



Northern Prawn Fishery Bycatch Strategy 2020-2024

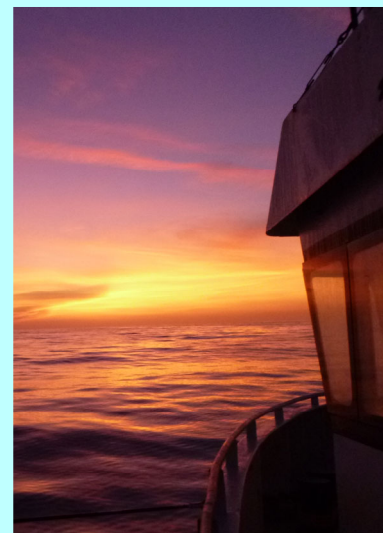


Australian Government
Australian Fisheries Management Authority



NPF Industry Pty Ltd

Producing the finest quality prawns from a sustainable marine ecosystem



Northern Prawn Fishery

Bycatch Strategy 2020-2024

Introduction

The Northern Prawn Fishery (NPF) spans over 750,000 km² across northern Australia and catches eight commercial species of prawns. The fishing grounds vary in depth and substrate across the breadth of the fishery and the fishing strategies can also vary with each target species group and season.

The NPF has two distinct fishing seasons each year: April to June, predominately targeting white Banana Prawns, and August to December, predominately targeting Tiger Prawns. Redleg Banana Prawns are also caught in the Joseph Bonaparte Gulf sub-fishery between August and December. This region is closed to fishing in the first season. A comprehensive suite of spatial and temporal closures, including permanent closures to protect sensitive habitats, are also in place to help maintain the sustainability and productivity of the fishery. The NPF is globally recognised as one of the world's best managed prawn trawl fisheries (Dichmont et al. 2007) and was first certified by the Marine Stewardship Council (MSC) in 2012.

General bycatch and interactions with non-targeted animals are not uniform across the fishery and can be quite different spatially and temporally. Higher quantities of fish bycatch are generally associated with Tiger Prawn fishing, while bycatch is generally less when catching white Banana Prawns where the schooling prawns are targeted in what are termed 'banana boils' (Dell et al 2009). Hence strategies to minimise these interactions may also differ.

The previous NPF Bycatch Strategy 2015 – 2018 was developed and implemented by the NPF industry with a target to reduce small bycatch by 30% over three years. Through this strategy, three new Bycatch Reduction Devices (BRDs) were developed that reduce small bycatch by between 37 - 44% when compared to the Square Mesh Panel BRD - the most commonly used BRD at the time. The new devices were mandated for use in the Tiger Prawn season from 2020 and older, less efficient devices were removed from the approved BRD list.

With these significant achievements in reducing the capture of small bycatch in recent years, the NPF industry has identified interactions with priority species – e.g. sawfishes and sea snakes – as the main priorities to be addressed under the NPF Bycatch Strategy 2020 – 2024. The industry will also continue to improve general bycatch mitigation through further enhancements to BRDs and/or gear modifications as part of this Strategy. Any further changes to BRDs and/or gear will be scientifically tested as was done under the previous strategy.

A crew-based monitoring program (CMO program) has been in place in the NPF since 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 those listed as Threatened,

Endangered and Protected (TEP) species under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

The data collected through the CMO program is used, in conjunction with data collected through the AFMA Scientific Observer Program and the NPF Integrated Monitoring Program, to analyse and assess catch trends in these species. The data collected through these programs is also used to inform the NPF's EPBC Act 5-year Strategic Assessment, the NPF Ecological Risk Assessment (ERA) and Marine Stewardship Council (MSC) certification. These programs also inform reviews of the Bycatch Strategy.

Interactions with TEP species are also recorded by NPF skippers in their daily logbooks. This data is used for quarterly reporting to the Department of Agriculture, Water and the Environment and to inform Ecological Risk Assessments of the Fishery.

Vision

To better understand and mitigate interactions with priority species and to continue to achieve reductions in bycatch.

Objectives

THREATENED, ENDANGERED AND PROTECTED (TEP) SPECIES

Objectives

1. Interactions with TEP 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 the trawl nets; and
6. Improve mitigation measures and survivability of these species.

Performance Indicators

1. Data collected through NPF observer programs and Integrated Monitoring Program for the bycatch sustainability assessment.
2. Crew Member Observers monitor a minimum of 2,340 trawl shots¹ (approximately 12% of fishing) across both fishing seasons for TEP species each year.
3. A minimum of 85% of interactions recorded by CMOs photographed for species verification to assist assessments of bycatch sustainability and ecological risk.

¹ See Brewer et al 2007.

4. Sawfish identification material developed and distributed to all vessels and training provided on species identification and handling techniques to increase survivability of the animals.
5. All NPF operators reporting interactions with sawfish in logbooks and, where possible, all sawfish species identified to species level. Reporting rates published in the annual NPF Data Summary.
6. Sawfish tissue samples collected during each fishing season by Crew Member Observers, AFMA Observers and other NPF skippers and/or crew for analysis of population abundances and connectivity and other research.
7. Research undertaken to collect data on sawfish and sea snake behavior when encountering trawl nets, including deployment of underwater camera systems on two NPF vessels during the fishing seasons.
8. CMO records of sawfish interactions analysed to determine if there are areas of the trawl net where sawfish are more susceptible to entanglement.
9. Alternative mitigation measures to improve escapement of sawfish and sea snakes investigated and adopted, including consideration of gear, behavioral, temporal and spatial measures, where feasible.

HIGH-RISK SPECIES

Objectives

1. Interactions with high-risk species are known by species, area and time and are independently validated.
2. Identify and implement measures to assist the fishery to avoid and/or minimise interactions with high-risk species.

Performance Indicators

1. Data collected through NPF observer programs and prawn monitoring surveys for bycatch sustainability assessment.
2. Industry code of conduct developed and implemented in 2020 (stipulating operators use Schedule 3 BRDs when targeting Tiger Prawns in the Banana Prawn season²) remains in force. Operators will report which BRDs were used in the annual NPF Gear Survey.
3. Crew Member Observers monitored a minimum of 2,340 trawl shots (approximately 12% of fishing) across both fishing seasons for high-risk species each year.
4. A minimum of 85% of interactions recorded by CMOs photographed for species verification and bycatch sustainability and ecological risk assessments, annually³.
5. Undertake review of possible additional measures required to assess high-risk species; e.g. targeted data collection, monitoring and/or research.
6. Support the implementation of new measures to avoid and/or minimize interactions with high-risk species.

² The new BRDs developed and implemented under the NPF Bycatch Strategy 2015-2018 that reduce bycatch by more than 30% are described under Schedule 3 of the NPF Gear Requirements Direction. These devices were made mandatory for use in the Tiger Prawn season from 1 August 2020.

³ CMOs collect data in addition to their work duties on the boat. It is not practical for 100% of interactions to be photographed and at times the animals may be released or escape before the photo can be taken.

GENERAL BYCATCH

Objectives

1. Avoid and/or minimise interactions with general bycatch species.
2. Investigate ways to further reduce the capture of small fish and other bycatch through new BRDs/technology.
3. Investigate and implement options, where feasible, to improve understanding of catch compositions across the fishery by species, area and season.
4. Continue to support the collection of independently validated data on general bycatch through the scientific observer program.

Performance Indicators

1. Industry code of conduct developed and implemented in 2020 (stipulating operators use Schedule 3 BRDs when targeting Tiger Prawns in the Banana Prawn season) remains in force. Operators will report which BRDs were used in the annual NPF Gear Survey.
2. Any new BRD design or modification is tested against either:
 - a) a Tom's Fisheye BRD that is positioned at 60 meshes from the codend drawstrings or
 - b) a Square Mesh Panel BRD that is positioned at 120 meshes from the codend drawstrings.
3. Any new device tested against:
 - a) the Tom's Fisheye BRD as described above and achieves a reduction in bycatch that is equal to or greater than the Tom's Fisheye BRD, with minimal (<2.5% prawn loss) and is approved for use in the NPF; **or**
 - b) a Square Mesh Panel BRD as described above and achieves a minimum of 43.7% reduction in bycatch with minimal (<2.5%) prawn loss and is approved for use in the NPF.
4. Analysis undertaken of the quantity of Tiger Prawns caught in the first season (as a proportion of the yearly Tiger Prawn catch) to determine a trigger value for review of BRD use in the first season.
5. Data collection and monitoring in place for general bycatch through independent scientific observer program and analysis undertaken as required.

Implementation

Objective	Risks being addressed	Performance Indicators	Actions
Threatened, Endangered and Protected (TEP) species			
<p>1. Interactions with TEP species are known by species, area and time and are independently validated.</p>	<p>Sawfish interactions Sea snake interactions Crew safety</p>	<p>Data collected through NPF observer programs and Integrated Monitoring Program for the bycatch sustainability assessment.</p> <p>Crew Member Observers monitored a minimum of 2,340 trawl shots (approximately 12% of fishing effort) across both fishing seasons for TEP species each year.</p> <p>A minimum of 85% of interactions recorded by CMOs photographed for species verification and bycatch sustainability and ecological risk assessments.</p>	<p>Deliver CMO training program (annually).</p> <p>Recruit a minimum of 12 CMOs per year to participate in the program (annually).</p> <p>Undertake catch trend analysis of CMO, scientific observer and NPF survey data every 3 years (2023).</p> <p>Submit a milestone report to AFMA on the CMO data collected to date (annually).</p> <p>Deliver a triennial sustainability assessment report for the TEP and NPF high-risk bycatch (2023).</p> <p>Provide update on CMO program to NPRAG and NORMAC (annually).</p>
<p>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.</p>	<p>Sawfish interactions Sea snake interactions</p>	<p>Alternative mitigation measures to improve escapement of sawfish and sea snakes investigated and adopted, including consideration of gear, behavioral, temporal</p>	<p>Identify alternative mitigation measures for industry to review for testing and adoption where feasible (2021 to 2024).</p>

Objective	Risks being addressed	Performance Indicators	Actions
3. Improve identification of sawfish species in logbook data.	Sawfish interactions	<p>and spatial measures, where feasible.</p> <p>Sawfish identification material developed and distributed to all vessels and training provided on species identification and handling techniques to increase survivability of the animals.</p> <p>All NPF operators reporting interactions with sawfish in logbooks and, where possible, all sawfish species are identified to species level. Reporting rates published in the annual NPF Data Summary.</p>	<p>Display sawfish identification material on vessels for skippers and crew to refer to (ongoing).</p> <p>Provide training at pre-season briefings and CMO workshops on species identification and handling techniques (annually).</p> <p>Analyse NPF logbook data for sawfish interaction reporting and species identification rates (annually).</p> <p>Publish aggregated data on sawfish interactions and species in the NPF Data Summary (annually).</p>
4. Contribute to improved understanding of sawfish and sea snake distribution and abundance in the area of the fishery.	Sawfish interactions Sea snake interactions	<p>Sawfish tissue samples collected during each fishing seasons by Crew Member Observers, AFMA Observers and other NPF skippers and/or crew for analysis of population abundances and connectivity and other research.</p> <p>Data collected through NPF observer programs</p>	<p>Distribute sawfish tissue sampling kits to CMOs, skippers, AFMA observers, broodstock collection vessels each season (biannually).</p> <p>Collect samples each season and supply to CSIRO for genetic analyses (biannually).</p> <p>Undertake catch trends analysis of CMO, scientific observer and NPF survey data every 3 years (2023).</p> <p>Submit a milestone report to AFMA on the CMO data collected to date (annually).</p>

Objective	Risks being addressed	Performance Indicators	Actions
		<p>and Integrated Monitoring Program for the bycatch sustainability assessment.</p> <p>Crew Member Observers monitored a minimum of 2,340 trawl shots (approximately 12% of fishing effort) across both fishing seasons for TEP species each year.</p> <p>A minimum of 85% of interactions recorded by CMOs photographed for species verification and bycatch sustainability and ecological risk assessments.</p>	<p>Deliver a triennial sustainability assessment report for the TEP and NPF high-risk bycatch (2023).</p> <p>Provide regular updates on CMO program to NPRAG and NORMAC (annually)</p>
<p>5. Contribute to improved understanding of interactions of sawfish and sea snakes with the trawl nets.</p>	<p>Sawfish interactions</p> <p>Sea snake interactions</p>	<p>Research undertaken to collect data on sawfish and sea snake behavior when encountering trawl nets, including deployment of underwater camera systems on two NPF vessels during the fishing seasons.</p>	<p>Deploy camera systems on two trawlers to monitor fishing activity to record sawfish and sea snake behaviour in the trawl nets (June 2020 to April 2023).</p> <p>Analyse video data (annually)</p> <p>Identify areas of the trawl gear with high entanglement of sawfish (2023 to 2024).</p>
<p>6. Improve mitigation measures and survivability of TEP species.</p>	<p>Sawfish interactions</p> <p>Sea snake interactions</p>	<p>CMO records of sawfish interactions analysed to determine if there are areas of the trawl net</p>	<p>Identify potential mitigation measures for testing to determine if sawfish interactions can be reduced (2023 to 2024).</p>

Objective	Risks being addressed	Performance Indicators	Actions
		where sawfish are more susceptible to entanglement.	Identify research options for sawfish post trawl survivability experiments and present to industry and NPRAG for consideration and adoption (December 2022).
High-Risk Species			
1. Interactions with high-risk species are known by species, area and time and are independently validated.	High-risk species	<p>Data collected through NPF observer programs and prawn monitoring surveys for bycatch sustainability assessment.</p> <p>Crew Member Observers monitored a minimum of 2,340 trawl shots (approximately 12% of fishing) across both fishing seasons for high-risk species each year.</p> <p>A minimum of 85% of interactions recorded by CMOs photographed for species verification and bycatch sustainability and ecological risk assessments, annually.</p>	<p>Deliver CMO training program (annually).</p> <p>Recruit a minimum of 12 CMOs per year to participate in the program (annually).</p> <p>Undertake catch trends analysis of CMO, scientific observer and NPF survey data every 3 years (2023).</p> <p>Submit a milestone report to AFMA on the CMO data collected to date (annually).</p> <p>Deliver a triennial sustainability assessment report for the TEP and NPF high-risk bycatch (2023).</p> <p>Provide an update on CMO program to NPRAG and NORMAC (annually).</p>
2. Identify and implement measures to assist the fishery to avoid and/or minimise interactions with high-risk species.	High-risk species	Industry code of conduct developed and implemented in 2020 (stipulating operators use Schedule 3 BRDs when targeting Tiger Prawns in the Banana	<p>Implement Industry code of conduct and operators adhere to code (2021 and ongoing)</p> <p>Operators reporting which BRDs were used in the annual NPF Gear Survey (annually).</p>

Objective	Risks being addressed	Performance Indicators	Actions
		<p>Prawn season) remains in force.</p> <p>Undertake review of possible additional measures required to assess high-risk species; e.g. targeted data collection, monitoring and/or research.</p> <p>Support the implementation of new measures to avoid and/or minimize interactions with high-risk species.</p>	<p>Undertake review to identify possible additional measures required to assess high-risk species (by 2024).</p> <p>Explore measures for minimising interactions with high-risk species and trial candidate measures (2020 to 2024).</p>
General Bycatch			
1. Avoid and/or minimise interactions with general bycatch species.	General bycatch	Industry code of conduct developed and implemented in 2020 (stipulating operators use Schedule 3 BRDs when targeting Tiger Prawns in the Banana Prawn season) remains in force. Operators will report which BRDs were used in the annual NPF Gear Survey.	Implement Industry code of conduct and adhere (operators) to code (2020 and ongoing). Operators reporting which BRDs were used in the annual NPF Gear Survey (annually).
2. Investigate ways to further reduce the capture of small fish and other bycatch through new BRDs/technology.	General bycatch	Any new BRD design or modification is tested against either:	Continue to encourage innovations to improve BRD performance (2020 to 2024).

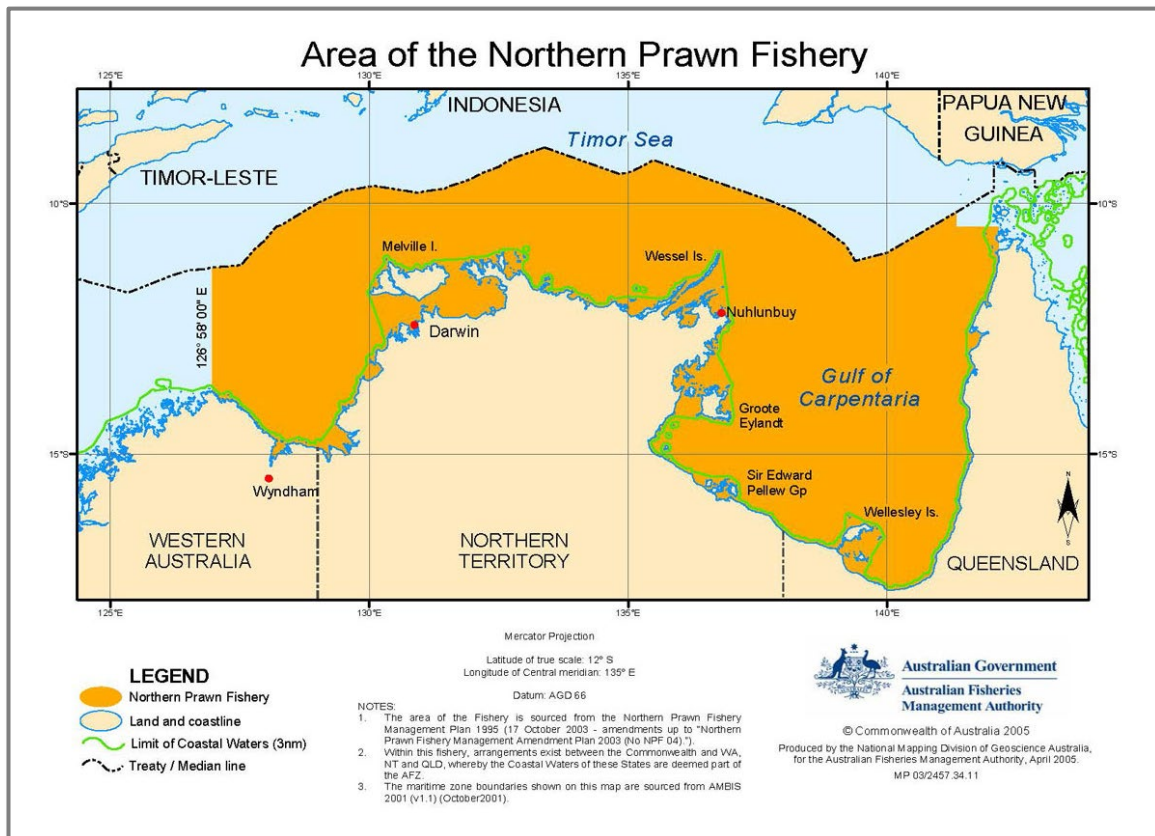
Objective	Risks being addressed	Performance Indicators	Actions
		<p>a) a Tom’s Fisheye BRD that is positioned at 60 meshes from the codend drawstrings or</p> <p>b) a Square Mesh Panel BRD that is positioned at 120 meshes from the codend drawstrings.</p> <p>Any new device tested against:</p> <p>a) the Tom’s Fisheye BRD as described above and achieves a reduction in bycatch that is equal to or greater than the Tom’s Fisheye BRD, with minimal (<2.5% prawn loss) and is approved for use in the NPF; or</p> <p>b) a Square Mesh Panel BRD as described above and achieves a minimum of 43.7% reduction in bycatch with minimal (<2.5%) prawn loss and is approved for use in the NPF.</p>	<p>Determine conditions under which new BRDs/ technology might be tested (December 2021).</p> <p>Monitor testing of new BRDs/ technology and disseminate results to industry, NPRAG and NORMAC (December 2024).</p> <p>Update NPF Gear Requirements Direction to remove ineffective devices (end of 2021).</p> <p>Analyse Tiger Prawn catch in the Banana Prawn season and develop a trigger value for review of BRD use in consultation with NPRAG (end of 2024).</p>

Objective	Risks being addressed	Performance Indicators	Actions
		Analysis undertaken of the quantity of Tiger Prawns caught in the first half (as a proportion of the yearly Tiger Prawn catch) to determine a trigger value for review of BRD use in the first season.	
3. Investigate and implement options, where feasible, to improve understanding of catch compositions across the fishery by species, area and season.	General bycatch	Data collection and monitoring in place for general bycatch through independent scientific observer program and analysis undertaken as required.	Independent scientific observers collect data on catch compositions (ongoing). Identify options to improve understanding of catch compositions across the fishery for consideration by NPFI and NPRAG (December 2024).
4. Continue to support the collection of independently validated data on general bycatch through the scientific observer program.	General bycatch	Data collection and monitoring in place for general bycatch through independent scientific observer program and analysis undertaken as required.	Independent scientific observers collect data on catch compositions and general bycatch (ongoing).

Appendix 1 Fishery snapshot

Management

The NPF is located off Australia's northern coast, extending from Cape York Peninsula, Queensland, in the east to Cape Londonderry in Western Australia. The fishery is managed by the Commonwealth through AFMA under Offshore Constitutional Settlement (OCS) arrangements with Queensland, the Northern Territory and Western Australian governments and the Northern Prawn Fishery Management Plan 1995.



The NPF is managed through a series of input controls, including limited entry to the fishery, catch triggers, gear restrictions, bycatch restrictions and a system of seasonal, spatial and temporal closures.

In January 2009, AFMA and NPF Industry Pty Ltd (NPFi) entered a co-management trial aimed at providing industry bodies with a greater role in advising AFMA on operational and commercial matters in a fishery. Since the trial was completed in 2012, AFMA and NPFi have implemented co-management as a permanent component of the management arrangements in the NPF.

Product

Banana and Tiger Prawns are the main species targeted in the fishery with various other prawns having commercial importance including Endeavour Prawns. The commercial catch is also made up of byproduct species including Scampi, Bugs, Scallops and Squid.

Sustainability and Economics

The Fishery adopted a Maximum Economic Yield (MEY) target for the Tiger Prawn fishery in 2005 and implemented an MEY catch trigger for white Banana Prawns for the first time in 2014. The MEY targets have been adopted to optimise net economic returns to the Australian community from the Fishery and to contribute to the ecologically sustainable development of the Fishery.

The NPF was one of Australia's first fisheries to explicitly focus on bycatch research and minimisation, developing a Bycatch Action Plan (BAP) in 1998 which was the first of any Australian fishery. Since the implementation of the BAP, the Fishery has achieved significant milestones in the management of bycatch, including more than a 50% reduction of bycatch through the introduction of Turtle Excluder Devices (TEDs), Bycatch Reduction devices (BRDs), reduced effort and the implementation of spatial and temporal closures.



The certification of the Fishery in 2012 by the Marine Stewardship Council (MSC) as a sustainably managed fishery is testament to the success of the measures which have been adopted to date. NPF Industry is committed to a continuous improvement process to further reduce ecosystem impacts, including in relation to bycatch.

Research outcomes have shown TEDs to be successful in the reduction of incidental capture of turtles, with rates decreasing from approximately 5,700 interactions (deaths unknown) in the late 1980s (Poiner et al. 1990) to less than 70 interactions and 5 fatalities a year (Laird, 2020). Additional benefits include a reduction in the capture of large sharks and rays by 86% and 94% respectively, including a reduction in the capture of the most commonly caught sawfish, the Narrow Sawfish *Anoxypristis cuspidata*, by 73% (Brewer et al. 2006).

Few BRD designs have been successful in delivering significant reductions in sea snake bycatch. However, trials of the Popeye Fishbox design in 2006 revealed that this design can deliver an 87% reduction in catches of sea snakes when installed at 70 meshes from the codend drawstrings and 48% reduction in small fish bycatch (Raudzens, 2007).

Trials using the Square Mesh Panel in combination with a Witch's Hat BRD Enhancer in 2009 demonstrated that (when used in conjunction with a TED) a 34% reduction in small finfish bycatch is possible when installed at 100 meshes from the codend drawstrings (Gerner and Maynard, 2010).

The need for further refinements was identified by industry to enhance durability and ease of use. Additional trials in 2013 and 2014 of refined Witch's Hat designs demonstrated more modest performance in bycatch reduction achieving 12% and 5%, respectively (Laird et al. 2015).

In 2015, NPF Industry Pty Ltd launched the NPF's Bycatch Strategy 2015-2018 with the vision to reduce the capture of small bycatch by 30% within three years. A key component of the Bycatch Strategy was industry innovation and through this process, several BRDs were developed.



From 2015 to 2017, the industry developed BRDs were initially tested by commercial vessel crews during the fishing seasons. Through this process, the Kon's Covered Fisheyes (KCF), Tom's Fisheye, and the FishEX 70 were selected for at-sea scientific testing in the Fishery, primarily in the Gulf of Carpentaria, during commercial operations in 2016 and 2018. In all trials the performance of the new BRD designs was compared to the commonly used Square Mesh Panel BRD to determine the level of bycatch reduction and prawn loss/gain of the new designs. The three devices were found to significantly reduce capture of small bycatch by approximately 23.25 to 43.73%, with average commercial prawn losses ranging from -3.33% to +0.5% (Laird et al. 2020) and were approved for use in the Fishery.

To assist skippers with the transition from the Square Mesh Panel or standard Fisheye BRDs to the new BRDs, an implementation plan was developed where vessels were required to operate with 50% of the vessels nets fitted with the new BRDs and the remaining 50% with the current BRD used. In August 2018, NPF Industry Pty Ltd and AFMA implemented the phase-in approach for the Tiger Prawn seasons as a means of demonstrating to the fishers the effect of the new BRDs on significantly reducing small bycatch and at the same time maintaining their commercial prawn catches. As there would be significantly less bycatch volumes in their nets with the new BRDs compared to what skippers are used to, comparing their catches between the new device and what they previously used could alleviate concerns of prawn losses and show commercial prawn catch is not being compromised. Full implementation of the new BRDs in the Tiger Prawn season became mandatory on 1 August 2020.

References

- Blaber, S.J.M., Brewer, D.T. and Harris, A.N. 1994. *The distribution, biomass and community structure of fishes of the Gulf of Carpentaria*. Australian Journal of Marine and Freshwater Research, 45: 375-396.
- Brewer D., Heales D., Milton D., Dell Q., Fry G., Venables B., and Jones, P. (2006). *The impact of turtle excluder devices and bycatch reduction devices on diverse tropical marine communities in Australia's northern prawn trawl fishery*. Fisheries Research 81, 176–188.
- Brewer, DT, Griffiths, S, Heales, DS, Zhou, S, Tonks, M, Dell, Q, Kuhnert, P, Keys, S, Whitelaw, W, Burke, A, Raudzens, E. (2004). Design, trial and implementation of an integrated, long-term bycatch monitoring program, road tested in the NPF. Final Report on FRDC Project 2004/024. CSIRO Cleveland. pp. 416.
- Dell, Q., Brewer D.T., Griffiths, S.P., Heales, D.S. and Tonks, M.L. 2009. *Bycatch in a tropical schooling – penaeid fishery and comparisons with a related, specialised trawl regime*. Fisheries Management and Ecology, 16 (3) 191-201.
- Dichmont, C.M., Loneragan, N., Brewer, D.T., Poiner, I. 2007. *Partnerships Towards Sustainable Use of Australia's Northern Prawn Fishery*. Pp. 207-230. In: McClanahan, T.R. and Castilla, J.C. (Eds). Fisheries management: progress towards sustainability. Blackwell Publishing, Oxford. 332 pp.
- Gerner M. E. & Maynard D. (2010). *At-sea testing of the witch's hat bycatch reduction device enhancer in the Northern Prawn Fishery*. Australian Fisheries Management Authority, Canberra.
- Laird, A. (2020). *Northern Prawn Fishery Data Summary 2019*. NPF Industry Pty Ltd, Australia.
- Laird, A, Cahill, J., Hall, S., Liddell, B., Lawrence, E., and Fry, G. (2020). *Industry gear innovations achieves bycatch reduction target in the NPF*. Final Report. NPF Industry Pty Ltd, Queensland, Australia. Pp. 67.
- Laird, A., Prendergast, A., and Wakeford, J. (2015). *At sea testing of the witch's hat BRD enhancer 2.0 with a modified square mesh panel in the Northern Prawn Fishery*. NPF Industry Pty Ltd, Australia.
- Poiner, I. R., Buckworth, R. C., and Harris, A. N. M. (1990). *Incidental Capture and Mortality of Sea Turtles in Australia's Northern Prawn Fishery*. Australian Journal of Marine and Freshwater Research. 41, 97-110.
- Raudzens, E.E. (2007). *At sea testing of The Popeye Fishbox bycatch reduction device onboard the FV Adelaide Pearl for approval in Australia's Northern Prawn Fishery*. Australian Fisheries Management Authority, Canberra.