiwi Islands	(08) 8944 8416
Wanga Djakamirr	Ramingining	(08) 8979 7920
Yirralka Rangers	Gove Peninsula to Blue Mud Bay	(08) 8939 1852
Yugul Mangi Rangers	Ngukurr, Roper River	(08) 8975 4744

CONTACT LIST - Reporting and Assistance

Contact

Aquatic Biosecurity www.nt.gov.au/d/Fisheries www.marinepests.gov.au	Report suspected introduced aquatic pests	Phone.... (08) 8999 2126 Mobile..... 0413 381 094
	Vessel inspection	Mobile..... 0413 381 094
Customs and Border Protection www.customs.gov.au	Enquiries	Phone..... 1300 363 263
	Report suspicious activities (24 hrs)	Phone..... 1800 06 1800
Fishwatch/Fishkill info	Report ghost nets, illegal/suspicious fishing activities, fish kills	Phone..... 1800 891 136
Marine Safety Branch www.nt.gov.au/transport/safety/marine/publications/index.shtml	Vessel Survey and Manning Requirements	Phone.... (08) 8924 7100
Northern Territory Seafood Council www.nts.com.au	Industry representative body	Phone.... (08) 8981 5194 Mobile..... 0488 030 429
	NT Fisheries www.nt.gov.au/d/Fisheries	General Enquiries
Licensing		Phone.... (08) 8999 2305 Fax..... (08) 8999 2057
Indigenous Liaison		Phone.... (08) 8999 2164 Mobile..... 0401 115 813
NT Pollution Hotline www.nt.gov.au/nreta/environment/waste/hotline.html		Report a pollution incident within 3 nm
NT Water Police	Fisheries compliance and enforcement	Phone.... (08) 8936 4819 Mobile..... 0407 794 736
Rescue Co-ordination Centre Australia (RCC Australia)	Report collisions, emergencies and pollution beyond 3nm	Phone..... 1800 641 792 Phone.... (02) 6230 6811
SeaNet NT, OceanWatch Australia www.oceanwatch.org.au ; www.youtube.com/user/SeaNetNT	Assistance with environmental issues and public education	Phone.... (08) 8981 5194 Mobile..... 0421 054 274



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