

NORTHERN TERRITORY BARRAMUNDI FISHERY ENVIRONMENTAL MANAGEMENT SYSTEM



A voluntary, industry driven, environmental initiative.

**This EMS was originally developed in 2006 by the
Northern Territory Barramundi Licensee Committee with assistance from:**

**Northern Territory Seafood Council
Fisheries Research and Development Corporation**

Revised by the barramundi industry in 2010

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INTRODUCTION

An Environmental Management System, or EMS, is a formal process used for addressing the issues or risks affecting the environmental sustainability of an activity. The EMS model is based on a philosophy of continuous improvement – that is, recognising current performance, 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 improving and demonstrating environmental responsibility. A number of other benefits can be gained from having an EMS, including: reduced operating costs, higher product prices from having a clean, green image, improved public image of the industry, improved compliance levels across operators, and most importantly, helping ensure the long term sustainability of the fishery by reducing or preventing any impacts on the environment.

Vision

To responsibly conduct the harvest of resources in the Northern Territory Barramundi 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, their likelihood of occurrence and predicted consequences.
- To provide fishery operators with a concrete 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.
- Reduce interactions with and impacts on non-retained species.
- Minimise interactions with wildlife.
- Reduce 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 NT commercial barramundi 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, the Barramundi Fishery Code of Practice and the guidelines for interactions with protected species (Protected Species Awareness Information) These documents are available from the NTSC office and website.

Implementation

The EMS management organisation (NTSC and SeaNet) will work with an annually elected EMS management 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:

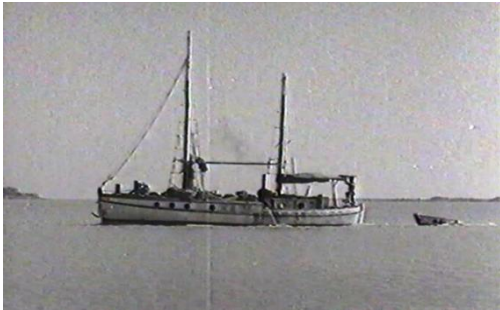
- Be conducted by the EMS organisation in consultation with the EMS management team.
- Seek feedback from individual fishers, relevant government agencies and other stakeholder groups with an interest in the fishery.
- Include information on instances of fishery operators not complying with the EMS and formulate a response to the non-compliance.
- 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.
- Provide an annual EMS summary report to be distributed to all Barramundi Licensee Committee members and made available to other stakeholders, including all current barramundi licence lessees.

THE BARRAMUNDI FISHERY

History

The early days of fishing in the Northern Territory were a reflection of the rest of development in the Territory – driven by people attracted to the harsh, remote Top End for adventure, escape or a second chance. Some of the early barramundi fishers combined fishing with crocodile or buffalo shooting, with fishing being a small, seasonal part of their business.

The development of the commercial fishing industry in the Northern Territory was constrained by distance to markets and access to chilling or freezing equipment. In the early 1950s the Haritos family started a barramundi fishing and crocodile shooting business. In one season around 25 tonne of barramundi was air-freighted to Sydney, Melbourne, Adelaide and Brisbane, but the market collapsed shortly after. Commercial fishing for barramundi continued but did not reach significant proportions until the 1970s, when there was a rapid expansion of effort.



Reliable commercial catch and effort data have been collected since 1972. The highest annual harvest, just over 1000 tonnes, was taken in 1977. Following reviews and overexploitation concerns, new management arrangements were adopted in conjunction with a licence buy-back scheme. The buyback scheme was funded dollar for dollar by government and industry, with an industry levy contributing to the Industries Trust Fund. The number of licences was thus reduced from 113 in 1980 to 26 in 1999, fulfilling the industry component of the buyback and ending the industry levy. Currently there are 21 fully transferable licences.

In 1988 the Mary River system was closed to commercial barramundi fishing, followed by closures of the Daly River, Roper River and partial closure of the Victoria River. In 1988 and 1989 the Federal Government closed the East, West and South Alligator rivers and the Wildman River. In 1998 Darwin Harbour and Shoal Bay were closed, followed by the McArthur and Adelaide rivers.

Management changes in the fishery have seen the catch per unit of effort (CPUE) for barramundi increase two to three times the levels seen following the sharp falls in the late 1970s. In 2000 the annual harvest again approached 1000 tonnes, but the effort levels were more than 4 times less than those in 1977. In recent years the annual harvest has remained between 500-650 tonnes.



Current Management

The commercial Barramundi Fishery is a significant contributor to the Northern Territory economy and its good management is supported by both industry and government. The fishery extends from the high water mark to three nautical miles seaward of the low water mark and is restricted to waters seaward of the coast, river mouth or closure lines. Commercial fishing is not permitted within the confines of Kakadu National Park, the Mary River Management Zone, Darwin Harbour, Shoal Bay, or in various key river systems. In addition, fishers may not operate or anchor within the dugong protection area in the south-western Gulf of Carpentaria.

The fishery targets Barramundi (*Lates calcarifer*) and King Threadfin (*Polydactus macrochir*), with the season running from 1 February to 30 September. The closed season from 1 October to 31 January was introduced at the insistence of the commercial industry in the late 1980s to protect breeding stock. Fishing is undertaken using nets, with a maximum length of one kilometre allowed to be used under a full commercial barramundi licence. The length of net used is restricted by the number of units a licence holder has – one unit is equivalent to 100 metres of net, while a full licence has 10 units.



Nets are set and retrieved from dinghies while the fish are processed on board the main boat – generally small vessels between 8 to 16 metres in length. Nets can only be set across half a watercourse and must not be set within 25 metres of another net in rivers. Outside river mouths, the minimum legal mesh size is 150 mm (6 inch) and within a river the minimum legal mesh size is 175 mm (7 inch).

Boats are often at sea for several weeks and in some cases, months. Because of the remote areas being fished, most operations are based on frozen product. A small fresh “on ice” market for barramundi has also emerged and this product is delivered to market weekly by road or air. Product is primarily sold in the Northern Territory and Sydney.



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 concrete set of strategies to improve their 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. Public opinion and subsequent political lobbying have had an increasingly powerful, and often negative, impact on the access rights of commercial fishers. It is imperative for the survival of the industry that these perceived risks are acknowledged and managed. 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. This is especially true when dealing with those species considered to be particularly vulnerable and/or high profile such as turtles, dugong, sawfish, crocodiles and dolphin.

The following table, *Risk Identification & Action Plan*, briefly outlines the risks identified by industry as having the potential to adversely impact the environment and/or negatively influence public opinion regarding the environmental impacts of the industry. A more detailed assessment is given in the later section, *Detailed Analysis of Risks, Risk Rankings & Recommended Actions*.

RISK IDENTIFICATION AND ACTION PLAN

Risk	Justification for inclusion of risk, and potential control measures and actions required to reduce the risk (see Risk Analysis for more detail on justification and risk ranking)	Person or agency responsible for reducing risk
LEGISLATION		
Non-compliance with regulations	<p>Awareness of regulations is high but non-compliance may occur, with significant impact on public opinion.</p> <p>Actions:</p> <ul style="list-style-type: none"> • Report non-compliance • Licence owners ensure lessees comply with regulations • Develop an industry-wide licence lease agreement with provision for cancellation of lease agreement following failure to comply with regulations 	<p>All fishers Licence owners NTSC NT Fisheries</p>

Risk	Justification and actions to manage risk	Responsibility
RETAINED SPECIES		
<p>Unsustainable depletion of target and/or by-product species as a result of commercial fishing</p> <p>Note: This is an external risk as strategies to achieve sustainable harvest are the responsibility of NT Fisheries. However, industry has a role in providing accurate data and influencing public opinion.</p>	<p>Annual reviews and management measures by NT fisheries ensure sustainable commercial resource use, but public perception of the impact commercial fishing is still negative.</p> <p>Actions:</p> <ul style="list-style-type: none"> • Ensure logbook data is accurate • Participate in observer programs • Hand in tags to NT Fisheries to assist in monitoring commercial exploitation rates • Be aware of how your fishing activities may be negatively perceived and alter your behaviour if necessary • Initiate and participate in programs to improve public perception • Improve data collection on recreational catches and ensure impacts are widely understood 	<p>All fishers NTSC, SeaNet NT Fisheries</p>
NON-RETAINED SPECIES		
<p>Death of bycatch before or after release</p>	<p>Survival of bycatch is partly dependent on time spent in the net. Bycatch is to be avoided, for both ecological as well as economical reasons.</p> <p>Actions:</p> <ul style="list-style-type: none"> • Avoid setting nets in areas where bycatch will occur • Clear nets regularly • Release bycatch quickly • Share information on areas/times of high levels of bycatch • Be aware of how your fishing activities may be negatively perceived and alter your behaviour if necessary 	<p>All fishers</p>

INTERACTIONS WITH WILDLIFE

Interactions with sawfish

Some sawfish species can be abundant at certain times and in some areas – negative impact on public opinion of sawfish interactions can be significant.

Actions:

- Report the interaction (Marine Wildwatch Hotline 1800 453 941) and record in logbooks
- Avoid setting nets in areas and at times sawfish are known to occur
- Pay particular attention early in the season, February to April is a peak time for sawfish interactions
- Check nets regularly to minimise the chance of sawfish dying if they are caught
- Release sawfish from nets as quickly as possible
- Don't leave nets unattended in the water for long periods of time
- Don't allow nets to dry out – this minimises bycatch deaths and maintains target catch quality
- Practice low tide sets
- If interactions do occur, move and let others in the area know
- Participate in observer programs to improve knowledge of sawfish abundance
- Follow best practice guidelines outlined in *Sawfish Information and Identification* (page 18)

All Fishers

Risk	Justification and actions to manage risk	Responsibility
INTERACTIONS WITH WILDLIFE continued		
Interactions with crocodiles	<p>Crocodile populations are increasing and interactions will occur. Negative impact on public opinion could be significant.</p> <p>Actions:</p> <ul style="list-style-type: none"> • Report the interaction (Marine Wildwatch Hotline 1800 453 941) and record in logbooks • Release crocodiles from nets as quickly as possible • Follow best practice guidelines outlined in <i>Protected Species Awareness Information – Crocodiles</i> (available from NTSC office and website) 	All fishers
Interactions with dugongs	<p>Fishing in dugong areas is avoided but negative impact on public opinion due to any interaction with dugongs could be highly significant.</p> <p>Actions:</p> <ul style="list-style-type: none"> • Report the interaction (Marine Wildwatch Hotline 1800 453 941) and record in logbooks • Avoid fishing in known dugong areas • If interactions do occur, move and let others in the area know • Follow best practice guidelines outlined in <i>Protected Species Awareness Information – Dugongs</i> (available from NTSC office and website) • Ensure new entrants to the fishery are aware of dugong areas and the need to avoid them 	All fishers Licence owners

Interactions with dolphins and whales	<p>There are no recorded interactions between dolphins or whales in the barramundi fishery. Being primarily an intertidal zone fishery there is very little likelihood of such interactions occurring. The risk is included here because of the very high likelihood of negative public opinion due to any interaction.</p> <p>Actions:</p> <ul style="list-style-type: none"> • Report the interaction (Marine Wildwatch Hotline 1800 453 941) and record in logbooks • Check nets regularly and, in the unlikely event of an interaction, release the animal quickly • Don't allow nets to dry out 	All Fishers
Interactions with turtles	<p>Interactions with turtles in the barramundi fishery are rare. The risk is included here because of the very high likelihood of negative public opinion due to any interaction.</p> <p>Actions:</p> <ul style="list-style-type: none"> • Report the interaction (Marine Wildwatch Hotline 1800 453 941) and record in logbooks • If a turtle is entangled in a net it should be carefully removed, revived and released into the water • Follow best practice guidelines outlined in <i>Protected Species Awareness Information – Turtles</i> (available from NTSC office and website) 	All Fishers

Risk	Justification and actions to manage risk	Responsibility
IMPACTS ON THE ENVIRONMENT		
Lost or discarded fishing equipment or other marine debris	<p>It is rare for commercial operators to lose fishing gear. Damaged nets and rubbish or wastes (excluding fish wastes) are disposed of in ports. However, marine debris originating from elsewhere can mistakenly be attributed to the local fishing industry.</p> <p>Actions:</p> <ul style="list-style-type: none"> • Retrieve any lost fishing gear where possible • Report lost gear • Retrieve other marine debris found if possible, or report its location • Help improve the fishery profile by initiating or participating in marine debris cleanup activities 	All Fishers & stakeholders SeaNet
Spread of introduced marine pests within NT waters	<p>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.</p> <p>Actions:</p> <ul style="list-style-type: none"> • Follow the Best Practice Guidelines outlined by the National System for the Prevention and Management of Marine Pest Incursions (www.marinepests.gov.au) • Report any suspected marine pests to NT Aquatic Biosecurity 	All Fishers

<p>Damage to water quality from chemical or fuel spill</p>	<p>The NT Marine Pollution Act and the Barramundi Fishery Code of Practice cover the safe and appropriate handling and storage of chemicals and fuel at sea.</p> <p>Actions:</p> <ul style="list-style-type: none"> • Store chemicals, fuel and oil safely & securely • Maintain vessels to prevent pollution from fuel use • Collect used oil for disposal at onshore facilities • Follow safe fuelling procedures when refuelling and maintain a spill kit for emergencies 	<p>All Fishers</p>
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Risk	Justification and actions to manage risk	Responsibility
EXTERNAL RISKS TO THE FISHERY		
Area closures	<p>Commercial fishing is perceived as having a much larger impact on marine resources than the recreational sector. There is continuing pressure by the recreational sector to close further areas to commercial barramundi fishing.</p> <p>Actions:</p> <ul style="list-style-type: none"> • Ensure fishing operations are conducted according to the fishery Code of Practice & EMS and avoid negative interactions with other stakeholders • Hand in tags to NT Fisheries to assist in monitoring commercial and recreational exploitation rates • Improve the profile of the commercial fishing industry within the wider community by initiating or participating in programs to improve public perception of the industry • Improve data collection on recreational catches and ensure impacts are widely understood 	<p>All Fishers NTSC SeaNet NT Fisheries</p>
Illegal fishing & marketing	<p>The illegal marketing of fish from unlicensed fishers is known to occur, however the quantities are unknown.</p> <p>Actions:</p> <ul style="list-style-type: none"> • Improve traceability of marketed barramundi • Report suspected illegal marketing • Ensure compliance with the NT seafood labelling system and report infringements 	<p>NT Fisheries All Fishers Seafood wholesalers and retailers</p>

SAWFISH INFORMATION AND IDENTIFICATION

Sawfish (family Pristidae) are modified rays which have shark-like bodies, gill openings on the underside of the head and an extended toothed rostrum – or “saw”. Four species are found in Northern Territory waters: the Freshwater Sawfish (*Pristis micodon*), Green Sawfish (*Pristis zijsron*), Dwarf Sawfish (*Pristis clavata*) and Narrow Sawfish (*Anoxypristis cuspidata*). Sawfish inhabit freshwater, estuarine and marine waters, with a preference for coastal bays and foreshores. This, along with their toothed rostrum, makes them vulnerable to capture in all forms of fishing nets.

Freshwater, Green and Dwarf Sawfish are currently listed as vulnerable under the Environment Protection and Biodiversity Act 1999 (EPBC ACT). This means they are automatically given protected status under Commonwealth Legislation. Narrow Sawfish are not currently listed under the EPBC Act. However, public opinion indicates a belief that any sawfish is a protected species and this needs to be considered when fishing.

How to avoid or minimise interactions

- Avoid setting nets in areas and at times sawfish are known to occur.
- Pay particular attention early in the season, February to April is a peak time for sawfish interactions.
- Check nets regularly to minimise the chance of sawfish dying if they are caught.
- Don't leave nets unattended in the water for long periods of time.
- Don't allow nets to dry out – this minimises bycatch deaths and maintains target catch quality.
- Practice low tide sets.
- If interactions do occur, move out of the area and let others in the area know of the sawfish concentration.

Handling and release of sawfish

- Try and minimise the amount of time the sawfish is out of the water.
- Release sawfish away from set nets and avoid placing nets in the vicinity of the release site for as long as possible.
- Even if a sawfish shows no movement or signs of life be aware it may just be exhausted - be cautious about handling it at close quarters, and release it into the water without interference.
- Where a sawfish is accidentally killed in nets the carcass should be released into the water without interference.
- Under Northern Territory legislation it is an offence to be in possession of a protected sawfish or any part of a protected sawfish.

Small & juvenile sawfish

- Take care in handling small to medium sawfish as the base of the saw is very soft and can be easily kinked or broken.
- If firm enough, hold at the base of the saw to untangle the mesh.
- Turning sawfish upside down can often calm them enough to untangle the mesh.

Medium and large sawfish

- Keep your body in either in front or behind the saw not to the side, even if you believe it's secured well.
- To move or lift a large sawfish a slipknot can be placed around the saw and two people can move it – one holding the rope and the other holding the tail.

- One crew member can hold the saw using the entangled net while the other turns the body over – this can help keep the sawfish calm.
- Untangle the tail and mid section before tackling the saw.
- A screwdriver or net hook can be used to lever the mesh off the teeth of the saw.
- It has been reported that laying over the first dorsal fin and applying body weight may pacify the sawfish.
- When trying to untangle a sawfish next to the boat, rest the saw over the gunnel and apply downward pressure. A second person can assist with untangling.

Reporting interactions and contributing to research

All interactions with protected species must be recorded in your logbook. Under the EPBC Act interactions with Freshwater, Green and Dwarf Sawfish must be reported. Interactions can also be reported to Marine WildWatch. The abundance, movement and distribution of the four sawfish species in the Northern Territory are poorly understood and professional fishermen can be an important source of information and observations. Participating in observer programs can also help resource managers identify the species and gather more information on sawfish populations.

Under the EPBC Act it is not an offence to interact with a protected species when conducting your regular fishing operations, even if the interaction results in the animal's death. However, it is an offence to not report an interaction with a protected species. Record the date of interaction, species, approximate length, location and whether the sawfish was released alive or dead.

SAWFISH SPECIES IDENTIFICATION

Snout has 24 – 34 pairs of teeth

First dorsal begins behind pelvic fin

Olive green colour



Green Sawfish (*Pristis zijsron*)

Snout has less than 24 pairs of teeth

18 – 22 pairs of teeth beginning
Some distance from the head

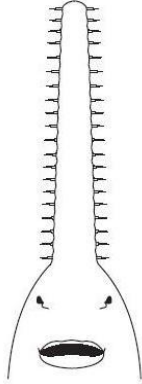
Greyish colour



Narrow Sawfish (*Anoxypristic cuspidata*)

Teeth starting close to the head and spaced evenly or close to evenly

Green/brown colour

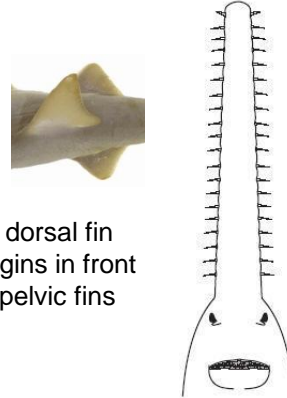


1st dorsal fin
slightly behind
pelvic fins



Dwarf Sawfish (*Pristis clavata*)

Yellowish colour



1st dorsal fin
begins in front
of pelvic fins



Freshwater Sawfish (*Pristis microdon*)

Daley, R.K, Stevens, J.D, Last, P.R, Yearsley, G.K. 2002, *Field Guide to Australian Sharks and Rays*, CSIRO Marine Research and Fisheries Research & Development Corporation, Australia.

McAuley, R, Newbound, D, Ashworth R. 2002, *Field Identification Guide to Western Australian Sharks and Shark-like Rays*, Fisheries Occasional Publications No. 1, July 2002, Department of Fisheries, Perth Western Australia 2002.

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 consequences of them occurring. It then considers the effect on the risk ranking by industry undertaking the identified mitigating actions. As discussed previously this analysis also considers public opinion when assigning a rank to a risk.

Likelihood	Consequence if the risk does occur
1 Rare, but not impossible	A Negligible, very insignificant impact, unlikely to be measurable
2 Unlikely, but has been known to occur	B Minor, possibly detectable but minimal impact
3 Possible, it may occur	C Maximum acceptable level of impact, recovery measured in months or years; or significant impact on public perception of the fishery
4 Occasional, it may occur	D Serious impact, recovery measured in years to decades; or highly significant impact on public perception of the fishery
5 Likely, expected to occur	E Catastrophic, widespread and permanent damage, recovery unlikely

Likelihood	Consequence					Risk category (Likelihood x Consequence)
	A	B	C	D	E	
1	1	2	4	7	11	
2	3	5	8	12	16	1-10 Low risk (Low)
3	6	9	12	17	20	11-15 Moderate risk (Moderate)
4	10	14	18	21	23	16-25 High risk (High)
5	15	19	22	24	25	

LEGISLATION

Non-compliance with regulations

Initial risk ranking:

High

Likelihood: 4 Consequence: C

Barramundi Fishery operators are familiar with and understand the legislative requirements imposed on them. The penalties for non-compliance are high. However, non-compliance does still occur and this could have a significant negative impact on public opinion regarding the fishery as well as posing a risk to sustainability. This in turn could lead to further loss of access to fishing areas.

Actions: Operators are encouraged to report any non-compliance to the relevant authorities. Licence owners should ensure lessees are aware of regulations and comply with them as a condition of the continued lease agreement.

Improved risk ranking:

Low

Likelihood: 2 Consequence: C

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

Initial risk ranking: **Low**

Likelihood: 2 Consequence: C

NT Fisheries undertake stock assessments every five to seven years in addition to conducting annual reviews of the fishery to ensure the commercial harvest is at a sustainable level. Fishing logbook data provides valuable information for managing the fishery and additional data is obtained through Fisheries Observers. However, public perception of the impact of commercial fishing is often at odds with the scientific data, especially in the Northern Territory where the number of fishing licences is extremely low. Negative publicity from commercial fisheries around the world tends to drive peoples opinion of the local industry, regardless of the facts. General public awareness of regulations and requirements placed on professional fishers is also low.

Actions: Ensure fishing logbook data is accurate and, where possible, welcome observers on board to ensure accurate data is collected for the best management of the fishery. Hand in tags from tagged fish to NT Fisheries to assist them in demonstrating the limited impact of commercial fishing on barramundi stocks. Help improve public perception of the industry by participating in industry awareness raising campaigns or informal public education – some fishers, for example, have been asked to give a talk to their children’s school class.

Fishing operators should always be aware of how their fishing activities may be negatively perceived by the general public or other stakeholders (amateur fishers, indigenous groups) and alter their behaviour accordingly. For example, processing your catch while anchored nearby a community could lead to carcasses washing ashore which will result in that community having a negative opinion of the fishery. Disposal of carcasses in deeper water and on an outgoing tide will prevent this.

Improve data collection on recreational catches and ensure impacts are widely understood (NT Fisheries).

Improved risk ranking: **Low** *Likelihood: 1* *Consequence: C*

NON-RETAINED SPECIES

Death of fish bycatch before or after release

Initial risk ranking: **Moderate** *Likelihood: 3* *Consequence: C*

Survival of bycatch is partly dependent on the time it spends caught in the net. It is not in the ecological or economical interests of commercial operators to take bycatch as it wastes time clearing the net and can lead to the deterioration in quality of the retained species. In addition, the negative impact of bycatch issues on public opinion regarding the fishery can be significant. One dead fish floating by a charter boat, washing up on a community beach or near a boat ramp can be enough to significantly influence public opinion against commercial fishing, regardless of the overall effects of that one fish on the sustainability of the fishery.

Actions: All efforts should be made to reduce the amount of bycatch caught by the strategic placement of fishing gear and clearing nets on a regular basis. Release bycatch quickly to maximize chances of survival. Share information on areas/times of high levels of bycatch or protected species. Always be aware of how your fishing activities may be perceived by the general public or other stakeholders.

Improved risk ranking: **Low** *Likelihood: 2* *Consequence: B*

INTERACTIONS WITH WILDLIFE

Interactions with sawfish

Initial risk ranking:

High

Likelihood: 4 Consequence: C

Sawfish are prevalent around certain areas of the NT but when interactions do occur the sawfish are able to be released unharmed in the majority of cases. However, negative impact on public opinion of any sawfish interactions can be significant.

Actions: Report the interaction and record in your logbook. Avoid setting nets in areas and at times sawfish are known to occur – February to April is a peak time for sawfish interactions. Check nets regularly to minimise the chance of sawfish dying if they are caught. Release sawfish from nets as quickly as possible. Do not leave nets unattended in the water for long periods of time and don't allow nets to dry out – this minimises bycatch deaths and maintains target catch quality. Practice low tide sets. If interactions do occur, move and let others in the area know. Maintain accurate logbook records and participate in observer programs to improve identification of species and understanding of abundance and distribution. More detailed information on minimising or avoiding sawfish interactions and handling and release techniques can be found in *Sawfish Information and Identification* (page 18).

Improved risk ranking:

Low

Likelihood: 3 Consequence: B

Interactions with crocodiles

Initial risk ranking: **Moderate** *Likelihood: 4 Consequence: B*

Having crocodiles become entangled in fishing nets is to be avoided for the safety of the crocodile and the operator. Nets can also be damaged if crocodiles become entangled. However, interactions will increase as crocodile populations increase. Negative impact on public opinion due to any interaction with crocodiles could be significant.

Actions: Report the interaction and record in your logbook. Release crocodiles from nets as quickly as possible. If interactions do occur, move and let others in the area know. Follow best practice guidelines outlined in *Interactions with Protected Species – Crocodiles* (available from the NTSC office and website).

Improved risk ranking: **Low** *Likelihood: 3 Consequence: B*

INTERACTIONS WITH WILDLIFE CONTINUED

Interactions with dugongs

Initial risk ranking: Moderate *Likelihood:* 2 *Consequence:* D

Commercial operators are aware of areas where dugongs are likely to be encountered and fishing is not conducted in these areas. However, the negative impact on public opinion of any dugong interaction is likely to be highly significant.

Actions: Report the interaction and record in your logbook. Avoid fishing in known dugong areas. Ensure new entrants to the fishery are aware of dugong areas and the need to avoid them. Follow best practice guidelines outlined in *Interactions with Protected Species – Dugongs* (available from the NTSC office and website).

Improved risk ranking: Low *Likelihood:* 1 *Consequence:* D

Interactions with dolphins and whales

Initial risk ranking: Low *Likelihood:* 1 *Consequence:* C

There are no recorded interactions between dolphins or whales in the barramundi fishery. Being primarily an intertidal zone fishery there is very little likelihood of such interactions occurring. The risk is included here because of the likelihood of significant negative impact on public opinion due to any interaction.

Actions: Report the interaction and record in your logbook. Check nets regularly and, in the unlikely event of an interaction, release the animal quickly. Don't allow nets to dry out.

Improved risk ranking: **Low** *Likelihood: 1 Consequence: C*

Interactions with turtles

Initial risk ranking: **Low** *Likelihood: 2 Consequence: C*

Interactions with turtles in the barramundi fishery are rare. While there are a number of endangered turtle species in Northern Territory waters, their preferred habitat is not the mud flat and mangrove areas in which barramundi fishing is usually conducted.

Actions: Report the interaction and record in your logbook. Check nets regularly and, in the unlikely event of an interaction, revive and release the animal quickly. Do not allow nets to dry out. Follow best practice guidelines outlined in *Interactions with Protected Species – Turtles* (available from the NTSC office and website).

Improved risk ranking: **Low** *Likelihood: 2 Consequence: C*

IMPACTS ON THE ENVIRONMENT

Lost or discarded fishing equipment or other marine debris

Initial risk ranking:

Low

Likelihood: 2 Consequence: B

It is rare for commercial operators to lose fishing gear. Damaged nets and rubbish or wastes (excluding fish wastes) are disposed of in port as per the NT Marine Pollution Act and the Barramundi Fishery Code of Practice. However, the high incidence of marine debris originating from elsewhere can mistakenly be attributed to the local fishing industry.

Actions: All efforts must be made to retrieve any lost fishing gear, as well as retrieving any other derelict gear found, as it presents possible hazards to marine life and fishing operations. In terms of improving public relations and benefiting the marine environment, fishers could initiate or join in marine debris cleanup activities.

Improved risk ranking:

Likelihood: 1 Consequence: B

Spread of introduced marine pests within NT waters

Initial risk ranking:

Low

Likelihood: 1 Consequence: C

There are currently no known introduced marine pests within the coastal areas in NT waters. However, there is always the possibility of marine pests being introduced by vessels coming from other areas – marinas are a known risk environment for the establishment of introduced marine pests in the NT.

Actions: Follow the Best Practice Guidelines outlined by the National System for the Prevention & Management of Marine Pest Incursions. Report any suspected marine pests to NT Aquatic Biosecurity.

Improved risk ranking: **Low** *Likelihood: 1* *Consequence: C*

Damage to water quality from chemical or fuel spill

Initial risk ranking: *Likelihood: 3* *Consequence: B*

The NT Marine Pollution Act and the Barramundi Fishery Code of Practice cover the safe and appropriate handling and storage of chemicals and fuel at sea. Every precaution should be taken to prevent fuel or chemical spills at sea.

Actions: Store chemicals, fuel and oil safely and securely. Maintain vessels to prevent pollution from fuel use. Collect used oil for disposal at approved onshore facilities. Follow safe fuelling procedures and maintain a spill kit for emergencies.

Improved risk ranking: **Low** *Likelihood: 2* *Consequence: B*

EXTERNAL RISKS TO THE FISHERY

Area closures

Initial risk ranking: **Moderate** *Likelihood: 3 Consequence: C*

Commercial fishing is generally seen as having a much larger impact on marine resources than the recreational sector. There is continuing pressure by the recreational sector to close further areas to commercial barramundi fishing. Closures without effort removal results in increased fishing effort in remaining areas, while operators supplying the fresh fish market find themselves pushed further away and unable to transport fresh product. Valuable data needed to manage the fishery is also lost once commercial fishing logbook data is no longer provided for an area.

Actions: Improve the profile of the commercial fishing industry within the wider community. Hand in tags from tagged fish to NT Fisheries to assist them in demonstrating the limited impact of commercial fishing on barramundi stocks. Ensure fishing operations are conducted according to the Barramundi Fishery Code of Practice and EMS and avoid negative interactions with other stakeholders.

Improve data collection on recreational catches and ensure impacts are widely understood (NT Fisheries).

Improved risk ranking: **Low** *Likelihood: 2 Consequence: C*

Illegal fishing and marketing

Initial risk ranking: **Moderate**

Likelihood: 3 Consequence: C

The illegal marketing of fish caught by unlicensed fishers is known to occur, however the quantities are unknown. This is a significant issue as it affects marketing opportunities for legal commercial catches. The reallocation of resources from the commercial sector to the recreational sector also decreases the supply of legally caught fish on the market, making it more attractive for illegal marketing to occur. Mislabelling of products, such as Nile perch being substituted for barramundi, is a continuing concern.

Actions: Improve traceability of marketed barramundi. Report suspected illegal marketing. Ensure compliance with the NT seafood labelling regulations and report infringements.

Improved risk ranking: **Low**

Likelihood: 2 Consequence: B

CONTACT LIST

Aquatic Biosecurity www.nt.gov.au/d/Fisheries www.marinepests.gov.au	(08) 8999 2126 0413 381 094 Vessel Inspection 0413 381 094
Customs and Border Protection www.customs.gov.au/	Enquiries 1300 363 263 Report suspicious activities (24 hrs) 1800 06 1800
Fishwatch/Fishkill info	Illegal/suspicious fishing activities, fish kills 1800 891 136
Fisheries Police	(08) 8936 4819 0407 794736
Marine Safety Branch www.nt.gov.au/transport/safety/marine/publications/index.shtml	(08) 8924 7100
Marine WildWatch www.nt.gov.au/nreta/wildlife/marine/marinewildwatch/index.html	1800 453941
NT Fisheries www.nt.gov.au/d/Fisheries	General Enquiries (08) 8999 2144 Fisheries Fax (08) 8999 2065 Licensing (08) 8999 2305 Licensing Fax (08) 8999 2057 Indigenous Liaison (08) 8999 2164 0401 115813
NT Pollution Hotline www.nt.gov.au/nreta/environment/waste/hotline.html	1800 064567
Northern Territory Seafood Council www.ntsc.com.au	(08) 8981 5194
Rescue Co-ordination Centre Australia (RCC Australia) Reporting close collisions and pollution at sea beyond 3nm.	1800 641 792 (02) 6230 6811
SeaNet NT, OceanWatch Australia www.oceanwatch.org.au	(08) 8981 5194 0421 054 274