Australian Government
Australian Fisheries Management Authority

Ecological Risk Management

Northern Prawn Fishery

March 2025

Securing Australia's fishing future
www.**afma**.gov.au

Contents

Tables

1 Ecological Risk Assessment

1.1 Ecological Risk Assessments for the Effects of Fishing Framework

The Ecological Risk Assessment for the Effects of Fishing (ERAEF) framework involves a hierarchical approach that moves from a comprehensive but largely qualitative analysis of risk at Level 1, through a more focused and semi-quantitative approach at Level 2, to a highly focused and fully quantitative "model-based" approach at Level 3.

The approach makes use of a general conceptual model of how fishing impacts ecological systems, which is used as the basis for the risk assessment evaluations at each level of analysis (Levels 1-3). For the ERAEF approach, five general ecological components are evaluated, including key commercial species and secondary commercial species, byproduct and bycatch species, protected species, habitats, and ecological communities. The assessment of risk at each level takes into account current management strategies and arrangements.

1.2 Summary of ERA results

The Northern Prawn Fishery (NPF) is divided into three components for the ERA analyses: the Tiger Prawn, Banana Prawn, and Redleg Banana prawn sub-fisheries. The latest Tiger Prawn and Banana Prawn ERAs were finalised in 2021, including data from 2013 to 2017. The first ERA for the Redleg Banana Prawn sub-fishery was finalised in mid-2025, including data from 2017 to 2021.

In all sub-fisheries, four sawfish species (green, narrow, largetooth and dwarf sawfish) were evaluated at high risk following a residual risk analysis (**Table 1**), partially due to life history and vulnerability parameters, and uncertainty in stock status. Both ERAs conducted in 2021 noted that most sawfish interactions reported in logbooks are not identified to species level but as Family Pristidae, although the Bycatch Monitoring Program in the NPF reported that 92% of interactions are narrow sawfish (*Anoxypristis cuspidata*) (Fry et al. 2021).

Following a targeted program from NPFI to improve species level sawfish reporting (supported by AFMA management), there was a significant improvement in reported interactions (average of 90% operators) and species level reporting of sawfish (~85% reported to species). This was reflected in the Redleg ERA, which reported that most interactions were recorded as narrow sawfish, followed by Family Pristidae (Sporcic et al. 2025).

Table 1. Species identified as potentially high-risk, following a preliminary residual risk analysis, under the ERAs for the Tiger Prawn; Banana Prawn, Redleg Banana Prawn sub-fishery (Sporcic et al. 2021a; Sporcic et al. 2021b; Sporcic et.al. 2025).

Assessment type	Number of missing attributes	Species type	Common name	Scientific name	Final risk score
Productivity Susceptibility Analysis (PSA)	0	Chondrichthyans	Narrow sawfish	*Anoxypristis cuspidata*	High
	0		Dwarf sawfish	*Pristis clavata*	High
	0		Green sawfish	*Pristis zijsron*	High
	0		Largetooth sawfish	*Pristis pristis*	High

It was recommended that the scores of the four high risk sawfishes be re-assessed as outcomes of new research become available. The management response relating to at-risk sawfish species is outlined below in **Section 2.2**.

2 Ecological Risk Management Response

2.1 NPF Management and Monitoring Arrangements

2.1.1 Risk management for commercial and byproduct species

The NPF Harvest Strategy, which covers the key commercial and byproduct species of the fishery, has been developed in line with the *Commonwealth Fisheries Harvest Strategy Policy 2018* (CHSP). The harvest strategy sets out the management actions necessary to achieve defined biological and economic objectives and must contain a process for monitoring and conducting assessments to the conditions of the fishery, and rules that control the intensity of fishing activity. With a harvest strategy in place, fishery managers and industry can operate with greater confidence that fishing activity is both ecologically and economically sustainable.

The key commercial species targeted in the NPF include:

- Common banana prawn (*Penaeus merguiensis*)
- Redleg banana prawn (*Penaeus indicus*)
- Grooved tiger prawn (*Penaeus semisulcatus*)
- Brown tiger prawn (*Penaeus esculentus*)

Other commercial species in the fishery include:

- Blue endeavour prawn (*Metapenaeus endeavouri*)
- Red endeavour prawn (*Metapenaeus ensis*)
- Western king prawn (*Melicertus latisulcatus*)
- Red spot king prawn (*Melicertus longistylus*)
- Black tiger prawn (*Penaeus monodon*)

Byproduct species:

- Scampi (primarily *Metanephrops australiensis* and *Metanephrops boschmai*)
- Slipper lobster or bugs (*Thenus parindicus* and *Thenus australiensis*)
- Scallop (*Amusium pleuronectes*)
- Squid, cuttlefish, mud crabs, tropical rock lobster, and some larger fish species

The specific triggers, reference points, and decision rules for the commercial and byproduct species are outlined in the NPF Harvest Strategy with other relevant byproduct limits and prohibited species outlined in Fisheries Management (Northern Prawn Fishery Limited-take and Prohibited-take Species) Direction 2021.

2.1.2 Risk management for bycatch and discard species

The NPF Bycatch Strategy 2020-2026[1] was developed with the aim to better understand and mitigate interactions with ETP species and to continue to achieve reductions in bycatch. The strategy outlines specific objectives and performance indicators for general bycatch, high risk species, and ETP species.

Several management and data collection programs are in place to achieve these objectives, including the crew member observer (CMO) program which commenced in 2003. This program collects data (including photos for species verification purposes) on interactions with species identified as potentially at high risk from the fishing activity and endangered, threatened, and protected (ETP) listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The Bycatch Monitoring Program analyses data collected through the CMO program, AFMA Scientific Observer Program, NPF Integrated Fishery-independent data Program, and logbook reporting to assess catch trends in key ETP and high risk species, with 14 species statistically measurable and assessable in the latest assessment, using data up until 2022 (Fry, et. al, 2024).

The data collected through these programs is also used to inform the NPF's EPBC Act 5-year Strategic Assessment, Bycatch Strategy, ERAs and Marine Stewardship Council (MSC) certification.

2.1.3 Risk management for ETP species

In maintaining MSC certification and Wildlife Trade Operation (WTO) approval, AFMA and NPFI are pursuing the following objectives relating ETP interactions:

1) Interactions with ETP species are known by species, area and time and are independently validated.
2) Fishing operations take all reasonable steps to avoid the mortality of, or injury to, species listed under the EPBC Act, with particular focus on sawfishes and sea snakes.
3) Improve identification of sawfish species in logbook data.
4) Contribute to improved understanding of sawfish and sea snake distribution and abundance in the area of the fishery.
5) Contribute to improved understanding of interactions of sawfish and sea snakes with trawl nets.
6) Improve mitigation measures and survivability of these species.

Sawfish Bycatch Mitigation

Over the past two decades, there has been a focus on better understanding the sawfish interactions in the NPF, including a range of research and monitoring projects that initially focused on determining interaction rates and improving crew identification of sawfish species and accurately recording this in logbooks. This resulted in vast improvements in the accuracy and precision of sawfish monitoring that enables us to better understand the extent of the issue and the spatial and temporal details of these interactions. Since 2017, the focus has shifted towards the development of potential mitigation options and quantifying the impact that the NPF is having on sawfish populations. These research projects initially focused on behavioural

[1] The NPF Bycatch Strategy was extended from 2024 to 2026 to align with the development of the Sawfish Mitigation Strategy (due mid-2026)

characteristics of sawfish in trawl nets and mitigation measures to reduce interactions and has continued into 2025 with a further focus on defining population structure and estimates and trawl survivability.

As impacts on sawfish populations is currently the most critical bycatch issue in the NPF, both the MSC certification and NPF WTO approval (re-certified in July and December 2023 respectively), included the following sawfish conditions:

- ***WTO (due 30 June 2026):*** AFMA must draw on the information developed through the Strategic Research Plan and other supporting research to develop a sawfish bycatch mitigation strategy for the NPF. The strategy should consider the application of all relevant management measures and controls, including potential technological, behavioural, temporal, and spatial responses.
- ***MSC (due 2028):*** Demonstrate that direct effects of the tiger prawn and white banana prawn sub-fisheries are highly likely (with 80% probability) to not hinder recovery of sawfish species.

Species Identification

Another WTO condition requires AFMA to ensure, where possible, all interactions with sawfish and sea snakes in the NPF are reported to the species level. Considerable progress has been made on sawfish identification for logbook reporting in recent years, which is supported by several management and industry initiatives.

In addressing the identification of high risk sawfish species, NPFI and AFMA increased education and developed more resources for operators in the NPF. Each vessel is physically provided with a sawfish identification poster and other identification resources including the protected species guide, and the new northern Australia shark guide. These resources, as well as further training, are provided to operators at the briefings held before each fishing season.

The CMO program undertakes an annual training workshop to enhance identification of ETP species. At the annual workshops, each CMO is supplied with a sampling kit and digital cameras for recording catch data and taking photographs of the ETP species and 'at risk' bycatch species caught in trawls during the banana prawn and tiger prawn seasons. Photographs of ETPs are supplied to a CSIRO scientist and can be used to verify identifications or make an accurate identification outside of fishing operations. AFMA observers are also trained to provide expert identification and at-sea training to crew while onboard undertaking their fishery monitoring program.

2.1.4 Data strategy

To underpin management decisions that ensure ecological sustainability, accurate data collection and monitoring of fishing activity is required to assess and determine an acceptable level of environmental impact. To support this, a broader review of the NPF data collection and monitoring is underway, scheduled to conclude in mid-2026. The key elements of this review include:

- Identification of the current and future data needs for the fishery, including collection of duplicated or unnecessary data, data gaps and required spatial and temporal distribution of data collection.
- Determine the most cost-effective way to collect this data from the available dependant and independent tools (e.g. AFMA observers, CMOs, electronic monitoring, surveys etc.).

This review will support the development of an NPF Data Strategy, outlining the data collection and monitoring requirements, sources, and how it supports evidence-based management decisions and assessments in the NPF.

2.1.5 Research plans

The Northern Prawn Fishery Five Year Strategic Research Plan 2024-28 identifies the research priorities for the fishery to:

- Assist with the pursuit of the management objectives for the NPF, which are consistent with AFMA's objectives.
- Enable the effective implementation and appraisal of management arrangements.

The Strategic Research Plan summarises the priorities for RD&E investment for the NPF for the period 2024-28. Long-term, the Plan seeks to inform a balanced investment portfolio across the environment, development, social and economic research, and extension relevant to end-users. The current and recently completed research projects in the NPF are summarised in **Appendix A**.

2.2 Management Response for High Risk Sawfish Species

The management response for the high risk sawfish species, including monitoring and reporting requirements, is outlined in the NPF Sawfish Plan 2024-2026 (Sawfish Plan), which was developed and finalised in late 2024. This was initially developed to meet the MSC condition requirements, although its scope was expanded to include the related sawfish WTO conditions.

The Sawfish Plan outlines the key actions and activities that have been undertaken to date along with the management activities and significant level of research currently underway, including timeframes for completion. The research has two main focuses: development of mitigation options to reduce sawfish interactions in the NPF and improving available information on sawfish populations/distribution and post release survivability.

Several mitigation focused research projects have recently concluded, with the ongoing mitigation projects concluding later in 2025. The population, distribution and post release survival research projects are still underway, concluding in late 2025 or 1st half of 2026. The outcomes of these research projects will be used to meet MSC 2023 Condition Milestone 1 and the relevant sawfish WTO conditions outlined in Section 2.1.3.

The progression of the Sawfish Plan actions and activities (including the development of the sawfish mitigation strategy), will be led by AFMA and NPFI and closely monitored by NPRAG and NORMAC over the next 18-24 months.

3 References

AFMA (2024). Northern Prawn Fishery Harvest Strategy 2024. AFMA. Accessible at: afma.gov.au/sites/default/files/2024-10/NPF-Harvest-Strategy-2024-Sept24.pdf.

AFMA (2023). Northern Prawn Fishery Five-year Strategic Research Plan 2024-2028. AFMA. Accessible at: afma.gov.au/sites/default/files/2024-08/npf-strategic-research-plan-24-28.pdf.

Fry, G., Liang, X., Yang, W-H., Meteyard, B., Laird, A. and Lawrence, E. (2024) Monitoring interactions with bycatch species using crew-member observer data collected in the Northern Prawn Fishery: 2020 – 2022. Final Report to AFMA; R2020/0804. June 2024. CSIRO, Australia. Pp. 220.

NPF Industry Pty Ltd, AFMA (2024) Northern Prawn Fishery Bycatch Strategy 2020-2026. AFMA. Accessible at: afma.gov.au/sites/default/files/2025-01/NPF-Bycatch-Strategy-2020-2026-Dec-2024.pdf.

NPF Industry Pty Ltd, AFMA (2024) Northern Prawn Fishery Sawfish Workplan 2024-2026. AFMA. Accessible at: afma.gov.au/sites/default/files/2025-01/NPF-Sawfish-Work-Plan-Dec-2024.pdf.

Sporcic, M., Van der Velde, T., Donovan, A., Gerber, C., Fuller, M., Fry, G., Roos, M. (2025). Ecological Risk Assessment for the Effects of Fishing. Draft Report for the Northern Prawn Fishery: Redleg Banana Prawn sub-fishery, 2017 - 2021. Report for the Australian Fisheries Management Authority.

Sporcic, M., Donovan, A., Van Der Velde, T., Fuller, M., Fry, G. (2021a). Ecological Risk Assessment for the Effects of Fishing. Report for Northern Prawn Fishery: Tiger Prawn sub-fishery 2013- 2017. Report for the Australian Fisheries Management Authority. 282 p.

Sporcic, M., Donovan, A., Van Der Velde, T., Fuller, M., Fry, G. (2021b). Ecological Risk Assessment for the Effects of Fishing. Report for Northern Prawn Fishery: Banana Prawn sub-fishery 2013- 2017. Report for the Australian Fisheries Management Authority. 226 p.

Appendix A – Current/Recently Completed Research Projects in the NPF

Research project	Status	Principal Investigator	Purpose
NPF Stock Assessment 2024-2028 **Finishing 2028**	Active	CSIRO	• Provide a full assessment of the tiger prawn fishery for 2026 (using 2025 data). • Provide an update of the fishery catch, effort and survey index of the tiger prawn fishery for 2025 and 2027. • Update the fishing power series in assessment years, that incorporates data from gear surveys conducted annually (for both the tiger prawn fishery and the redleg banana prawn fisheries). • Estimate MEY-based TAEs (Total Allowable Effort) for the tiger prawn fishery for 2026 plus 2027 (based on the 2026 assessment). • Assess stock status of the Redleg Banana Prawn fishery (and if relevant key environmental factors) and provide a TAE for Redleg Banana Prawns in each of 2025, 2026, and 2027. In 2025, review the minimum 70 fishing day threshold requirement to run an assessment in the harvest strategy. • Support the annual estimation of MEY-catch rate triggers for the White Banana Prawn fishery. This will be undertaken each year, i.e., 2025, 2026 and 2027.
Integrated monitoring program NPF 2024-27 **Finishing 2027**	Active	Rob Kenyon (CSIRO)	Undertake analysis of data collected during the recruitment/spawning surveys to determine and evaluate: • Fishery independent parameters on the state and status of the population and recruitment indices for commercial prawn species; • The spatial extent, variability, and abundance of prawn populations; and • The spatial extent and abundance of byproduct and bycatch species at risk.
Vessel charter for the NPF recruitment/spawning surveys 2024-27 **Finishing 2027**	Active	Annie Jarrett (NPFI)	• 2024-25: To obtain two adequate vessels for the recruitment survey (for a 15-20 day period in January/February) meeting the specifications; being the required length, providing adequate crew, providing fuel, and providing stores for both crew and scientists. • 2025-26: To obtain adequate vessels for the spawning survey (one vessel for a 21-day period in June/July) and to obtain two adequate vessels for the recruitment survey (for a 15-20 day period in March) meeting the specifications; being the required length, providing adequate crew, providing fuel, and providing stores for both crew and scientists. • 2026-27: To obtain two adequate vessels for the recruitment survey (for a 15-20 day period in March) meeting the specifications; being the required length, providing adequate crew, providing fuel, and providing stores for both crew and scientists.

Research project	Status	Principal Investigator	Purpose
Integrating long-term catch trend analysis of bycatch species into ecosystem-based sustainability of the Northern Prawn Fishery: 2023 - 2025. **Finishing 2026**	Active	Gary Fry (CSIRO)	• Attend the 2024, 2025 and 2026 annual crew member observer (CMO) workshops and train observers in TEP and 'at risk' bycatch species identification and quality catch data recording. • Process all digital data collected by the CMO, AFMA scientific observers (SO) and integrated monitoring (IMP) programs in 2023, 2024 and 2025 and report on data collected via annual milestone reports. • Undertake a catch trends analysis of CMO, SO and IMP data collected over the 2023-25 banana and tiger prawn seasons, including an evaluation of the performance of the CMO, SO and IMP programs over the previous three years. • Deliver a triennial sustainability assessment report for the TEP and 'at risk' bycatch species impacted by the NPF in 2026.
Multi- fishery collaboration to assess population abundances and post release survival of threatened sawfish in northern Australia FRDC 2022-068 **finishing June 2026** **Co-funded by NESP**	Active	Rich Pillans (NESP)	• Obtain data on abundance of sawfish (via collection of CKMR tissue samples). • Obtain estimates of post release survival (through a sat-tag tagging program) of sawfish captured in gillnet and prawn trawl fisheries operating in the Gulf of Carpentaria and Northern Territory.
Methods to account for climate impacts in fishery models and management: case study example of environmental contributors that affect tiger prawn population dynamics FRDC 2022-062 **finishing in March 2026** **Co-funded by AFMA**	Active	Éva Plagányi (CSIRO)	• Collate relevant environmental and biological data, spatially disaggregated where possible, and conduct statistical analyses to inform as to potential environmental drivers of tiger prawn population dynamics. • To rigorously analyse and quantify potential role of environmental variability in driving tiger prawn population dynamics, including exploring plausibility of alternative hypotheses and possible role of changes in predation. • To fill the most critical data gap and obtain data on inshore tiger prawn juvenile abundance and associated habitat. • Outreach and extension: a number of extension activities and materials to support broader dissemination of study findings.
Trials of oceanographic data collection on commercial fishing vessels in SE Australia FRDC 2022-007 **finishing May 2025**	Active	Ian Knuckey (Fishwell Consulting)	• Effective installation and operation of oceanographic data collection equipment on network of commercial fishing vessels using a range of common fishing gear. • To provide QC'd data direct to fishers in near real-time to assist in habitat characterisation and the targeting of effort. • To cost-effectively increase the spatial resolution of sub-surface physical data collected in Australia's inshore, shelf, upper-slope, and offshore waters by fitting commercial fishing equipment from a variety of gear types with low-cost temperature/pressure sensors. • To make the QC'd temperature depth data publicly available through the IMOS-AODN portal for uptake and use in ways that support safe maritime operations the sustainable management of marine resources, and improves understanding of drivers of change.

Research project	Status	Principal Investigator	Purpose
Mitigating Sawfish Interactions in the Northern Prawn Fishery (NPF Industry Pty Ltd) Threatened and Migratory Species Fisheries Bycatch Mitigation Program – **Finished April 2025**	Complete	Annie Jarrett (NPFI)	• Collect and analyse data to determine the potential efficiency of TED flap mesh material to enable the egress of sawfish; and • Undertake trials of a modified TED (STED) which has been designed with a view to reducing sawfish interactions/improving escapement.
Assessing the impacts of trawl gear on sawfishes in the Northern Prawn Fishery with the aim to identify and test mitigation measures ensuring the long-term sustainability of Sawfish populations in northern Australia **FRDC 2019-112 finishing 2025**	Active	Gary Fry (CSIRO)	• Build on the Our Marine Parks Round One grant pilot project (2019) by using the 2019 - 2022 industry (CMO) data and photographs to 1) identify the type of TED being used by each vessel and 2) determine the position each sawfish is caught in the nets. • CMO photos of sawfish catches will be analysed to identify specific areas of the trawl net where sawfish are most commonly entangled and to determine the species, sex, and life status of the sawfish reported by the CMOs. • Underwater video cameras will be deployed on a number of NPF commercial vessels during the banana and tiger prawn seasons of 2020 - 2023 to monitor behaviour of sawfish interactions with trawl nets. • Video footage will be analysed to determine sawfish behaviour when entering a trawl net and escapement rates using current trawl gear, which are unknown at present. • Provide footage of other large animals that escape through the TED.
Estimating Narrow Sawfish (*Anoxypristis cuspidata*) abundance using close kin mark recapture FRDC 2021-015 **finishing 2025**	Active	Toby Patterson (CSIRO)	The CSIRO has pioneered a new technique for assessing populations called Close-Kin Mark Recapture (CKMR) that can be applied to sawfish in the NPF. With enough data, and for suitable species, the method can provide estimates of: • abundance of the breeding adult segment of a population • adult survival rates • connectivity within mature individuals of a population • population trends
NPF Ecological Risk Assessment – Redleg Banana Prawn Sub-fishery **Finishing 2025**	Completed	Miriana Sporcic (CSIRO)	Ecological risk assessments are used to identify which species, habitats or communities are at risk from the effects of fishing. The ERA allows a broad range of species to be assessed under a single framework, allowing for informed decisions management decisions.

Research project	Status	Principal Investigator	Purpose
Investigating potential for fishing gear, technology and management measures to reduce sawfish and sea snake interactions in Australia's Northern Prawn Fishery (NPF Industry Pty Ltd) MSC funded project **Finished November 2024**	Complete	Annie Jarrett (NPFI)	• Analyse observer data and catch data to identify differences in bycatch between individual vessels, gear type and net mesh size, fishing grounds, and fishing times and seasons. • Support the development and design of sawfish bycatch mitigation trials. • Evaluate whether the implementation of Tom's Fisheye BRD to trawl nets has reduced sea snake bycatch.
Potential of electric fields to reduce bycatch of highly threatened sawfishes. **Finished 2021**	Complete	Katya Abrantes (JCU)	• Tested the effects of electric fields on sawfish behaviour to assess the potential of electric pulses in mitigating sawfish bycatch. • Experiments were conducted in a tank where 2 electrodes were suspended in the water column, connected to a pulse generator, and placed across the swimming path of sawfish. • Two largetooth sawfish (*Pristis pristis*) were tested in control conditions, in the presence of a baseline pulse, and of 5 variations of that pulse where 1 parameter (polarity, voltage, frequency, pulse shape, pulse duration) was altered at a time. • Conditional inference trees were used to identify the effects of various parameters (e.g. treatment, individual) on reaction type, re action distance, twitching presence and duration, and inter-approach times.
How does trawl gear configuration affect sawfish catches - mitigating commercial fishing interactions with sawfish in the North and North-West Marine Parks Networks. **Finished 2019**	Complete	Gary Fry (CSIRO)	• CSIRO monitors trends in catch within the NPF and produces speciesspecific catch rates and maps of catch that are published in the sustainability report produced every 3 years. Narrow sawfish CPUE in the NPF was stable between 2010–2019. • >900 photos from CMOs used to identify where sawfish are entangled in the net (2010–2018). The net is divided into 9 regions with these data showing small (<1.4 m total length (TL)) sawfish mainly in the cod end and large sawfish in the first 2 m of net before the TED. There were also differences between bottom and top opening TEDs. • Cameras in the net were used to investigate if animals escaped and also where they were caught in the net.