Risk Assessment

Transition of the NSW Southern Fish Trawl Restricted Fishery to Commonwealth Management

59918095

Prepared for

NSW Department of Primary Industries

19 February 2018

Cardno

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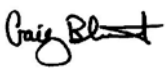

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Executive Summary

Currently an Offshore Constitutional Settlement (OCS) arrangement exists between New South Wales (NSW) and the Commonwealth governments in relation to the commercial fishing take of certain species, in certain waters, by certain methods. NSW Department of Primary Industries (DPI) and the Australian Fisheries Management Authority have worked co-operatively to address OCS issues including rationalizing the management of commercial fisheries that harvest fish stocks shared with other jurisdictions, which are governed by existing OCS agreement. It is proposed to transition the management of the Southern Fish Trawl Restricted Fishery (SFTF) to the Commonwealth and amalgamate it with the Commonwealth South East Trawl Sector (CTS) of the Southern and Eastern Scalefish and Shark Fishery (SESSF). Negotiations are currently underway with regards to the details of the new management arrangements that are to apply to SFTF operators once the transition to Commonwealth management is complete.

As part of this process NSW DPI has engaged Cardno to conduct a Risk Assessment for potential management transition options so that the relative risks (and benefits) of each can inform negotiations among stakeholders. This document presents the results of a high level qualitative risk assessment for the amalgamation of the SFTF with the SESSF CTS.

Cardno's Terms of Reference (ToR) for the risk assessment included:

1. Identify the real and perceived environmental, economic and social risks/benefits associated with the transition under a proposed package (where fishing business owners that are eligible for a SFTF endorsement are granted species quota SFRs and a NSW Coastal Waters (NCW) Permit with various conditions, subject to two spatial closure scenarios) to each stakeholder group (commercial fishing industry, recreational fishing industry, and the broader NSW community);
2. Identify the environmental, economic and social risks/benefits associated with the transition under an alternative package (where NSW cedes some or all waters open to fish trawling to the Commonwealth and the fishery becomes one where former SFT operators have a boat SFR and species quota SFRs) to each stakeholder group (commercial fishing industry, recreational fishing industry, and the broader NSW community);
3. Determine a relative level of each risk identified in 1) and 2), and propose options to mitigate those risks.

Transition Option 1 would grant fishing business owners that are eligible for a SFTF endorsement with quota SFRs based on some level of catch history and a NSW Coastal Waters (NCW) Permit with conditions that restrict fishing activity to within 3 nm of the NSW coastline south of Barrenjoey Head (subject to two spatial closure scenarios), restrict vessel length to a maximum of 25 m and permit certain exemptions to gear restrictions when targeting inshore species. Access rights and area of operation of SESSF CTS concession holders would remain unchanged.

Under Transition Option 2, NSW cedes some or all of state coastal waters open to fish trawling (subject to four spatial closure scenarios) to the Commonwealth and the fishery becomes one where former SFTF operators are issued SESSF CTS Vessel SFRs and species quota SFRs.

Input or output controls under both options would be similar, meaning many of the risks from the two options would be more or less the same. The main differences between the options would be how many vessels could potentially operate in NCW, the size of the vessels and how much of NCW would be closed under each option.

High risks would potentially be associated with:

(1) Option 2, where CTS vessels were allowed to fish in NCW with few constraints. This scenario could potentially lead to large increases from current effort, and greater competition with other commercial or recreational fisheries that share grounds or resources. In addition to potentially leading to environmental concerns, this could also result in a high risk of loss of income if catches were reduced as a result;

(2) Implementation of inshore closures (Options 1 or 2). This scenario could potentially lead to increased effort into a smaller area than currently fished and greater competition with other commercial fisheries that share grounds or resources. This could also lead to the issues identified above;

(3) Increases in boat size (Options 1 or 2). This would likely be due to a perception by stakeholders that larger vessels could catch more fish or cause environmental harm;

(4) Decreases in MLL (minimum legal length) or no size limit for some important recreational species (Options 1 or 2). This would likely be due to a perception by stakeholders that trawlers would have access to more fish or cause environmental harm; and

(5) Mid-water and pair trawling (Option 2). This would likely be due to a perception by stakeholders that mid-water and/or pair trawling would have a negative indirect effect on fish targeted by recreational fishers (by reducing abundance of forage species) or cause environmental harm (such as increased TEP interactions or discarding and food web effects).

In addition to the risks of hazards above associated with the two options, there would also be potential benefits from each. The likelihood or ranking among these benefits was not part of Cardno's ToR, but it is clear that there are many potential benefits to the various stakeholders associated with either option. Given the qualitative nature of this project, it is however not clear whether the benefits of an option potentially outweigh the risk.

It should be noted that various economic, social and environmental consequences of management change (hazards or benefits) can interact with one another. An attempt to mitigate a particular risk to one stakeholder may have the effect of increasing risk (or reducing benefit) to another category and/or stakeholder. For example, permitting SFTF operators a gear exemption for not using a BRD (i.e. continuation of using current gear) with one method will mitigate risk to their income but increase risk to AFMA's reputation and responsibility for environmental stewardship. It is beyond the scope of the present report to assess the effect of proposed mitigation strategies on identified risks, nor to discuss optimising benefits.

Of the two transition options (and associated spatial closure scenarios) considered by NSW DPI and AFMA, Option 1 (with no spatial closures) results in minimum relative change and most closely resembles the pre-transition status quo. As such, it represents the most risk averse management transition option. Option 2 involves a number of high risks due to the possible increased effort of the CTS fleet and different gears operating in NCW. With this in mind, the task of identifying strategies to mitigate risks associated with the transition of SFTF to Commonwealth management is intertwined with a comparison of Option 1 and Option 2 with respect to relative risk. A number of attributes of Option 1 could be seen as measures to mitigate risk that arise from implementation of Option 2. For example: high economic, environmental and social risks were associated with increases in individual vessel size and also increases in fleet size potentially operating in NCW. Option 1 can mitigate more effectively against these risks by using a permit to control access. Permits allow conditions to be attached and can be used to limit vessel length, the area of operation and gear used. A permit system could restrict the number of vessels allowed to operate in NCW and also their length. Whilst Option 1 does allow for an increase in vessel length from 20m (current SFTF maximum) to 25m it should be understood that vessels in excess of 20m are currently allowed (via exemptions) to operate in the SFTF and that a maximum length of 25m would permit all vessels currently endorsed in the SFTF to continue operating post-transition. It should be noted that vessel permits are not as valuable to operators given the operating conditions attached and that they cannot be leased and must be renewed each year.

Certain gear restrictions (e.g. mandatory use of BRD) and spatial closure options (e.g. inshore or full NCW closure) have been associated with high economic risks to operator income due to reduced catch share of certain species (e.g. eastern school whiting) and reducing the amount of ground able to be trawled, thereby squeezing the same number of operators into a smaller area..

The issue of mid-water trawling and pair trawling in NSW coastal waters is controversial and has significant opposition from various stakeholders, including conservation groups, recreational fishers and other NSW commercial fisheries. It is an option to address perceptions and concerns with public consultation. These gears/methods are not proposed as part of the vessel permit (Option 1) but would be available for use in NCW under Option 2.

Finally, going forward, if Option 1 was selected, it is recommended that the recreational fishing sector be consulted further for input into the final permit conditions.

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Abbreviations

AFMA	Australian Fisheries Management Authority
AFZ	Australian Fishing Zone
BAP	NSW Commercial Fisheries Business Adjustment Program
BRD	Bycatch Reduction Device
Consequence	Outcome of an event affecting objectives
CTS	Commonwealth South East Trawl Sector
DPI	Department of Primary Industries
EBFM	Ecosystem Based Fisheries Management
ECDWTS	East Coast Deep Water Trawl Sector
EIS	Environmental Impact Statement
ERA	Ecological Risk Assessment
ERM	Ecological Risk Management
FIS	Fisheries Independent Surveys
FMS	Fisheries Management Strategy
FM	Fisheries Management
GABTS	Great Australian Bight Trawl Sector
GHAT	Gillnet, Hook and Trap Sector
HCR	Harvest Control Rule
HSP	Harvest Strategy Policy
HSF	Harvest Strategy Framework
IAP	Independent Allocation Panel
ISMP	Independent Scientific Monitoring Program
ITQ	Individual Transferable Quota
Leasing	Term used by some fishers when a business owner nominates another person to use his/her endorsement to fish
Likelihood	Chance of something happening
MEY	Maximum Economic Yield
MPA	Marine Protected Area
MSL	Minimum Size Limit
nm	Nautical Miles
NSW	New South Wales
NCW	New South Wales Coastal Waters
OCS	Offshore Constitutional Settlement
OTF	NSW Ocean Trawl Fishery
RAC	Resource Assessment Class
RBC	Recommended Biological Catch
Risk Analysis	Process to comprehend the nature of risk and to determine the level of risk
Risk Assessment	- Overall process of risk identification risk analysis and risk evaluation
SESSF	Commonwealth Southern and Eastern Scalefish and Shark Fishery
SESSFRAG	Southern and Eastern Scalefish and Shark Fishery Resource Assessment Group
SETFIA	South East Trawl Fishing Industry Association
SFR	Statutory Fishing Right
SFTF	NSW Southern Fish Trawl Restricted Fishery
SFTTWG	Southern Fish Trawl Transition Working Group
SMP	Seabird Management Plan
SPF	Small Pelagic Fishery
STR	South Tasman Rise
TEP	Threatened, Endangered and Protected Species
ToR	Terms of Reference
TAC	Total Allowable Catch
VCW	Commonwealth Victorian Coastal Waters Sector
VMS	Vessel Monitoring System

1 Introduction

1.1 Background

Currently an Offshore Constitutional Settlement (OCS) arrangement exists between the New South Wales (NSW) and Commonwealth governments in relation to the commercial fishing take of certain species, in certain waters, by certain methods. NSW Department of Primary Industries (DPI) and the Australian Fisheries Management Authority (AFMA) have worked co-operatively to address OCS issues including rationalising the management of commercial fisheries that harvest fish stocks shared among jurisdictions and that are currently governed by the existing OCS agreement. Two such fisheries are the Southern Fish Trawl Restricted Fishery (SFTF), currently managed by NSW and the South East Trawl Sector (CTS) of the Southern and Eastern Scalefish and Shark Fishery (SESSF), managed by the Commonwealth.

It is proposed to merge the SFTF into the Commonwealth SESSF. Negotiations are currently underway with regards to the details of the new management arrangements that are to apply to SFTF operators once the transition to Commonwealth management is complete. Two potential scenarios for merging the fisheries are given in **Section 2.2.4** (Option 1) and **Section 2.2.5** (Option 2).

As part of this process NSW DPI has engaged Cardno to undertake a risk assessment for the two potential scenarios (the project) so that the relative risks (and benefits) of each can inform negotiations. This document presents the results of the risk assessment.

1.2 Study Aims and Objectives

The broad aims of the project are to identify key risks and benefits associated with the transfer of management of the SFTF to the Commonwealth.

Cardno has taken the following steps in the project:

- Determine a suitable risk assessment procedure;
- Establish/define the context for the risk assessment;
- Identifying hazards and benefits associated with proposed changes in management; and
- Assess and rank identified risks.

Cardno's Terms of Reference (ToR) for the project were:

1. Identify the real and perceived environmental, economic and social risks/benefits associated with the transition under a proposed package (where SFTF endorsement holders are granted SFRs and a NSW Coastal Waters (NCW) Permit with various conditions, subject to two spatial closure scenarios) to each stakeholder group (commercial fishing industry, recreational fishing industry, and the broader NSW community);
2. Identify the environmental, economic and social risks/benefits associated with the transition under an alternative package (where NSW cedes some or all waters open to fish trawling to the Commonwealth and the fishery becomes one where former SFT operators have a boat SFR and species quota SFRs) to each stakeholder group (commercial fishing industry, recreational fishing industry, and the broader NSW community);
3. Determine a relative level of each risk identified in 1) and 2), and propose options to mitigate those risks; and
4. Consideration should be given to (but not limited to): Commonwealth and NSW licensing data including vessel length; and vessel level catch and effort data (by species) to determine historical fishing behaviour.

1.3 Assumptions and Limitations

Please note the following qualification when reading this report:

1.3.1 Stakeholder Consultation

Given the restrictions on the report completion date it was recognised that consultation with stakeholder groups representing NSW commercial fishing industry, recreational fishing sector and conservation groups would not be possible. As such it was agreed to limit consultation to NSW recreational and commercial fishing managers.

1.3.2 Data Analysis

Some NSW commercial fishing data relevant to the risk assessment could not be made available as it may have contained personal information of commercial value due to the relatively small size of the SFTF and limited number of operators.

Other data were not available at time of reporting and such further analysis could not be done to support the risk assessment. This included:

- Licensing data. No analysis was possible of vessel length for the existing SFTF and CTS SESSF fleets;
- Stratified SFTF catch and effort data. Catch and effort data could not be parsed into inshore (low tide to 1 nm) and offshore (1 nm to 3 nm), so it was impossible to more accurately quantify the possible effect of an inshore and complete closure of NCW on SFTF operators under the two transition options; and
- Financial data such as sale/transfer value of SFTF concession, CTS vessel SFR and relevant taxa Quota SFR, catch value and management contributions. As such, the evaluations of economic risk and benefit were qualitative and high level only.

2 Approach to Risk Assessment

Cardno has taken the following steps in its approach to assessing the risk of the transition options:

- Establish/define the context for the risk assessment;
- Identifying hazards and benefits associated with the proposed changes in management;
- Consult with NSW Recreational Fisheries Managers to obtain input into the list of hazards associated with the transition options and the potential consequences of these to the sector; and
- Assess and rank identified risks.

2.1 Risk Management Guidelines

In 2009, the International Organisation for Standardization (ISO) released *ISO 31000:2009 Risk Management – Principles and Guidelines.* Standards Australia has adopted this standard, which it has titled 'AS/NZS ISO 31000:2009 (ISO 31000). ISO 31000 is a set of principles and guidelines rather than a compliance standard. ISO 31000 describes a generic approach for managing any form of risk in a systematic, transparent and credible manner, and within any scope and context.

Risk assessment has become an important means for identifying the likelihood and relative consequence of potential hazards associated with human activities. It is also now being widely advocated as beneficial for fisheries management (Fletcher 2005).

Typically, assessment of risk entails the identification of a potential hazard (i.e. some aspect of the activity that could affect the environment), a judgment of the likelihood that the hazard has of occurring and a judgement of the consequence of that hazard, if it did result from the proposed activity (**Table 2-1, Figure 2-1**). Frequently, scientists and managers also consider those aspects of the environment that might be subject to the hazard; such aspects are often referred to as receptors.

The operational aspects of the SFTF and SESSF CTS were reviewed to identify potential environmental, social and economic hazards associated with the transition options. The risk assessment then investigated these hazards in greater detail.

Key points that need to be recognised in relation to the general risk assessment:

(1) The risk assessment was done at a broad area, that is, without particular spatial resolution within the current operating areas of the fisheries;

(2) The risk analysis methodology mainly deals with impacts on the environment, however, the methodology has also been interpreted to analyse relevant social and economic hazards; and

(3) The risk assessment focuses on potential effects on the SFTF with only limited consideration of the effects on the SESSF CTS.

The rationale for scoring probability/likelihood of a hazard occurring and of the consequence if the hazard eventuated are based on expert opinion from the data available. Scores of likelihood and consequence were combined into a matrix to provide a subjective judgement of significance. Based on this, each hazard/risk is identified as low, medium or high significance. This does not mean that an option should not proceed (i.e. if the level of risk is high) or that an issue should be ignored if the level of risk is considered low, but rather that the issue may need greater or less effort in management/mitigation or that further research on the receptor may be required.

Table 2-1 Likelihood and consequences (environmental. social and economic) of hazards associated with proposed management changes.

Probability / Likelihood			
A	Almost certain	Happens often, will happen	>1/month
B	Likely	Could readily happen	>1/year
C	Possible	Could happen as has occurred elsewhere	1 to 10 years
D	Unlikely	Has not happened but could	10 to 50 years
E	Rare	Conceivable in extreme circumstances	> 50 years
Consequences (Environmental)			
1	Extreme environmental harm (widespread impacts to more than one entire stock or widespread harm to more than one threatened or protected species)		
2	Major serious harm (widespread impacts to an entire stock or widespread harm to a threatened or protected species)		
3	Moderate harm (widespread impacts to parts of a stock or widespread interference to a threatened or protected species)		
4	Minor environmental harm (localised impacts to a parts of a stock or localised interference to a threatened or protected species)		
5	Negligible environmental harm or interference		
Consequences (Social)			
1	Extreme (regular conflict between recreational and commercial fishing vessels for species)		
2	Major (much overlap of recreational and commercial fishing grounds or species or major perceived impact)		
3	Moderate (some overlap of recreational and commercial fishing grounds or species, or some perceived impact)		
4	Minor (very little overlap of recreational and commercial fishing grounds or species, or very little perceived impact)		
5	Insignificant		
Consequences (Economic)			
1	Extreme (extreme decrease in profitability of holders of NCW Permit, CTS Vessel SFR or Quota SFR)		
2	Major (major decrease in profitability of holders of NCW Permit, CTS Vessel SFR or Quota SFR)		
3	Moderate (moderate decrease in profitability of holders of NCW Permit, CTS Vessel SFR or Quota SFR)		
4	Minor (small decrease in profitability of holders of NCW Permit, CTS Vessel SFR or Quota SFR)		
5	Insignificant		

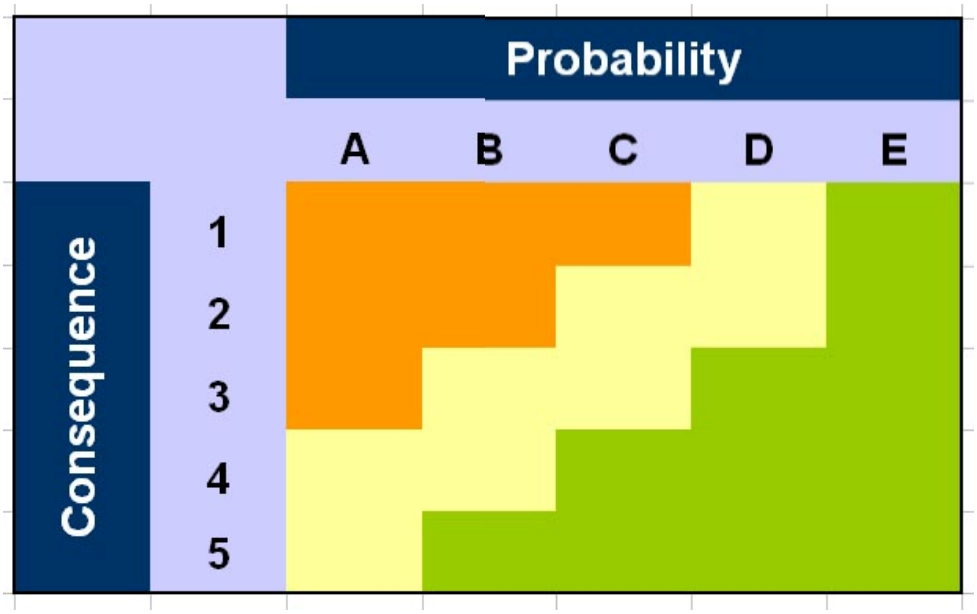

Figure 2-1 Risk analysis methodology: significance assessment matrix.

2.2 Context

2.2.1 The Southern Fish Trawl Restricted Fishery

The Southern Fish Trawl Restricted Fishery (SFTF) is currently managed by NSW and involves fish trawling south of Barrenjoey Head and within 3 nm of the NSW coastline. Most common gears used are otter trawl with one operator using Danish seine. The SFTF is a restricted fishery and is predominantly managed by input controls such as limited entry, spatial and temporal closures and restrictions on vessel length and gears. Output controls include minimum size limits on a number of key target species and daily catch limits ("trip limits"). SFTF endorsements must be renewed annually and can be permanently transferred. See **Appendix A** for a detailed description of the fishery.

2.2.2 The Commonwealth Trawl Sector of the Commonwealth Southern and Eastern Scalefish and Shark Fishery

The Commonwealth Trawl Sector (CTS) of the Commonwealth Southern and Eastern Scalefish and Shark Fishery (SESSF) operates in Australian Fishing Zone (AFZ) waters. Whilst the SESSF is subject to various input controls (limited entry, closures, gear restrictions) management of the fishery is primarily through Total Allowable Catch (TAC) limits. TAC is set annually for each key target species and represents the total catch by all concession holders that can be taken during the year. Each species' TAC is allocated among 'eligible' operators via quota statutory fishing rights (SFRs). Each quota SFR allows the concession holder to take a certain amount (kg limit) for the quota species. Quota SFRs can be sold or leased and are generally eligible across the entire area of the SESSF and are valid for the length of the management plan. Additional output controls include trip limits and minimum size limits on certain species. See **Appendix A** for a detailed description of the fishery.

2.2.3 Current Overlap of the SFTF and SESSF CTS

The SFTF shares targeted fish stocks given the NSW Coastal Waters (NCW) are adjacent to AFZ waters. The fisheries also use similar methods.

Operators from both fisheries must pay an annual contribution to management and have obligations regarding reporting of fishing activity, catch and interactions with threatened, endangered and protected (TEP) species. A number of operators are dual endorsement holders having concessions to fish in both SFTF and the SESSF.

See **Appendix A** for a direct comparison of operating areas, endorsements and licensing, catch and effort for target and byproduct species (incl. quota and trip limits), size limits, vessel sizes and gear, costs and value, status of stocks and threatened species protection for the NSW SFTF and Commonwealth SESSF CTS.

2.2.4 Transition Option 1

Transition Option 1 would grant SFTF endorsement holders SFRs and a New South Wales Coastal Waters (NCW) Permit with conditions that restrict fishing activity to within 3 nm of the NSW coastline south of Barrenjoey Head (subject to two spatial closure scenarios), restrict vessel length to a maximum of 25 m and permit certain exemptions to gear restrictions when targeting inshore species. Access rights and area of operation of SESSF CTS concession holders would remain unchanged (see **Table 2-2**).

Table 2-2 Transition Option 1

Current Access Right	Proposed Access Right when integrated into the SESSF
SFTF endorsement (to operate only within NSW coastal waters i.e. within 3 nm of low water)	Quota SFR (the Commonwealth will allocate the quantum of quota to NSW and the IAP will determine the criteria for allocation to fishing businesses). New South Wales Coastal Waters (NCW) Permit (with the option of accessing a SESSF CTS Vessel SFR from the existing pool of SESSF CTS Vessel SFRs[1]).
Dual endorsement SESSF CTS Vessel SFR SFTF endorsement	 CTS Vessel SFR and Quota SFR (retaining existing access and quota). Additional Quota SFR (based on SFTF catch history) and NCW Permit.
SESSF CTS Vessel SFR	CTS Vessel SFR and Quota SFR (retaining existing access and quota).
Proposed Conditions of NCW Permit	
Permitted area of operation is restricted to NSW Coastal Waters (i.e. within 3 nm of low water) south of Barrenjoey Head.	
Maximum vessel length of 25 m.	
Fishing gear[2]: when operating under NCW permit to target school whiting in ocean waters west of 90 m depth contour (defined under NSW Fisheries Management (General) Regulation 2010. Clause 24 as “Waters Designated as Trawl Whiting Grounds in the Southern Fish Trawl Fishery) operators be permitted use of otter board gear with 90 mm single mesh for wing and 90 mm double braided mesh (200 round) codend without BRDs”.	
All other SESSF CTS regulations will apply to holders of a NCW Permit.	

1. CTS Boat SFR’s to be acquired from the existing pool of CTS Boat SFR’s: transfer assistance package to be negotiated with NSW government.
2. AFMA to consider compliance implications of multiple gear types being carried on board.

It will be possible for NCW Permit holders to lease quota and/or purchase Quota SFRs from quota holders and catch this quota component from NCW. Similarly, SESSF CTS Vessel SFR holders can lease quota or purchase Quota SFRs from NCW Permit holders and take this quota component from Commonwealth waters. Dual authority holders would be entitled to catch the entirety of their combined quota from either Commonwealth and/or NSW coastal waters.

2.2.4.2 Spatial Closure Scenarios

The risk assessment will consider the transition Option 1 under two separate spatial closures scenarios (see **Table 2-3**).

Table 2-3 Spatial closure scenarios considered under the transition Option 1.

Spatial Closure Scenarios	Area of operation under NCW Permit
1. No closure	Area of operation from low water to 3 nm off the NSW coast extending south of Barrenjoey Head to the NSW border.
2. Inshore closure	Area of operation from 1 nm to 3 nm off the NSW coast extending south of Barrenjoey Head to the NSW border. Fishing not permitted from low water out to 1 nm.

2.2.5 Transition Option 2

Under this transition package NSW cedes some or all of state coastal waters open to fish trawling (subject to four spatial closure scenarios) to the Commonwealth and the fishery becomes one where former SFTF operators are issued SESSF CTS Vessel SFRs and species quota SFRs (see **Table 2-4**).

Table 2-4 Transition Option 2

Current Access Right	Proposed Access Right when integrated into the SESSF
SFTF endorsement (to operate only within NSW coastal waters i.e. within 3 nm of low water)	Quota SFR (based on SFTF catch history). SESSF CTS Vessel SFR permitting access to Commonwealth SESSF waters and NCW open to fish trawling.
Dual endorsement SESSF CTS Vessel SFR SFTF endorsement	 Retain existing Quota SFR. SESSF CTS Vessel SFR expanded operational area to include NCW open to fish trawling. Additional Quota SFR (based on SFTF catch history)
SESSF CTS Vessel SFR	Retain existing Quota SFR. SESSF CTS Vessel SFR expanded operational area to include NSW coastal waters open to fish trawling.
Proposed Conditions	
Permitted area of operation includes previous Commonwealth SESSF waters and NSW coastal waters open to fish trawling (subject to four spatial closure scenarios).	
No vessel length restrictions. Commonwealth policy precludes vessel length restrictions being placed on Vessel SFRs.	
Fishing gear[1]. When operating under NCW permit to target school whiting in ocean waters west of 90 m depth contour (defined under NSW Fisheries Management (General) Regulation 2010. Clause 24 as "Waters Designated as Trawl Whiting Grounds in the Southern Fish Trawl Fishery) operators be permitted use of otter board gear with 90 mm single mesh for wing and 90mm double braided mesh (200 round) codend without BRDs". Mid-water trawling and pair trawling would not be permitted.	
All other SESSF CTS regulations (see **Appendix A**) will apply to previous holders of SFTF endorsement.	

1. AFMA to consider compliance implications of multiple gear types being carried on board.

2.2.5.2 Spatial Closure Scenarios

The risk assessment will consider the transition Option 2 under four separate NCW spatial closures scenarios: (i) no closure (ii) “patchwork” closures (iii) inshore closure, and (iv) full closure (see **Table 2-5**).

Table 2-5 Spatial closure scenarios considered under the transition Option 1.

Spatial Closure Scenarios	Area of operation permitted in NSW Coastal Waters
1. No closure	Area of operation from low water to 3 nm off the NSW coast extending south of Barrenjoey Head to the NSW border.
2. “Patchwork” closures	A series of (yet to be determined) areas within NSW coastal waters that could be closed to fishing
3. Inshore closure	Area of operation from 1 nm to 3 nm off the NSW coast extending south of Barrenjoey Head to the NSW border. Fishing not permitted from low water out to 1 nm.
4. Full closure	No fishing is permitted from low water to 3 nm off the NSW coast extending south of Barrenjoey Head to the NSW border.

2.3 Summary of Potential Management Changes Associated with Each Option

Table 2.6 provides a detailed description of regulatory changes faced by SFTF and SESSF CTS concession holders under the two proposed transition options and four NCW spatial closure scenarios. Notably, input or output controls (see **Appendix A**) under both options would be similar, meaning many of the risks from the two options would be more or less the same. The main differences between the options would be how many vessels could potentially operate in NCW, how much of NCW would be closed and reductions to size-limits or no size limits of many species.

Table 2-6 Management changes resulting from the amalgamation of SFTF and SESSF CTS relevant to various transition options and scenarios. The tick [✓] symbol indicates that the management change stated in the row is relevant to the transition option and spatial closure combination detailed in the column. The [?] symbol indicates that the stated management change has not yet been confirmed by AFMA.

Management Changes Resulting from Amalgamation of SFTF and SESSF CTS	Option 1: NCW Permit		Option 2: SESSF CTS Vessel SFR			
	No Closure	Inshore Closure	No Closure	Patchwork Closure	Inshore Closure	Complete Closure
1. SFTF endorsement holders (only) receive SESSF **Quota SFR**	✓	✓	✓	✓	✓	✓
2. SFTF endorsement holders receive **NCW Permit**	✓	✓				
3. SFTF endorsement holders receive CTS Boat **SFR**			✓	✓	✓	✓
4. Some or all of NSW coastal waters ceded to Commonwealth			✓	✓	✓	
Output Controls						
5. SFTF catch of SESSF quota spp restricted by Quota SFR	✓	✓	✓	✓	✓	✓
6. Changes to minimum legal lengths (MLL) for quota species • Flathead: 33cm TL ⇨ 28cm TL • Silver trevally: 30cm TL ⇨ no MLL • Flounder: 25cm TL ⇨ no MLL • Jackass Morwong: 30cm TL ⇨ no MLL • School shark: 91cm TL ⇨ 45cm (rearmost gill slit to ventral insertion of caudal fin)	✓	✓	✓	✓	✓	✓
7. Changes to trip limits**.** Removal of trip limits on SESSF quota managed species • Flathead spp: 200 kg trip limit	✓	✓	✓	✓	✓	✓

• Jackass morwong: 350 kg trip limit • Blue warehou: 100 kg trip limit • Silver warehou: 50 kg trip limit • Ocean perch: 300 kg trip limit • Gemfish: 50 kg trip limit						
Input Controls						
8. Max vessel length 25m in NCW open to fishing	✓	✓				
9. Gear allowances permitted in NCW "Trawl Whiting Grounds"	**?**	**?**	**?**	**?**	**?**	**?**
10. Changes to otter trawl net requirements • Increased min. mesh size (≥ 115mm) in net mouth and wing • Mandatory use of approved BRD in codend • Increase min. mesh size (≥ 102mm) in codend for double twine	✓	✓	✓	✓	✓	✓
11. Danish seine minimum mesh size reduced: 83mm ⇨ 38mm	✓	✓	✓	✓	✓	✓
12. Mid-water trawling and pair trawling permitted in NCW waters			✓	✓	✓	✓
Miscellaneous						
13. Stock Assessment for quota spp and non-quota TAC spp managed by SESSF HSF multi-tiered assessment system.	✓	✓	✓	✓	✓	✓
14. Increase in annual contribution to management.	✓	✓	✓	✓	✓	✓
15. Reporting. All vessels to operate under VMS, use E-Logs to submit catch and discards, to provide quota lease and sale price data as required by AFMA	✓	✓	✓	✓	✓	✓
16. Threatened, Endangered and Protected Species (TEPs) • SESSF ERM strategy • Seabird management plan (install one of three approved seabird mitigation devices) • Australian sealion management strategy • Upper-slope dogfish management strategy	✓	✓	✓	✓	✓	✓

17. Stock rebuilding strategies to manage recovery of eastern gemfish, school shark, blue warehou, orange roughy and pink ling (in eastern part of fishery)	✓	✓	✓	✓	✓	✓
18. Adoption of SESSF Bycatch and Discard workplan	✓	✓	✓	✓	✓	✓

3 Risks Analysis of Potential Changes in Management

3.1 Hazards and Risks

Table 3.1 provides a description of hazards associated with the potential changes to management above and the potential economic, environmental and social risks from these hazards, were they to occur.

All of the hazards were a function of the size of the SFTF, its current controls, and the potential of the much larger SESSF CTS fishery to cause hazards (under each option) given Commonwealth controls. The majority of risks were low or moderate, either because there was a small likelihood of the potential hazard occurring or because the consequence of the hazard was generally at the lower end of the range.

High risks, however, would potentially be associated with:

(1) Option 2, where CTS vessels were allowed to fish in NCW with few constraints. This scenario could potentially lead to large increases from current effort, and greater competition with other commercial or recreational fisheries that share grounds or resources. In addition to potentially leading to environmental concerns, this could also result in a high risk of loss of income if catches were reduced as a result;

(2) Implementation of inshore closures (Options 1 or 2). This scenario could potentially lead to increased effort into a smaller area than currently fished and greater competition with other commercial fisheries that share grounds or resources. This could also lead to the issues identified above;

(3) Increases in boat size (Options 1 or 2). This would likely be due to a perception by stakeholders that larger vessels could catch more fish or cause environmental harm;

(4) Decreases in MLL or no size limit for some important recreational species (Options 1 or 2). This would likely be due to a perception by stakeholders that trawlers would have access to more fish or cause environmental harm; and

(5) Mid-water and/or pair trawling (Option 2). This would likely be due to a perception by stakeholders that mid-water and/or pair trawling would have a negative indirect effect on fish targeted by recreational fishers (by reducing abundance of forage species) or cause environmental harm (such as increased TEP interactions or discarding and food web effects).

Table 3-1 Description of consequences associated with management changes for the proposed amalgamation of NSW SFTF and Commonwealth SESSF CTS. L = likelihood of hazard occurring, C = consequence of hazard occurring. Blank = not applicable

High Risk	=	
Moderate Risk	=	
Low Risk	=	

Risks of Management Changes				Environment		Social		Economic	
Option	Management Change	Action	Potential Hazard	L	C	L	C	L	C
1, 2	Changes to otter trawl net restrictions	Increased min. mesh size in net mouth and wings and in codend (for double twine). Mandatory use of approved BRD in codend (see **Appendix A**- pg. A5).	Reduced catch and income for SFTF operators. Increased cost of gear upgrade for SFTF operators					B	3
1, 2	Changes to otter trawl net restrictions	AFMA permit exemptions for vessels targeting eastern school whiting and/or operating in waters west of 90 m depth contour, previously defined by NSW DPI as "Waters Designated as Trawl Whiting Grounds in the Southern Fish Trawl Fishery"	Damage to AFMAs reputation and may require changes to CTS Bycatch and Discard Workplan			D	3		
1, 2	Changes to Danish seine net requirements	Minimum mesh size reduced from 83mm ⇨ 38mm (see **Appendix A**- pg. A6)	Increased discard mortality. Increased conflict with NSW stakeholders as smaller mesh size could increase discard mortality or increased catch of shared target spp	C	4	C	4		
1, 2	SFTF endorsement holders receive SESSF Quota SFR	Target species in SESSF are TAC/quota managed	Increased annual management contribution cost for SFTF endorsement holders. Decreased annual earnings for SFTF operators due to limit on annual catch earnings (quota) and increased management contribution. Possible impacts on non-quota and non-TAC spp as no SESSF stock assessment done on these species	D	4			C	3
1, 2	SFTF endorsement holders receive SESSF Quota SFR	Total number of quota SFRs will increase.	Value of quota SFR (for permanent transfer or lease) declines					D	4

1, 2	SFTF endorsement holders receive SESSF Quota SFR	Operators will be able to increase quota by buying or leasing quota SFR from existing CTS quota holders	Increased effort and therefore catch, discards and TEP interactions in NCW under the NCW Permit option (Option 1)	C	3				
1, 2	Changes to minimum size limits (MSL)	Reduction or removal of minimum size restrictions for a number of target species incl. flathead, silver trevally, flounder and jackass morwong (see **Appendix A**- pg. A7)	Increased conflict with stakeholders such as some NSW commercial fisheries and recreational fishers that target these species at a bigger size limit. This is more relevant to Option 2 if fishing is allowed in NCW. Decreased income of some NSW commercial fishers and charter boat operators who target same species because of increased risk/problem of growth overfishing (e.g. silver trevally, blue-spotted flathead). Again, more relevant to Option 2.	B	3	B	2	B	3
1	NCW Permit condition restricts max. vessel size to 25m	Max. vessel size in NCW increases from 20m ⇨ 25m	Increased discard mortality and TEP interactions and impacts on previously inaccessible benthic habitats. Perception by stakeholders (recreational fisher and conservation groups) that larger vessels have a greater impact.	B	3	B	2		
2	Mid-water trawling and/or pair trawling permitted in CTS	Mid-water trawling and/or pair trawling would be permitted in NCW (see **Appendix A**- pg. A6)	Increased conflict with NSW stakeholders with increased catch of shared target spp Increased discard mortality and TEP interactions. Increased conflict with stakeholders such as other NSW commercial fisheries, recreational fishers and conservation groups	C	2	B	2		
2	SFTF endorsement holders issued CTS Vessel SFR and some or all of NCW ceded to Commonwealth	SFTF endorsement holders issued CTS Vessel SFR and access to Commonwealth waters. Larger CTS vessels get access to NCW.	Inequitable re-allocation of rights as dual endorsement holders receive no additional vessel rights nor expansion of operating area. Perception by stakeholders that larger vessels have a greater impact.	B	3	B	2		

2	SFTF endorsement holders issued CTS Vessel SFR	Total number of CTS Vessel SFRs in SESSF increases	Value of CTS Vessel SFR (for permanent transfer or lease) declines					D	3
2	SFTF endorsement holders issued CTS Vessel SFR and some or all of NCW ceded to Commonwealth	CTS vessels permitted to fish in NCW. No vessel size restrictions.	Increased discard mortality and TEP interactions and impacts on previously inaccessible benthic habitats. Decreased annual income for SFTF operators in NCW due to competition from CTS effort and increased operation costs (e.g. fuel, labour) as forced to fish further offshore. Increased competition and/or declining catch for other inshore NSW commercial fisheries and recreational fishers as fishing effort and discard mortality in CTS catch increase in NCW.	C	2	C	2	C	2
1, 2	Some or all of NCW closed to fish trawling	Inshore (within 1 nm) closures or complete closures of NCW	Decreased catch and income due to loss of trawl grounds from closures. SFTF operators that currently focus on inshore species would be disproportionately affected. NCW Permit holder would have no alternative trawl grounds to offset closures. Greater habitat impacts in areas remaining open to fishing as fishing effort is concentrated into a smaller area (particularly for Option 1 and inshore closure combination). Possible increase in discard mortality and TEP if those taxa are associated with areas remaining open to trawling (particularly for Option 1 and inshore closure combination).	B	2	B	4	B	2

3.2 Benefits

In addition to the risks of hazards above associated with the two options, there would also be potential benefits from each. **Table 3.2** provides a description of the potential benefits below. The likelihood or ranking among these benefits was not part of Cardno's SoW, but it is clear that there are many potential benefits to the various stakeholders associated with either option. Given the qualitative nature of this project, it is however not clear whether the benefits of an option potentially outweigh the risk.

Table 3-2 Description of benefits associated with management changes for the proposed amalgamation of NSW SFTF and Commonwealth SESSF CTS

Option	Management Change	Action	Benefit
1	SFTF endorsement holders issued NCW Permit	SFTF endorsement holders issued NCW Permit	NCW Permit can be permanently transferred (sold) representing a financial value
2	SFTF endorsement holders issued CTS Vessel SFR	SFTF endorsement holders issued CTS Vessel SFR	CTS Vessel SFR can be permanently transferred (sold) and leased representing a financial value
2	SFTF endorsement holders issued CTS Vessel SFR and some or all of NCW ceded to Commonwealth	CTS vessels permitted to fish in NCW	Reduced operating costs (e.g. fuel/labour) for CTS operators who can meet part of quota in nearshore NCW trawl grounds
2	SFTF endorsement holders issued CTS Vessel SFR	SFTF vessels access Commonwealth waters	Increased income for SFTF as new trawl grounds offer opportunities offset increased distance (e.g. more productive grounds or possibility of targeting new species with leased/purchased quota SFR)
1, 2	Changes to otter trawl net restrictions	Mandatory use of approved BRD in codend	Decrease in discard mortality
1, 2	Changes to otter trawl net restrictions	Increased min. mesh size in net mouth and wings and in codend (for double twine). Mandatory use of approved BRD in codend (see **Appendix A**- pg. A5).	Approval from NSW stakeholders for reduced discard mortality from BRDs
1, 2	Changes to Danish seine net requirements	Minimum mesh size reduced from 83mm ⇨ 38mm (see **Appendix A**- pg. A6)	Increased catch for SFTF (incl. non-quota species)
1, 2	Mid-water trawling and/or pair trawling permitted in CTS	Mid-water trawling and/or pair trawling would be permitted in NCW	Increased catch and income if target species susceptible to mid-water trawling are present in commercial levels in NCW
1, 2	SFTF endorsement holders receive SESSF Quota SFR	SFTF endorsement holders receive SESSF Quota SFR which can be sold or leased. Uncaught quota can be leased.	CTS Vessel SFR can be permanently transferred (sold) and leased representing a financial value.
1, 2	SFTF endorsement holders receive SESSF Quota SFR	Target species in SESSF are TAC/quota managed	TAC, quota or share managed fisheries provide greater certainty for concession holders. SFR rights have greater longevity than Permits with duration matching the management plan. Quotas offer greater predictability about catch and earnings.

1, 2	SFTF endorsement holders receive Quota SFR and NCW Permit or Vessel SFR	SFTF endorsement holders receive Quota SFR and NCW Permit or Vessel SFR	Combination of CTS quota SFR and NCW Permit or Vessel SFR will have greater transfer/sale value than NSW SFTF endorsement
1, 2	SFTF endorsement holders receive SESSF Quota SFR	Target species in SESSF are TAC/quota managed	TAC/quota management potentially more sustainable management of target spp than limited entry/input controls of SFTF
1, 2	Changes to minimum size limits (MSL)	Reduction or removal of minimum size restrictions for a number of target species incl. flathead, silver trevally, flounder and jackass morwong (see **Appendix A**- pg. A7)	Increased quota SFRs for SFTF operators (and therefore increased income and sale/lease value of quota SFR) if historical catch is adjusted for discard of target species due to MSL
1, 2	Changes to reporting	Vessels operate under VMS, electric monitoring and observer program	Improved sustainability outcomes with better estimates of discarding and TEP interactions for SFTF fleet
1, 2	Some or all of NCW closed to fish trawling	Closure options 2 (patchwork closures), 3 (inshore closures) or 4 (complete closures of NCW)	Improved perception by some stakeholder groups, incl. recreational fishers and conservation groups that impacts from trawling are being minimised .
1, 2	Some or all of NCW closed to fish trawling	Closure options: 3 (inshore closures) and 4 (complete closures of NCW)	Reduced impacts on benthic habitats in closed areas and discard mortality and TEP interactions of taxa associated with those areas
1, 2	Some or all of NCW closed to fish trawling	Closure options: 3 (inshore closures) and 4 (complete closures of NCW)	Improved catch of other NSW commercial fisheries in closed NCW areas due to reduced competition and discard mortality

4 Conclusion and Mitigation

It should be noted that various economic, social and environmental consequences of management change (hazards or benefits) can interact with one another. An attempt to mitigate a particular risk to one stakeholder may have the effect of increasing risk (or reducing benefit) to another category and/or stakeholder. For example, permitting SFTF operators a gear exemption for not using a BRD (i.e. continuation of using current gear) with one method will mitigate risk to their income but increase risk to AFMA's reputation and responsibility for environmental stewardship. It is beyond the scope of the present report to assess the effect of proposed mitigation strategies on identified risks. In addition, this section is limited to proposing mitigation for identified high risks and will not discuss optimising benefits.

Of the two transition options (and associated spatial closure scenarios) considered by NSW DPI and AFMA, Option 1 (with no spatial closures) results in minimum relative change and most closely resembles the pre-transition status quo. As such, it represents the most risk averse management transition option. Option 2 involves a number of high risks due to the possible increased effort of the CTS fleet and different gears operating in NCW. With this in mind, the task of identifying strategies to mitigate risks associated with the transition of SFTF to Commonwealth management is intertwined with a comparison of Option 1 and Option 2 with respect to relative risk. A number of attributes of Option 1 could be seen as measures to mitigate risks that arise from implementation of Option 2. For example: high economic, environmental and social risks were associated with increases in individual vessel size and also increases in fleet size potentially operating in NCW. Option 1 can mitigate more effectively against these risks by using a Permit endorsement class. SESSF permits allow conditions to be attached and can be used to limit vessel length, the area of operation and gear used. A permit system could restrict the number of vessels allowed to operate in NCW and also their length. Whilst Option 1 does allow for an increase in vessel length from 20m (current SFTF maximum) to 25m it should be understood that vessels in excess of 20m are currently allowed (via exemptions) to operate in the SFTF and that a maximum length of 25m would permit all vessels currently endorsed in the SFTF to continue operating post-transition. It should be noted that vessel permits are not as valuable to operators given the operating conditions attached and that they cannot be leased and must be renewed each year. Although maintaining a spatially and regulatory structured fishery could be perceived as an additional management burden to AFMA there are similar permits already in use (e.g. Victorian Coastal Waters (VCW) Permit).

Certain gear restrictions (e.g. mandatory use of BRD) and spatial closure options (e.g. inshore or full NCW closure) have been associated with high economic risks to operator income due to reduced catch share of certain species (e.g. eastern school whiting).

The issue of mid-water trawling and pair trawling in NSW coastal waters is controversial and has significant opposition from various stakeholders, including conservation groups, recreational fishers and other NSW commercial fisheries. It is an option to address perceptions and concerns with public consultation and awareness campaigns but the legacy of the public "debate" around the Abel Tasman (a.k.a "Super Trawler") indicates this would probably have limited success. These gears/methods are not proposed as part of the vessel permit (Option 1) but would be available for use in NCW under Option 2. These gears/methods are used in the CTS off the west coast of Tasmania in winter but are more common in the Small Pelagic Fishery (SPF), where the Abel Tasman was to operate. Whilst the species commonly targeted in the SPF (e.g. jack mackerel, blue mackerel and Australian sardine) have been recorded in the SFTF they only represent ~1% of catch (although as they are not targeted in mid-water this does not quantify their potential in NCW)..

Finally, going forward, if Option 1 was selected, it is recommended that the recreational fishing sector be consulted further for input into the final permit conditions.

5 References

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Transition of the NSW Southern Fish Trawl Restricted Fishery to Commonwealth Management

APPENDIX

A

DETAILED DESCRIPTION OF NSW SFTF AND COMMONWEALTH SESSF

The following table provides a detailed description of the SFTF and SESSF CTS including the relevant regulatory framework for each fishery. Unless specified otherwise in the transition options it is assumed that current SFTF endorsement holders will become subject to SESSF CTS regulations listed in **Table A.1** following the proposed amalgamation. Differences between the SFTF and the SESSF CTS are used to inform the identification and assessment of risk and benefit for the proposed amalgamation.

Table A.1 Detailed description of NSW Southern Fish Trawl Restricted Fishery (SFTF) and the Commonwealth South East Trawl Sector (CTS) of the Southern and Eastern Scalefish and Shark Fishery (SESSF).

	NSW Southern Fish Trawl Restricted Fishery (SFTF)	Southern and Eastern Scalefish and Shark Fishery (SESSF) Commonwealth South East Trawl Sector (CTS)
Sectors	SFTF is one sector of the NSW Ocean Trawl Fishery (OTF). The major endorsements/share classes of the OTF are: • Inshore and Offshore Prawn • Ocean Trawl – Deepwater Prawn • Ocean Trawl – Fish Northern Zone • **Southern Fish Trawl Restricted (SFTF)**	SESSF is comprised of the following major sectors: • **Commonwealth South East Trawl Sector (CTS)** • East Coast Deepwater Trawl Sector (ECDWTS) • Scalefish Hook Sector • Shark Hook Sector • Shark Gillnet Sector • Trap Sector • Great Australian Bight Trawl Sector (GABTS). Scalefish Hook, Shark Hook, Gillnet and Trap Sectors are collectively referred to as the Gillnet, Hook and Trap Sector (GHAT). Smaller sectors in the SESSF include the South Australian, Tasmanian and Victorian coastal waters sectors.
Jurisdiction/Area of Operation	Ocean waters that are not more than 3 nm from the natural coast line and are south of a line drawn due east of Barrenjoey Head and ending at the southern NSW border.	CTS covers the area of the AFZ extending southward from Barrenjoey Head around the New South Wales (adjacent to NSW State waters), Victorian and Tasmanian coastlines to Cape Jervis in South Australia. This sector is adjoined by the ECDWTS, the GABTS, the Commonwealth Victorian Coastal Waters Sector (VCW), and the South Tasman Rise (STR). The STR is not a sector of the SESSF but is managed separately by AFMA. The CTS is overlapped by parts of the GHAT sector. The fishery operates in both Commonwealth and State waters under different Offshore Constitutional Settlement arrangements with State governments.

	NSW Southern Fish Trawl Restricted Fishery (SFTF)	Southern and Eastern Scalefish and Shark Fishery (SESSF) Commonwealth South East Trawl Sector (CTS)
Number of Endorsements	23 endorsement holders in the SFTF (NSW DPI 2017a).	57 concession holders in the SESSF CTS (Department Environment 2016).
Key Target and Byproduct Species	**Primary Target Species** These taxa represented 80% of landings by weight at the time of the 2007 Management Strategy for the Ocean Trawl Fishery (NSW DPI 2007) *****Eastern School Whiting, *Sillago flindersi* Stout Whiting, *Sillago robusta* *Tiger Flathead, *Neoplatycephalus richardsoni* * Bluespotted Flathead, *Platycephalus caeruleopunctatus* *Silver Trevally, *Pseudocaranx dentex* Fiddler Shark, *Aptychotrema rostrata* Southern Calamari, *Sepioteuthis australis* Octopus, OCTOPODIDAE, various spp Cuttlefish, *Sepia* spp. *Royal Red Prawn, *Haliporoides sibogae* **Primary Target Species Update** (*Unpublished Data*, 2009-2016) Ten most important taxa (~80% landings by weight), in order of importance (% of total catch by weight): Eastern school whiting (36%), silver trevally (16%), tiger flathead (12%), stingrays/stingarees (3%), ocean jackets (3%), bluespotted flathead (3%), flathead other (3%), southern calamari (3%), john dory (2%), red gurnard (2%) **Key Secondary Species** (~14% landings 2004/5, NSW DPI 2007) Blue Swimmer Crab, *Portunus armatus* Squid, CEPHALOPODA, various spp. Gurnard/Latchet, *Pterygotrigla andertoni* *Pterygotrigla polyomata* *Chelidonichthys kumu* *John Dory, *Zeus faber* *Mirror Dory, *Zenopsis nebulosus* Angel Shark, *Squatina* sp. Flounder, PLEURONECTIDAE/BOTHIDAE, various spp.	**CTS Key target species**: tiger flathead, pink ling, blue grenadier and silver warehou (Department Environment 2016) **Quota Species/Area Groups** Alfonsino, *Beryx splendens* Bight Redfish, *Centroberyx gerrardi* Blue-eye Trevalla, *Hyperoglyphe Antarctica* *Schedophilus labyrinthica* (Ocean Blue-Eye) Blue Grenadier, *Macruronus novaezelandae* Blue Warehou, *Seriolella brama* Deepwater Flathead, *Neoplatycephalus conatus* Deepwater Shark Basket (East), various spp. Deepwater Shark Basket (West), various spp. Elephant fish, CALLORHINCHIDAE/RHINOCHIMAERIDAE Flathead, 5 spp. *Neoplatycephalus aurimaculatus* (Toothy Flathead) *Neoplatycephalus richardsoni* (Tiger Flathead) *Platycephalus bassensis* (Southern Sand Flathead) *Platycephalus caeruleopunctatus* (Bluespotted Flathead) *Platycephalus speculator* (Southern Bluespotted Flathead) Gemfish (Eastern), *Rexea solandri* Gemfish (Western), *Rexea solandri* Gummy Shark, *Mustelus antarcticus* Jackass Morwong, *Nemadactylus macropterus* John Dory, *Zeus faber* Mirror Dory, *Zenopsis nebulosus* Ocean Perch, 2spp. *Helicolenus barathri* (Bigeye Ocean Perch - offshore)

	NSW Southern Fish Trawl Restricted Fishery (SFTF)	Southern and Eastern Scalefish and Shark Fishery (SESSF) Commonwealth South East Trawl Sector (CTS)
	Red Mullet, MULLIDAE, various spp. *Redfish, *Centroberyx affinis* Leatherjacket, MONACANTHIDAE, various spp. *Ocean Perch, *Helicolenus barathri* *Helicolenus percoides* Sole, SOLEIDAE, various spp. *Shark, various spp. Grey Morwong, *Nemadactylus douglasii* Pink Tilefish, *Branchiostegus wardi* **Boarfish, *Paristiopterus labiosus* *** Quota species in SESSF** **** Non-quota TAC species in SESSF**	*Helicolenus percoides* (Reef Ocean Perch – inshore) Orange Roughy (Albany & Esperance), *Hoplostethus atlanticus* Orange Roughy (Cascade Plateau), *Hoplostethus atlanticus* Orange Roughy (Eastern), *Hoplostethus atlanticus* Orange Roughy (Southern), *Hoplostethus atlanticus* Orange Roughy (Western), *Hoplostethus atlanticus* Oreo (smooth Cascade), various spp. Oreo (smooth other), various spp. Oreo (basket), various spp. Pink Ling, *Genypterus blacodes* Redfish, *Centroberyx affinis* Ribaldo, *Mora moro* Royal Red Prawn, *Haliporoides sibogae* Sawshark, 2 spp. School Shark, *Galeorhinus galeus* School Whiting, *Sillago flindersi* Silver Trevally, *Pseudocaranx dentex* Spotted (silver) Warehou, *Seriolella punctata* **Non-Quota TAC Species** Boarfish – trigger (ECDWT sector), *Paristiopterus labiosus* Orange Roughy – incidental catch (ECDWT sector)
Catch and Effort	**SFTF Mean annual catch = 332 t** (± 85 t SD) over period 2009 – 2016 (NSW DPI unpublished data). Total annual catch and catch rate peaked at 453 t and 17.2 kg/hr respectively in 2012. With the exception of 2012, annual catch rates have stayed within the range of 9.4 kg/hr to 12.7 kg/hr. The ten most common species represent 80 % of the catch by weight and the top 3 species make up nearly two thirds. Mean landings (t) and percentatge of total catch (2009 – 2016): • Eastern school whiting **113 t** (35.8 %)	**CTS Mean annual catch = 15,076 t** (± 4234 t SD) period 2004 – 2015 Landing in CTS (and broader SESSF) have decreased over time due to a reduction in effort. From a peak of 24,600 t in 2004 the CTS catch decreased to 10,275 t in 2015. CTS mean annual landings (& percentage of total catch) for the three most important taxa to the SFTF (data 2004 – 2015) • Eastern school whiting **503 t** (3 %)

<table>
<tr><th></th><th>NSW Southern Fish Trawl Restricted Fishery (SFTF)</th><th>Southern and Eastern Scalefish and Shark Fishery (SESSF)
Commonwealth South East Trawl Sector (CTS)</th></tr>
<tr><td></td><td>

Silver trevally 56 t (15.8 %)
Tiger flathead 39 t (11.5 %)

Over the period 2009 – 2015 (where data for both CTS and SFTF is available) the total catch by weight of SFTF represented 2.5% of CTS SESSF total catch.
Catch comparisons SFTF vs CTS over period 2009-2015.
Total landings (period: 2009 – 2015) and percentage of combined total for each fishery by species:
<table>
<tr><th></th><th colspan="2">SFTF</th><th colspan="2">CTS SESSF</th></tr>
<tr><th>Species</th><th>Catch Wt.</th><th>% comb.</th><th>Catch Wt.</th><th>% comb</th></tr>
<tr><td>E. school whiting</td><td>685</td><td>15.6</td><td>3,715</td><td>84.4</td></tr>
<tr><td>Silver trevally</td><td>416</td><td>28.6</td><td>1,040</td><td>71.4</td></tr>
<tr><td>Tiger Flathead</td><td>261</td><td>1.4</td><td>18,785</td><td>98.6</td></tr>
</table>
</td><td>

Silver trevally 127 t (1 %)
Tiger flathead 2,829 t (19 %)

Demersal otter trawl: targets tiger flathead & silver trevally (eastern school whiting is an incidental spp.)
Danish seine: targets eastern school whiting & tiger flathead
</td></tr>
<tr><th></th><th>SFTF Input Controls</th><th>SESSF Input Controls</th></tr>
<tr><td>Access Rights / Licensing</td><td>
Limited entry: SFTF was declared a restricted fishery in 1997. Eligibility for an endorsement required a demonstrated catch history during a criterion period. Endorsements are attached to a commercial licence and allow the right to use specific gear and take nominated species.
SFTF endorsements:

Must be renewed annually
Can be permanently transferred/sold but not leased

</td><td>
Limited entry. Finite number of endorsements.
Three endorsement classes: (1) Quota SFR or ITQ (2) Vessel SFR (3) Permit.
(1) Quota SFR / ITQ

Right to take a certain amount (kg limit) of quota species (based on number of SFRs owned and TAC set that year)
SFRs granted in 29 of 34 Quota spp (other five are ITQs)
Vessel SFR or permit required to be ‘eligible’ for quota SFR
Generally issued across the SESSF
Longevity is for length of management plan
Can be leased and permanently transferred/sold
Can fish for non-quota spp if have vessel SFR or permit. If non-quota spp has a TAC can fish it till TAC is reached

</td></tr>
</table>

	NSW Southern Fish Trawl Restricted Fishery (SFTF)	Southern and Eastern Scalefish and Shark Fishery (SESSF) Commonwealth South East Trawl Sector (CTS)
		(2) Vessel SFR • Allow a fisher to use a nominated boat in an area of the fishery using the method specified on the boat SFR certificate • Can be leased and permanently transferred/sold • Can be issued across the jurisdiction • Longevity is for length of management plan • Can fish for non-quota spp if have vessel SFR or permit. If non-quota spp has a TAC can fish it till TAC is reached **(3) Permit** • Must be renewed annually • Can be permanently transferred/sold but not leased • Contain conditions the holder must comply with and can be issued to a specific sector and limited to a particular area. • May be granted to allow fishing activities which are not covered under the Management Plan, or issued to implement new fishing conditions. For example, coastal waters permits are granted to allow Commonwealth operators to take Commonwealth managed quota species from State jurisdiction coastal waters (i.e. within 3 nm), e.g. Victorian Waters Inshore Trawl.
Vessel Restrictions	Maximum length of 20m Length exemptions do exist and vessels range from 9 – 27m (NSW DPI 2007).	No restrictions on vessel size under Vessel SFR. Not possible to restrict vessel size as part of vessel SFR but only as a condition attached to Permit.
Gear (incl. BRDs)	**1. Otter Trawl Net (Fish)** • Mesh size ≥ 90mm throughout • Length of headline not specified • Rubber discs/rollers (“Bobbin gear”) on ground rope up to 100mm diam. • Codends have single twine mesh with a diam. ≤ 6mm and "hanging ratio" of 1:1 (~ 100 meshes round) **unless** in waters designated as ‘trawl whiting grounds’ where codend may be 100 - 200 meshes in circumference, double twine up to 5 mm diam. and BRD absent / covered. Note: “Waters Designated as Trawl Whiting Grounds in the	**1. Otter Trawl Net (Fish)** • Mesh size ≥115mm in net mouth and wings • Length of headline not specified • Codend ≥ 90mm single twine mesh or ≥ 102mm double twine mesh; or ≥ 90mm double twine mesh with one or more BRDs • BRD: (a) single square mesh (≥ 90 mm) panel in upper side of codend (15 x 20 bars) or (b) large rotated mesh (T90) (≥ 90 mm) in upper codend (15 x 18 meshes)

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	Southern Fish Trawl Fishery" are defined as ocean waters west of the 90m depth contour. • Eight approved BRD designs but use only mandated in prawn trawl. **2. Danish Seine Net (Fish)** • Mesh size ≥ 83mm throughout • Length of headline not specified **3. Mid-Water Trawling** • Prohibited in NSW waters **4. Pair Trawling** • Prohibited in NSW Waters	**2. Danish Seine Net (Fish)** • Mesh size ≥ 38mm throughout • Length of headline not specified **3. Mid-Water Trawling** • Mesh size ≥ 90mm throughout • Mainly used to target blue grenadier off the west coast of Tasmania (June – August) or to target alfonsino. • More common method in Small Pelagic Fishery (SPF) to target species such as jack mackerel, blue mackerel, redbait and Australian sardine [**Note**: jack mackerel, blue mackerel and Australian sardine are landed in SFTF and from 2009-2017 represented just over 1% of catch by weight] **4. Pair Trawling** • Mesh size ≥ 90mm throughout. Primarily used in Commonwealth Small Pelagics Fishery in conjunction with mid-water trawling.
Closed Areas	A range of spatial and temporal closures apply to the OTF serving various purposes including protection of juvenile stock, resource sharing between sectors, and to protect the biophysical environment. Oceanic waters permanently closed to SFTF include: • Port Kembla (Red Point to Windang Island) • Twofold Bay • Merimbula Bay • Magic Point, Maroubra The OTF is also subject to a range of spatial closures arising from the comprehensive network of MPAs that include marine parks and aquatic reserves in which commercial fishing is restricted or not permitted.	Commonwealth and State jurisdiction waters periodically or temporarily closed to SESSF CTS trawl methods are listed in Attachment 2 and 3 of the SESSF Management Arrangements Booklet (AFMA 2014)
	SFTF Output Controls	**SESSF Output Controls**
Quota	SFTF is restricted entry fishery only. It is not a share management fishery and does not employ harvest controls such as quotas.	Management of SESSF is mainly through TAC limits. A TAC is set for each quota species (and certain non-quota species) and is the total catch by all concession holders that may be taken during that

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		fishing year. Currently 34 species/species groups are managed under quota. The unit Quota SFR entitlement (kg) is the species TAC divided by the number of Quota SFRs. Allowances are made for ~ 10% quota undercatch / overcatch each season (AFMA 2014).
Size Limits	The following SFTF target and key byproduct species are subject to minimum size limits (MSL) • Tiger Flathead - 33cm TL • Bluespotted Flathead - 33cm TL • Silver Trevally - 30cm TL • Flounder - 25cm TL • School shark - 91cm TL • Jackass morwong – 30 cm TL	The following SESSF quota species are subject to minimum size limits: • Tiger Flathead - 28cm TL • Bluespotted Flathead - 28cm TL • Silver Trevally – No MSL • Flounder – No MSL • School shark - 45cm in length when measured from the rearmost gill slit to the ventral insertion of the caudal fin • Jackass morwong – No MSL
Trip Limits	A commercial daily catch limit (or "trip limit") applies to a range of species taken from NSW waters as part of the OTF. These daily catch limits are often intended to directly limits the harvest levels of quota species targeted by SESSF endorsed boats (eg including redfish, morwong, ocean perch and flathead spp), other NSW sectors or TEPs (eg various dogfish spp). For example: • Flathead spp: 200 kg trip limit • Jackass morwong: 350 kg trip limit • Blue warehou: 100 kg trip limit • Silver warehou: 50 kg trip limit • Ocean perch: 300 kg trip limit • Redfish: 100 kg trip limit	A commercial daily catch limit (or "trip limit") applies to a range of species taken from Commwealth waters. Trip limits are intended to discourage targeting and directly limit the harvest levels of certain species (i) targeted by other Commonwealth sectors or State fisheries, or (ii) recovering stocks, (iii) discard/bycatch species and (iv) TEPs. Trip limits for State managed fisheries include: • Snapper: 50kg trip limit in Victorian waters
	SFTF Management - Miscellaneous	**SESSF CTS Management - Miscellaneous**
Stock Assessment	NSW DPI Fisheries assess the stock status of most exploited marine species annually (NSW DPI 2017b). Each (of 117) species are assigned an:	Commonwealth Fisheries Harvest Strategy Policy (HSP) targets an exploitation rate that keeps fish stocks at a level required to produce MEY and above a biomass limit (≥ 90% of the time). Alternative

	NSW Southern Fish Trawl Restricted Fishery (SFTF)	Southern and Eastern Scalefish and Shark Fishery (SESSF) Commonwealth South East Trawl Sector (CTS)
	1. **Exploitation status.** There are six categories of exploitation status: overfished, growth overfished, fully fished, moderately fished, uncertain, undefined. 2. **Resource Assessment Class (RAC).** There are five RACs (1-5) and each indicates the level of assessment performed. RAC 1 representing the 'highest' level of assessment, eg "Current population dynamic models producing estimates of relative biomass" etc (NSW DPI 2017b). Each species has a designated Target RAC that indicates the level of assessment ideally required based on that species relative importance to fisheries. NSW DPI fishery monitoring program includes use of scientific observers to record information on catches of target species and bycatch; collection of catch and effort data; and port monitoring of landed fish products. **Primary Target Species** – Status 2014/15 (**NSW DPI 2017b**) • **Eastern school whiting**: Uncertain (RAC = 3) [2013/14: Fully Fished, RAC = 1] • Stout whiting: Fully Fished (RAC = 2) • **Tiger flathead**: Fully Fished (RAC =1) • Bluespotted flathead: Uncertain (RAC = 3) • **Silver trevally**: Growth Overfished (RAC = 3) • Fiddler shark: NA • Southern calamari: Fully Fished (RAC = 3) • Octopus: Undefined (RAC = 5) • Cuttlefish, *Sepia* spp: Undefined (RAC = 5) Note that eastern school whiting was "moved from a Fully Fished status to an Uncertain status based on declining catches, declining catch rates in some sectors and the lack of a current assessment model" (p3 NSW DPI 2017b). "Eastern School Whiting had its RAC downgraded from a 1 to a 3 reflecting the outdated Commonwealth assessment that NSW DPI have relied upon during recent years" (p4, NSW DPI 2017b).	reference points may be adopted for some stocks to maximise economic returns across the fishery as a whole (AFMA 2017). The SESSF Harvest Strategy Framework (HSF) utilizes a tiered stock assessment system. There are three types of assessment depending on the amount and type of information available to assess stock status (Tier 1 represents the highest quality of information available). SESSF HSF adopts increased levels of precaution in response to increasing uncertainty about stock status in order to reduce risk. AFMA uses the information collected from fisher logbooks, the Integrated Scientific Monitoring Program (ISMP) and Fisheries Independent Surveys (FIS) to conduct stock assessments and determine a recommended biological catch (RBC). The RBC is the best scientific advice on what the total fishing mortality (landings from all sectors plus discards) should be for each species/stock. Each Tier has its own harvest control rule (HCR) that is used to determine the species TAC. The HCRs for the three tier levels differ depending on the types of indicators used. Quota SFRs for the year are calculated based on the current TAC. **AFMA Sustainability Status and Tier** • Eastern school whiting: Sustainable (Tier 1) • Tiger flathead: Sustainable (Tier 1) • Silver trevally: Sustainable (Tier 4) Eastern school whiting is targeted by Danish seine and caught incidentally by demersal otter trawl
Reporting	Fisher recorded catch and effort data, TEP interactions, bycatch observer program (only recently conducted for SFTF).	• Operators must maintain logbooks (contain data on catch, effort, gears, BRDS, TEP interactions etc)

<table>
<tr><th></th><th>NSW Southern Fish Trawl Restricted Fishery (SFTF)</th><th>Southern and Eastern Scalefish and Shark Fishery (SESSF)
Commonwealth South East Trawl Sector (CTS)</th></tr>
<tr><td></td><td></td><td>• Operators complete catch disposal records on landing.
• Each vessel has vessel monitoring system (VMS) which tracks and transmits data on vessel's position
• Electronic monitoring: is a system of sensors and video cameras capable of monitoring and recording fishing activities which can be reviewed later to verify logbook data
• Observer program: to verify catch and effort data in logbooks.</td></tr>
<tr><td>Costs and Value</td><td></td><td>SESSF Annual Levies (AFMA 2014)
Annual SESSF Vessel Levies
<table>
<tr><th>Sector</th><th>Levy amount per SFR</th></tr>
<tr><td>CTS Trawl Boat SFR*</td><td>$350.23</td></tr>
<tr><td>VCW Sector Permit**</td><td>$332.84</td></tr>
</table>
*Annual levy for Vessel SFR (vessel licence issued under Option 2)
**The Victorian Coastal Waters (VCW) Permit levy as this is likely similar to NCW Permit.

Annual SESSF Levy Amount per Quota SFR
<table>
<tr><th>Species</th><th>2014/15 TAC (t)</th><th>No. of SFRs</th><th>2013/14 Levy per Quota SFR</th></tr>
<tr><td>School Whiting</td><td>809</td><td>2020998</td><td>$0.03065</td></tr>
<tr><td>Silver trevally</td><td>615</td><td>463723</td><td>$0.05725</td></tr>
<tr><td>Flathead</td><td>2878</td><td>2940220</td><td>$0.16492</td></tr>
</table></td></tr>
<tr><th></th><th>SFTF Management of Environmental Impacts</th><th>SESSF CTS Management of Environmental Impacts</th></tr>
<tr><td></td><td>The NSW OTF (incl. SFTF) produced an environmental impact statement (EIS) for the fishery in 2004 (NSW DPI 2004). See Chapter B.2 – Ecological Issues. This Includes (but is not limited to):
• Risk analysis of non-commercial bycatch species (Section 2.4)
• Risk analysis of threatened & protected species (Section 2.5)</td><td>AFMA has a policy of Ecosystem Based Fisheries Management (EBFM) which considers the impact of fishing on:
• target species
• byproduct species
• bycatch/discard species</td></tr>
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	NSW Southern Fish Trawl Restricted Fishery (SFTF)	Southern and Eastern Scalefish and Shark Fishery (SESSF) Commonwealth South East Trawl Sector (CTS)
	• Risk analysis of species assemblages, species diversity and ecological processes (Section 2.6) • Risk analysis of marine habitats (Section 2.7)	• threatened, endangered and protected (TEP) species • habitats and communities
Threatened, endangered and protected species (TEP) and habitat	11 TEP species potentially as risk from OTF identified in the 2004 EIS (note: assessment for entire OTF and not just SFTF). The OTF was considered to pose either Moderate/Low (M/L) or Low (L) risk to all these species. These are the two lowest categories of risk and Moderate/Low is defined as "Possible small effects but population unlikely to be affected". These species were: • Gould's petrel, *Pterodroma leucoptera leucoptera* (M/L) • Northern royal albatross, *Diomedea sanfordi* (M/L) • Southern giant-petrel, *Macronectes giganteus* (M/L) • Wandering albatross, *Diomedea exulans* (M/L) • Blue whale, *Balaenoptera musculus* (L) • Dugong, *Dugong dugon* (L) • Southern right whale, *Eubalaena australis* (M/L) • Loggerhead turtle, *Caretta caretta* (L) • Grey nurse shark, *Carcharias Taurus* (L) • Green sawfish, *Pristis zijsron* (L) • Little penguin population, *Eudyptula minor* (M/L) Changes to relevant TEPs since 2004 EIS include: • 2010: Porbeagle shark, longfin mako shark and shortfin mako shark are listed as Migratory species (EPBC Act) • 2012: Scalloped Hammerhead shark, *Sphyrna lewini* listed as endangered • 2012: Great Hammerhead Shark, *Sphyrna mokarran* listed as vulnerable • 2013: Harrisson's Dogfish, *Centrophorus harrissoni*, listed as Conservation Dependent (EPBC Act) • 2013: Southern Dogfish, *Centrophorus zeehaani*, listed as Conservation Dependent (EPBC Act)	AFMA regularly monitor the effects fishing activities have on marine species, habitats and communities through ecological risk assessments (ERA). An ecological risk management (ERM) strategy is then developed to mitigate risks to marine species, habitats and communities identified in the assessment as impacted by commercial fishing operations (AFMA 2015). There are a number of TEP species found within the area of the SESSF. Fishers must report any interaction with a TEP species while fishing. AFMA also uses electronic monitoring systems to help monitor protected species interactions on some boats. All whales, dolphins, seabirds, seasnakes, turtles, seals and sea lions, syngnathids (seahorses, seadragons and pipefish), sawfishes (green, dwarf and freshwater), crocodiles, dugongs, sharks (Great White, Grey Nurse, Shortfin Mako, Longfin Mako and Porbeagle) are protected under the EPBC Act. An ERM conducted for the SESSF included both (i) otter board trawl (OT) in CTS and (ii) Danish seine (DAN) in the CTS, in addition to gillnet, hook and trap sectors. 219 TEP species have a distribution that overlaps with SESSF, including three shark spp, 74 seabird spp, 51 marine mammals spp, 10 marine reptiles spp and 81 species of bony fish. Of these 26 species have been assessed as at risk from the impacts of fishing across the SESSF including: 16 sharks, rays or skates); three bony fish; spp two invertebrate species groups; one seabird group and four marine mammals. Priority TEP species addressed in ERM relevant to otter board trawl (OT) and/or Danish seine (DAN) include (Table 1; AFMA 2015): • Australian Fur Seal, *Arctocephalus p. doriferus* (OT/DAN) • Harrisson's Dogfish, *Centrophorus harrissoni* (OT) • Southern Dogfish, *Centrophorus zeehaani* (OT) • Bight Ghost Shark, *Hydrolagus lemurs* (OT) • Grey Skate, *Dipturus canutus* (OT) • Green-Eyed Dogfish, *Squalus mitsukurii* (OT)

	NSW Southern Fish Trawl Restricted Fishery (SFTF)	Southern and Eastern Scalefish and Shark Fishery (SESSF) Commonwealth South East Trawl Sector (CTS)
	• 2016: Great white shark (*Carcharodon carcharias*) listed as vulnerable in NSW (FM Act). Also listed as Vulnerable and Migratory Species (EPBC Act) The SFTF has mandatory reporting of fishers interactions with TEPs (since 2005) and periodic use of observers to collect data on occurrences of TEP in catch. From 2012 – 2016 the Fish Trawl component of OTF (which includes SFTF) reported a total of 19 TEP interactions: 7 great hammerheads, 11 scalloped hammerheads and 1 NZ fur seal. All were caught in nets and discarded dead (NSW DPI 2017). A number of management responses have been initiated aimed at minimising impacts onTEPs (NSW DPI 2007, 2017). These include: • Educating fishers in the identification & avoidance of TEPs • Implementation of a number fishing closures. eg specific to Grey nurse shark • Zero kg trip limit to reduce interactions and mortality associated with the capture of Harrisson's Dogfish, Endeavour Dogfish, Southern Dogfish and Greeneye Spurdog • Improving gear for reducing incidental catch • Prohibition of mid-water trawling to prevent TEP interactions (NSW DPI 2017) • Observer-based research is currently underway for the OT Fishery. The field work component for the fish trawl sector (i.e. Northern and Southern) of the OT Fishery is complete with final reporting due December 2017. • Implementing the provisions of any recovery plans and threat abatement plans (eg 50 kg daily catch limit for Gemfish) Turtle and seal exclusion devices are not mandatory in NSW OTF nets. Based on previous observer studies and advice from industry, interactions with turtles and seals are believed to be low (NSW DPI 2007).	• Righteye Flounder, *Azygopus pinnifasciatus* (OT) • Nilson's Deepsea Dogfish, *Centrophorus squamosus* (OT) • Common skate, *Dipturus australis* (OT) • Eastern Fiddler Ray, *Trygonorrhina fasciata* (OT) • Yellow-backed Stingaree, *Urolophus sufflavus* (OT) • Rattail, *Ventrifossa nigrodorsalis* (OT) Over 2013 – 2015 the CTS reported interactions (including death) with the following protected species (Department of Environment 2016): • **Marine Mammals**: Antarctic fur seal, Australian fur seal, NZ fur seal, unidentified seals, dolphin • **Sea Birds**: albatrosses, shy albatross, Pacific gull, petrels, prions and shearwaters • **Sharks**: basking shark, shortfin mako great white shark, smooth hammerhead, scalloped hammerhead. • **Bony fish**: seahorses and pipefishes AFMA released Addressing Bycatch and Discarding in Commonwealth Fisheries: an Implementation Strategy (the Implementation Strategy) in 2008 to address high risk incidental catch, avoid interactions with threatened, endangered and protected (TEP) species and minimise discarding of target/quota species. AFMA has developed bycatch and discard workplans for the CTS. Workplans are reviewed every 2 years. AFMA employs a number of input and output controls as part of its ERM to mitigate impacts on target, byproduct/bycatch and TEP species. Input controls limit effort and indirectly control interactions with such species. These include spatial closures, gear restrictions and trip limits. Output controls directly limit the number of species which can be taken from the water or interacted with and include catch restrictions (eg TACs for target, byproduct and species under rebuilding strategies), size limits, trip limits and catch triggers. In addition AFMA collects considerable data on interaction via reporting, monitoring and observer programs.

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		AFMA has developed management arrangements for Australian sea lions, dolphins, seabirds, upper-slope dogfish and fur seals. For example; • Australian Sea Lion Management Strategy • Gillnet Dolphin Mitigation Strategy (not CTS) • Small Pelagic Fishery Dolphin Mitigation Strategy • Upper-Slope Dogfish Management Strategy These strategies include closures to sea lion colonies, remnant dogfish populations, depth closures to protect orange roughy and school shark and area closures with history of high dolphin interactions. AFMA approved seabird management plans (SMPs) are compulsory for all Commonwealth otter board trawl vessels in the SESSF. SMPs develop mitigation measures that help reduce seabird interactions with warp wires. SMPs include physical devices to reduce seabird interaction and measures to manage the discharge of biological waste from vessels to reduce seabird attraction and interaction. [Transition Option 1 outlines that all SFTF vessels will operate under the Seabird Management Plan (SMP) and use one of 3 approved seabird mitigation devices].
Stock Recovery	A commercial daily catch limit (or "trip limit") are used as part of stock rebuilding strategies. For example, there is a trip limit of 50kg for gemfish.	AFMA has developed stock rebuilding strategies to manage and monitor the recovery of Eastern Gemfish (2015), School Shark (2105) and Blue Warehou (2014), including small TACs to prevent targeting but allow for small amounts of unavoidable incidental catch. Orange Roughy is also classified as overfished and a conservation program was developed (Orange Roughy Stock Rebuilding Strategy 2014). To ensure School Shark is not targeted, a catch ratio of School Shark to Gummy Shark was implemented. The Upper-Slope Dogfish Management Strategy (2012) has implemented a series of spatial closures, retention/trigger limits, monitoring and handling training to promote the recovery of Harrisson's dogfish and southern dogfish. AFMA developed strategies to promote recovery of pink ling in the eastern part of the fishery and orange roughy in the Deepwater Shark Area.