



Seafood Risk Assessment

NSW Ocean Trap and Line Fishery

NSW Ocean Trap and Line Fishery

Units of Assessment:

Product Names:	<i>Pink Ling (Eastern stock)</i>
Species:	<i>Genypterus blacodes</i>
Stocks:	Pink Ling – Eastern stock
Gear types:	Setline / Trotline
Year of Assessment:	2017

Fishery Overview

The following is adapted from Georgeson and Chick (2016) and the NSW DPI Fisheries website (www.dpi.nsw.gov.au):

The New South Wales Ocean Trap and Line Fishery (OTLF) is a multi-gear, multi-species fishery that targets demersal and pelagic fish along the entire NSW coast, in continental shelf and slope waters. The OTLF became a limited entry fishery in 1997, and currently has 15 active fishers. Within the last five years, annual catches of Pink Ling in the OTLF have ranged between about 37-52 t, with >95% of that catch coming from demersal setline/trotline and droplines (Figure 1). Whilst setlines and trotlines are slightly different gear types, they are considered together throughout available literature for the OTLF, and are usually referred to only as ‘setline’. This convention is maintained throughout this document.

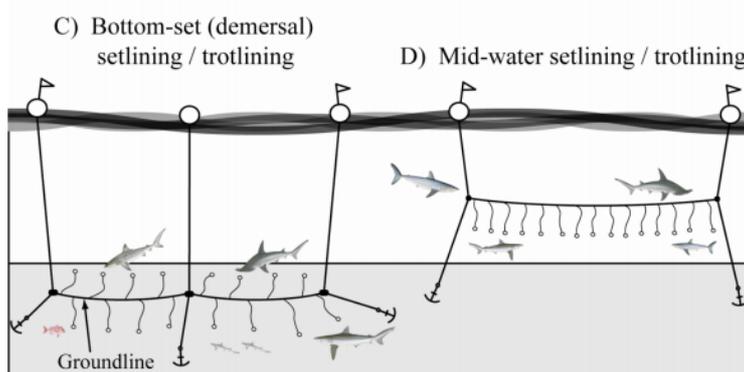


Figure 1: Setline gear (Macbeth and Gray, 2016)

The majority of the total Pink Ling eastern stock catch is taken in the Commonwealth-managed Southern and Eastern Scalefish and Shark Fishery (SESSF). In 2015, reported catch in the SESSF were around 301t, compared to 51t in the OTLF. Stock assessments are coordinated by the Australian Fisheries Management Authority (AFMA) as part of the ongoing management of the SESSF.

The OTLF currently operates under a Fishery Management Strategy established in 2006 (DPI, 2006a). It is a share management fishery, which means that commercial fishers must hold sufficient shares to be eligible for an endorsement to operate in the fishery. An endorsement authorises the use of specific gear to take fish for sale from certain waters. Two separate share classes exist for setline fishing: east and west of the 183m (100 fathom) depth contour (referred to as ‘Line East’ and ‘Line West’).

The fishery is currently undergoing a series of management reforms under the NSW Government’s Commercial Fisheries Business Adjustment Program (BAP). As part of the BAP, Pink Ling will move to quota based management, with individual transferable quotas (ITQs) expected to be allocated to Line East shareholders by June 2018¹. Catch quotas are expected to commence operation by December 2018.

¹ <http://www.dpi.nsw.gov.au/fishing/commercial/reform/decisions/otl-east>

Scoring

Performance Indicator	Score
COMPONENT 1	
1A: Stock Status	MEDIUM RISK
1B: Harvest Strategy	LOW RISK
1C: Information and Assessment	LOW RISK
OVERALL	LOW RISK
COMPONENT 2	
2A: Non-target Species	MEDIUM RISK
2B: ETP Species	MEDIUM RISK
2C: Habitats	LOW RISK
2D: Ecosystems	LOW RISK
OVERALL	MEDIUM RISK
COMPONENT 3	
3A: Governance and Policy	LOW RISK
3B: Fishery-specific Management System	MEDIUM RISK
OVERALL	MEDIUM RISK

Summary of main issues

- The eastern stock of Pink Ling is currently between the (Commonwealth) target and limit reference points, with the stock projected to grow under current harvest controls.
- The OTLF accounted for only ~15% of the catch in 2015, although there are no harvest control rules in place that would be expected to reduce exploitation as the point of recruitment impairment is approached.
- Considerable excess harvesting capacity appears to exist in the OTLF. This is being address through a Commercial Fisheries Business Adjustment Program which aims to reduce excess harvesting capacity and link shares to either catch or fishing effort. The expected introduction of a catch quota system for Pink Ling in 2018 offers the opportunity to address additional harvesting capacity and implement well-defined HCRs.
- The status of individual shark species taken in the OTLF is not well known.
- A 3-year observer program provided relevant data to determine catch composition and ETP interactions, however these data are not collected on an ongoing basis. There appears to be evidence of under-reporting of ETP species interactions in fisher logbooks.

Outlook

Component	Outlook	Comments
Target species	Improving	The Pink Ling eastern stock is projected to recover to B_{MSY} or above within two mean generation times under the current Commonwealth harvest strategy. The NSW Government is currently implementing a Commercial Fisheries Business Adjustment Program which aims to reduce excess harvesting capacity and link shares to either catch or fishing effort. A catch quota is expected to commence for Pink Ling in the OTLF from December 2018.
Environmental impact of fishing	Stable	No major changes are expected to Component 2 PIs
Management system	Improving	Reforms being implemented through the Commercial Fisheries Business Adjustment Program may lead to a reduction in some risk scoring.

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Disclaimer

This assessment has been undertaken in a limited timeframe based on publicly available information. Although all reasonable efforts have been made to ensure the quality of the report, neither this company nor the assessment's authors warrant that the information contained in this assessment is free from errors or omissions. To the maximum extent permitted by law, equity or statute, neither this company nor the authors accept any form of liability, be it contractual, tortious or otherwise, for the contents of this report or for any consequences arising from misuse or any reliance placed on it.

Background

This report sets out the results of an assessment against a seafood risk assessment procedure, originally developed for Coles Supermarkets Australia by MRAG Asia Pacific. FRDC is grateful for Coles' permission to use its Responsibly Sourced Seafood Framework. The aim of the procedure was to allow for the rapid screening of uncertified source fisheries to identify major sustainability problems, and to assist seafood buyers in procuring seafood from fisheries that are relatively well-managed and have lower relative risk to the aquatic environment. It uses elements from the GSSI benchmarked MSC Fishery Standard version 2.0, but is neither a duplicate of it nor a substitute for it. The methodology used to apply the framework differs substantially from an MSC Certification. Consequently, any claim about the rating of the fishery based on this assessment should not make any reference to the MSC.

This report is a "live" document that will be reviewed and updated on an annual basis.

Methods

Risk Assessment

Detailed methodology for the risk assessment procedure is found in MRAG AP (2015). The following provides a brief summary of the method as it relates to the information provided in this report.

Assessments are undertaken according to a 'unit of assessment' (UoA). The UoA is a combination of three main components: (i) the target species and stock; (ii) the gear type used by the fishery; and (iii) the management system under which the UoA operates.

Each UoA is assessed against three components:

1. Target fish stocks;
2. Environmental impact of fishing; and
3. Management system.

Each component has a number of performance indicators (PIs). In turn, each PI has associated criteria, scoring issues (SIs) and scoring guideposts (SGs). For each UoA, each PI is assigned one of the following scores, according to how well the fishery performs against the SGs:

- Low risk;
- Medium risk;
- Precautionary high risk; or
- High risk

Scores at the PI level are determined by the aggregate of the SI scores. For example, if there are five SIs in a PI and three of them are scored low risk with two medium risk, the overall PI score is low risk. If three are medium risk and two are low risk, the overall PI score is medium risk. If there are an equal number of low risk and medium risk SI scores, the PI is scored medium risk. If any SI scores precautionary high risk, the PI scores precautionary high risk. If any SI scores high risk, the PI scores high risk.

For this assessment, each component has also been given an overall risk score based on the scores of the PIs. Overall risk scores are either low, medium or high. The overall component risk score is low where the majority of PI risk scores are low. The overall risk score is high where any one PI is scored high risk, or two or more PIs score precautionary high risk. The overall risk score is medium for all other combinations (e.g. equal number of medium/low risk PI scores; majority medium PI scores; one PHR score, others low/medium).

Outlook

For each UoA, an assessment of the future 'outlook' is provided against each component. Assessments are essentially a qualitative judgement of the assessor based on the likely future performance of the fishery against the relevant risk assessment criteria over the short to medium term (0-3 years). Assessments are based on the available information for the UoA and take into account any known management changes. Outlook scores are provided for information only and do not influence current or future risk scoring.

Table 1: Outlook scoring categories.

Outlook score	Guidance
Improving	The performance of the UoA is expected to improve against the relevant risk assessment criteria.
Stable	The performance of the UoA is expected to remain generally stable against the relevant risk assessment criteria.
Uncertain	The likely performance of the UoA against the relevant risk assessment criteria is uncertain.
Declining	The performance of the UoA is expected to decline against the relevant risk assessment criteria.

Information sources

Information to support scoring is obtained from publicly available sources, unless otherwise specified. Scores are assigned on the basis of the objective evidence available to the assessor. A brief justification is provided to accompany the score for each PI. Information sources may include information gathered from the internet, fishery management agencies, scientific organisations or other sources.

Assessment Results

COMPONENT 1: Target fish stocks

1A: Stock Status

CRITERIA: (i) The stock is at a level which maintains high productivity and has a low probability of recruitment overfishing.

(a) Stock Status

MEDIUM RISK

Although genetic variation between eastern and western Pink Ling has not been found (Ward et al. 2001), differences in catch-rate trends, and size and age (Morison et al. 2013), indicate that there are either two separate stocks, or that exchange between eastern and western components of the Pink Ling stock is low and thus they are managed as separate stocks. AFMA has management arrangements in place to constrain catches of the eastern stock to the eastern catch limit, although total catches of Pink Ling are managed under a single TAC.

Pink Ling has been assessed using quantitative, model-based stock assessments since 2003. Although a number of versions of the model have been developed by different authors, the AFMA Slope Resource Assessment Group (SlopeRAG) agreed to use a model developed by Cordue (Cordue, 2013) as the base-case model for providing advice (Helidoniotis et al, 2017). The Cordue (2013) assessment was most recently updated in 2015 (Cordue 2015). The updated assessment estimated the eastern stock biomass in 2015 to be 0.30 B_0 . Thus, for the eastern stock there is evidence that the stock is highly likely to be above PRI, but limited evidence that the stock is at levels consistent with MSY.

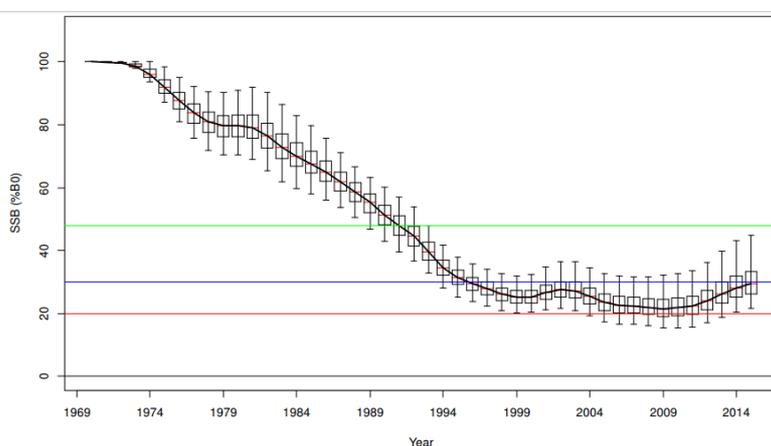


Figure 2: Estimated spawning stock biomass for eastern Pink Ling, 1970 to 2015 (Source: Cordue, 2015). The green line represents the SESSF target reference point ($B_{48\%}$); the red line is the SESSF limit reference point ($B_{20\%}$); the blue line is $B_{30\%}$.

PI SCORE

MEDIUM RISK

1B: Harvest Strategy

CRITERIA: (i) There is a robust and precautionary harvest strategy in place.

(a) Harvest Strategy

LOW RISK

The eastern Pink Ling stock is harvested by both the OTLF and the Commonwealth Southern and Eastern Scalefish and Shark Fishery (SESSF), with around 85% of the catch in 2015 being taken in the SESSF. To that end, the effectiveness of the harvest strategy on the stock is assessed at the whole-of-stock level. In this case, although catches in the OTLF are non-trivial, the main determinant of the overall effectiveness of the harvest strategy for the eastern Pink Ling stock is the effectiveness of the harvest strategy for the SESSF.

At the Commonwealth level, Pink Ling is managed under the SESSF Harvest Strategy Framework (HSF) (AFMA, 2017). The SESSF HSF is designed to meet the objectives of the Commonwealth Fisheries Harvest Strategy Policy 2007 (HSP), namely “the sustainable and profitable use of Australia’s Commonwealth fisheries in perpetuity through the implementation of harvest strategies that maintain key commercial stocks at ecologically sustainable levels, and within this context, maximise the economic returns to the Australian community” (DAFF, 2007). To meet this objective, harvest strategies are designed to pursue an exploitation rate that keeps fish stocks at a level required to produce maximum economic yield (MEY) and ensure stocks remain above a limit biomass level (B_{LIM}) at least 90% of the time. A number of tools are used to limit fishing mortality and monitor catches and stock status including:

- Limited entry;
- Catch controls through TACs and ITQs;
- Gear restrictions;
- Monitoring through logbooks and catch disposal records (CDRs);

- Monitoring through VMS
- Periodic stock assessments.

The HSF uses a three tier approach designed to apply different types of assessments and cater for different amount of data available for different stocks. Each Tier has its own harvest control rule (HCR) that is used to determine a recommended biological catch (RBC). The RBCs provide the best scientific advice on what the total fishing mortality (landings from all sectors plus discards) should be for each species/stock. For all Tier levels, once the RBC is determined from the results of the assessment and the application of the relevant HCR, a recommended total allowable catch (TAC) is calculated based on the TAC setting rules.

Pink Ling is a Tier 1 species under the HSF, meaning that a robust quantitative stock assessment is available. Both eastern and western Pink Ling stocks are managed under a single TAC, with catches of each stock monitored. Catches from all jurisdictions, including the OTLF, are included in the assessment of the eastern stock.

For Tier 1 stocks, the HCR is based on the following reference points:

- The limit biomass B_{LIM} – The default B_{LIM} proxy is B_{20} = 20% of the unfished spawning biomass;
- The B_{MSY} – the default B_{MSY} proxy is B_{40} = 40% of the unfished spawning biomass;
- The target biomass B_{TARG} (MEY) – B_{TARG} is generally equal to B_{MEY} , for which the default proxy is approximated by $1.2 * B_{MSY}$. If the default B_{MSY} proxy is used, this results in B_{48} = 48% of the unfished spawning biomass.

RBCs for Pink Ling are currently generated based on a model originally described by Cordue (2013). The model was most recently updated in 2015 and produced RBCs for the 2016–17 fishing season of 250 t for the east and 990 t for the west. Catch of eastern Pink Ling reported in logbooks in the 2015–16 fishing season was 230 t, which was below the 337 t TAC and the 250 t RBC. Projections from the 2015 stock assessment suggested that the stock could be rebuilt to the target reference point (B_{48}) within one mean generation time (8.8 years) with catches of up to 250t. If two mean generation times are allowed for rebuild, total removals could be 400–500 t per year. For the 2017-18 season, a combined eastern/western stock TAC of 1154 tonnes is in place, with eastern catches informally limited to 500t.

Additional controls to keep eastern catches under the RBC were introduced in 2014-15. These included a daily catch allowance for the eastern zone and a change in some concession conditions to restrict catch of pink ling from the eastern zone to 25 per cent of quota holdings (Helidoniotis et al, 2017).

At the NSW level, the OTLF harvest strategy currently consists of:

- Limited entry;
- Vessel restrictions;
- Gear restrictions;
- Monitoring through logbooks;
- Spatial and temporal closures.

Limited entry is implemented through a share management scheme under which access to the fishery is limited to shareholders or their nominated fishers who hold sufficient shares to satisfy the minimum shareholding levels established for each share class in the *Fisheries Management (Ocean Trap and Line Share Management Plan) Regulation 2006* (the SMP) (DPI, 2017a). Two separate share classes exist for setline fishing: east and west of the 183m (100 fathom) depth contour. Numbers of shareholders in the two line fishing share classes have been progressively reduced over time, with shareholders in the western zone (within 183m) falling from 474 in July 2005 to 275 in December 2016 (DPI, 2017a). In the eastern zone (outside 183m), the number of shareholders has fallen from 111 in July 2005 to 73 in December 2016.

Vessel restrictions include a limitation on vessel size (DPI, 2017a). Gear restrictions includes limitation on the number of hooks used and the prohibition of automatic baiting machines. Additional gear limits are applied near critical Grey Nurse shark habitats.

Fishing closures specific to the OTLF that are authorised under the Act can be found on the NSW DPI website at www.dpi.nsw.gov.au/fisheries/info/closures/commercial. This includes a ban on the harvest of Pink Ling inside 3 nm from the coastline.

Notwithstanding the reduction over time in eligible shareholders, Stevens et al (2012) reported considerable levels of excess harvesting capacity in the OTLF. In the eastern line fishing sector, 25 shareholders out of 80 contributed 95% of the catch (or 69% latency). In the western line fishing sector, 137 out of 336 shareholders contributed 95% of the catch (or 59% latency). Accordingly, while shareholder numbers have been reduced since 2012, substantial additional harvesting capacity is likely to remain in the fishery.

Accordingly, while the harvest strategy overall is responsive to the state of the stock and could be expected to achieve the stock management objectives reflected in Criterion 1A (i), this is largely because of arrangements in place in the Commonwealth SESSF in which the majority of the catch is taken. Because State catches are deducted from RBCs under the SESSF HSF to produce TACs (and therefore State catches are accounted for), we have scored the overall harvest strategy for the eastern Pink ling stock low risk.

Nevertheless, in the OTLF, there is very limited evidence that the current harvest strategy is responsive to the state of the stock and it is not clear that all elements work together. Weaknesses in State management arrangements for the OTLF are addressed in Component 3 below.

In order to address latency and other issues, the NSW Government is implementing a Commercial Fisheries Business Adjustment Program (the BAP) which link shares to either catch or fishing effort (DPI, 2017a). In the OTLF, share linkage arrangements will include increases in the minimum shareholding requirements for most share classes and the introduction of catch quotas for line fishing (eastern zone). A catch quota for Pink Ling is expected to commence in December 2018 (DPI, 2017a).

(b) Shark-finning

NA

CRITERIA (ii): There are well defined and effective harvest control rules (HCRs) and tools in place.

Consistent with 1B(i)(a) above, the primary determinant of the effectiveness of the harvest control rules (HCRs) in place for the eastern Pink Ling stock will be those in place for the SESSF given that fishery takes the majority of the catch.

In the SESSF, the eastern Pink Ling stock is classified as Tier 1 stock under the HSF. Well-defined HCRs are set out for each Tier 1 stock, designed to achieve the objectives set out in the HSF which in turn has been designed to meet the Commonwealth HSP (DAFF, 2007). Under the HSF, for Tier 1 stocks the target fishing mortality rate F_{TARG} represents the fishing mortality rate that would result in a spawning biomass of B_{TARG} (equal to B_{MEY}). The default value for F_{TARG} is F_{48} , the value of F corresponding to a B_{TARG} of B_{48} . Alternative reference points may be adopted for some stocks to better pursue the objective of maximising economic returns across the fishery as a whole. For Tier 1, the recommended maximum fishing mortality rate and HCR inflection point occurs at a proxy of F_{35} .

Recommended Biological Catch (RBC) is calculated by applying F_{TARG} to the current biomass B_{CUR} to calculate the total catch (including discards) in the next year, using the agreed base case assessment model:

$$RBC = Catch[F_{TARG} \rightarrow B_{CUR}]$$

Other sources of mortality arising from discarded catch, or catch taken by other jurisdictions (e.g. state and recreational sectors or research catch allowance), are subtracted from the RBC to produce a Commonwealth TAC.

In practice, the eastern and western stocks of Pink Ling are managed under a common TAC, with additional management measures introduced in recent years to limit catches of eastern Pink Ling to its nominal share of the overall TAC (e.g. daily catch allowance for the eastern zone and a change in some concession conditions to restrict catch of pink ling from the eastern zone to 25 per cent of quota holdings). Since 2014-15, multi-year TACs have been set taking into account the outcomes of probabilistic stock projections from the Cordue (2013) base case assessment.

Catch of eastern pink ling reported in logbooks in the 2016–17 fishing season was 338 t. According to projections from the 2015 stock assessment, there is little risk to the stock over the next few years of removals up to 550 t per year. The base-case projections suggested that the stock could be rebuilt to the target reference point (B_{48}) within one mean generation time (8.8 years). If two mean generation times are allowed for the rebuild, total removals can be 400–500 t per year (Cordue, 2015).

While there are well-defined HCRs for the Commonwealth component of the catch under the SESSF HSF (AFMA, 2017), there are no specific HCRs for the OTLF sector. The closest approximation to a HCR is the framework of trigger points set out in the Fishery Management Strategy (FMS) for the OTLF (DPI, 2006a) which require a review to be undertaken of the likely causes for the trigger and a review report outlining the remedial actions recommended in response to trigger point trips to be provided to the Minister within six months of the trigger point being tripped. Pink Ling is not listed as a primary or key secondary species under the FMS, so the main relevant trigger appears to be the monitoring of total annual landings of all secondary species to detect changes in targeting behaviour. While triggering this indicator may result in a review to assess the impact of any increase in Pink Ling catches, it is not clear that the framework requires that exploitation be reduced as PRI is approached. We note that even for primary and key secondary species, action is required only after the species is categorised as ‘overfished’ or ‘recruitment overfished’ (DPI, 2006a).

The status of Pink Ling is assessed annually by NSW DPI according to generic stock status categories (e.g. ‘fully fished’, ‘overfished’, ‘uncertain’) (e.g. Stewart et al, 2015). Status is determined based on the Commonwealth stock assessment and relevant NSW information. The status of Pink Ling in NSW has been listed as ‘uncertain’ in the 2013-14 and 2014-15 assessments (Stewart et al, 2015; DPI, 2017b). Accordingly, while some ongoing monitoring of stock status is in place and generic tools are available to limit exploitation (e.g. trip limits are used for other NSW species that are shared with Commonwealth fisheries), there is no well-defined or generally understood HCR to limit exploitation as PRI is approached.

Nevertheless, at the whole of stock level, the HCRs in place for the SESSF take into account State catches in the calculation of TACs and appear robust to the main uncertainties. The HCR is structured to ensure that exploitation is reduced as the PRI is approached and is expected to keep the stock fluctuating at a target level above B_{MSY} . Accordingly, we have scored this SI low risk.

We note the stock as a whole would be better positioned with the introduction of HCRs and tools complementary to Commonwealth fisheries which effectively limited exploitation as PRI is approached and aimed to maintain the stock at level around B_{MSY} . The planned introduction of a quota system for Pink Ling in December 2018 may facilitate the introduction of a well-defined HCR.

PI SCORE**LOW RISK**

1C: Information and Assessment

CRITERIA: (i) Relevant information is collected to support the harvest strategy.

(a) Range of information

LOW RISK

There is sufficient information available on stock structure, productivity and fleet characteristics to support the harvest strategy, although much of this comes from the monitoring and assessment in the SESSF. Pink Ling are found in temperate latitudes of southern Australia and New Zealand in depths 200–900 m (more commonly at 300–550 m), although ocean currents may carry larvae into shallow shelf waters and inshore (Kailola et al., 1993). Fishers have reported spawning aggregations in relatively shallow waters off western Tasmania (Strahan), and in waters at approximately 230 m off the east coast of Australia (Everard canyon near Lakes Entrance and Gabo Island) (Tilzey, 2000). Sexual maturity occurs at 4–5 years (60–72 cm TL) and longevity is about 28 years. Natural mortality of Pink Ling has been calculated, although there is a paucity of data available on the natural variability of natural mortality and the factors affecting spawning success.

The available information has been sufficient to undertake a number of Tier 1 stock assessments (e.g. Cordue, 2013; Cordue, 2015), to calculate RBCs based on the HCRs in the SESSF HSF, and to monitor catches against formal and informal (East/West) catch limits.

In 2015-16 fishing season there were 15 active fishers in the OTLF. While public information does not define how many of these used setline, gear-type data are collected. Fishers in the OTLF eastern zone are required to provide daily catch and effort information including catch position, hooks set and retained catch². This information is likely to be sufficient to calculate State catches for the purposes of deducting from the SESSF RBC. A short term observer program was conducted between 2007 and 2009 (Macbeth and Gray, 2016), which provided information on rates of discarding (100% of Pink Ling were retained while using setline gear), although this is not ongoing.

(b) Monitoring and comprehensiveness

LOW RISK

At the Commonwealth level, stock abundance has been monitored through Tier 1 integrated stock assessments since 2003. Assessments are informed by a number of indices including standardised CPUE, length frequency data by method (trawl, line), zone, sampling type (port, onboard), and depth stratum (0-300 m, 300-500 m, 500+ m), and age-frequency data (Cordue, 2015). Monitoring of removals from the SESSF occurs through compulsory catch and effort logbooks and catch disposal records (CDRs), with verification through at sea observer coverage. Industry-based fishery-independent resource surveys have also been run since 2008, which provide a timeseries of relative abundance indices for key target species, including Pink Ling. While the available information is sufficient to support an effective harvest strategy, it is worth noting there is evidence that Pink Ling are under-reported in logbooks (Helidoniotis et al, 2017). Information from catch disposal records are used to correct logbook catches for stock assessments.

In the OTLF, stock removals are monitored through a daily catch and effort logbook that is submitted monthly. A three year scientific observer program commenced in September 2007, with a final report published in 2015 (MacBeth and Gray 2016).

For the Commonwealth component of the stock, assessments are undertaken consistent with the HCR and there is good information on removals from the stock. In the OTLF, there is no formal HCR, but assessments of generic status are undertaken annually (e.g. Stewart et al, 2015) and removals from the stock are monitored. Together with periodic Commonwealth stock assessments, monitoring (particularly that occurring in Commonwealth fisheries) is likely to be sufficient to support an effective HCR.

CRITERIA: (ii) There is an adequate assessment of the stock status.

(a) Stock assessment

LOW RISK

Pink Ling has been assessed using quantitative, model-based (Tier 1) stock assessments since 2003. Annual integrated, age-structured assessments using catch-at-age data and standardised CPUE abundance indices were run using Stock Synthesis software from 2006 to 2012 (Helidoniotis et al, 2017). The 2012 Stock Synthesis model was updated again in 2013. The Cordue (2013) model was taken through to full Markov chain Monte Carlo (MCMC) probability analysis for the eastern stock to provide estimates of probabilities around results. SlopeRAG agreed to use this as the base-case model for providing advice. Results of the CASAL model indicated the biomass of the eastern stock of Pink Ling was estimated to be around 0.25 B_0 , ranging from 0.17 to 0.38, and trending upwards. The Cordue (2013) CASAL based model was updated in 2015 (Cordue, 2015). Changes to the model structure and data inputs are summarised in Cordue (2015) and included further analysis of eastern selectivity and estimates of natural mortality (M) following MCMC runs.

The assessments are appropriate for the stock and estimates of stock status relative to reference points are appropriate to the stocks of Pink Ling, and these estimates are available.

In NSW, weight of evidence based assessments of the eastern Pink Ling stock in NSW waters are undertaken regularly (annually or biannually) according to the framework outlined in Scandol (2004) (e.g. Chick, 2015). Assessments take into account the outcomes of the Commonwealth assessment and relevant NSW information.

(b) Uncertainty and Peer review

LOW RISK

Stock assessments at the Commonwealth level are subject to peer review and judgement (i.e., ability to reject the assessment) through the South East Resource Assessment Group (SERAG). The assessment identifies and takes into account the main sources of uncertainty. At the NSW level, uncertainty is taken into account qualitatively through the use of a weight of evidence based approach.

PI SCORE

LOW RISK

COMPONENT 2: Environmental impact of fishing

2A: Other Species

CRITERIA: (i) The UoA aims to maintain other species above the point where recruitment would be impaired (PRI) and does not hinder recovery of other species if they are below the PRI.

(a) Main other species stock status

MEDIUM RISK

² https://www.dpi.nsw.gov.au/__data/assets/pdf_file/0008/753146/New-South-Wales-Department-of-Primary-Industries-Catch-and-Effort-Logbook.pdf

The intent of this scoring issue is to examine the impact of the UoA on 'main' other species taken while harvesting the target species. 'Main' is defined as any species which comprises >5% of the total catch (retained species + discards) by weight in the UoA, or >2% if it is a 'less resilient' species. The aim is to maintain other species above the point where recruitment would be impaired and ensure that, for species below PRI, there are effective measures in place to ensure the UoA does not hinder recovery and rebuilding.

In a three-year observer study for the OTLF, Macbeth and Gray (2016) reported that *"in total, 5,626 organisms, comprising at least 119 different species (or groups), were caught during the 88 set/trotline days observed, with 82.8% of that total catch (by number) across 87 species retained."*

The report tabled the 10 most frequently caught species by number and gear type, with setline catches comprising: bigeye ocean perch (15.6%), Pink Ling (11.9%), Snapper (10.3%), Gummy Shark (10.1%), whitefin swellshark (6.0%), Eastern fiddler ray (4.5%), draughtboard shark (4.1%), Port Jackson shark (4.1%), Ribaldo (3.0%) and Eastern red scorpionfish (1.9%). Main other species are meant to be assessed as a proportion of the catch by weight, not by frequency, and thus there is some uncertainty as to whether these data include all species >5% of the total catch weight. However, for the purposes of this assessment, all species comprising 3% or more of the catch by number are considered to provide a reasonable basis to assess main other species for the fishery.

There are several sources of information that provide an assessment of stock status for these species. NSW DPI published a state-wide fisheries status report in 2015 (Stewart et al 2015) where they assessed the stock status of 112 species or species groups harvested in NSW. Recently, DPI published a summary update of these assessments (DPI, 2017b). For Bigeye Ocean Perch, Gummy Shark and Ribaldo, assessments of stock status are also provided by ABARES (Patterson et al, 2017). Finally, for Snapper and Gummy Shark, assessments of status are provided through the *Status of Key Australian Fish Stocks* reports (Stewardson et al 2016). The nine most frequently caught species (excluding Pink Ling) in the setline sector of the OTLF, and the available assessments of stock status are summarised in Table 2 below.

Table 2: Assessments of stock status for the 9 most frequently caught main other species by setline OTLF fishers.

Species	% of catch	Stewart et al (2015)	Patterson et al (2017)	Stewardson et al (2016)	DPI (2017b)
Bigeye ocean perch	15.6%	Fully fished	Not overfished		
Snapper	10.3%	Growth overfished		Undefined	Growth overfished
Gummy Shark	10.1%	Fully fished	Not overfished	Sustainable	Fully fished
Whitefin swellshark	6.0%				
Eastern fiddler ray	4.5%				
Draughtboard shark	4.1%				
Port Jackson shark	4.1%				
Ribaldo	3.0%		Not overfished		

Based on Table 2, bigeye ocean perch, Gummy Shark and Ribaldo are highly likely to be above the point of recruitment impairment.

There is some uncertainty on the status of the Snapper stock in South Eastern Australia. NSW reports (Stewart et al 2015, DPI 2017b) consider the species to be growth overfished, albeit not recruitment overfished. Fowler et al (2016) classify the stock as undefined overall, but note that the New South Wales part of the biological stock is unlikely to be recruitment overfished on the basis of stable size and age composition of commercial landings, with recent increases in the proportion of older fish. Accordingly, notwithstanding the uncertainty about overall stock status, at the NSW level there is some evidence to suggest that the measures in place are expected to ensure the OTLF will not hinder recovery.

Of the remaining shark species where no assessment of stock status is available, the IUCN lists Eastern Fiddler ray, Draughtboard shark and Port Jackson shark "of least concern". Whitefin swellshark is currently considered by the IUCN as "Near threatened", based on an assessment published in 2011³. The major threat to the species was considered to be Commonwealth Trawl Sector (CTS). The sustainability of whitefin swellshark harvested by the CTS was originally assessed as Precautionary High Risk in the Level 3 SAFE analysis (Zhou et al 2012). However, an extension of this approach reduced the estimated risk of overfishing to low risk (Zhou et al 2013). Thus, given the CTS was considered the major threat to the species, and the residual risk assessment indicated low risk of overfishing, some evidence exists that is at least unlikely that the OTLF is preventing recovery of the stock if indeed it is below PRI.

Given three of the eight species assessed are highly likely to be above the PRI, one is considered to be growth overfished, but not recruitment overfished, the status of three species is unknown but considered to be of 'least concern' by IUCN and the final species was rated low risk in a recent SAFE assessment for the fishery rated the major threat, there is at least some basis to conclude that the majority of main other species are likely to be above the PRI and/or the UoA has measures in place that could be expected to ensure it does not hinder recovery. Given the limited information on status of several species, there is insufficient information to conclude that the stocks are highly likely to be above the PRI. Accordingly, we have scored this SI medium risk.

CRITERIA: (ii) There is a strategy in place that is designed to maintain or to not hinder rebuilding of other species.

(a) Management strategy in place

MEDIUM RISK

³ <http://www.iucnredlist.org/details/42706/0>, accessed 28 July 2017

Measures in place to limit the catch of other species include:

- Limited entry;
- Vessel restrictions;
- Gear restrictions (e.g. maximum use of 10 setlines with no more than 6 hooks attached to any set line within 3 nautical miles; maximum use at any one time of 1200 hooks applies to any line fishing method outside 3 nautical miles);
- Spatial and temporal closures;
- Minimum legal sizes for some species (e.g. Snapper); and
- Trip/weekly catch limits for some species.

Trip limits include:

- For shark species other than dogfish, School Shark and Gummy Shark, OTLF line fishing eastern zone endorsement holders are limited to a weekly trip limit of 750kgs if the sharks are whole, or 500kgs if the headed or gutted⁴;
- Ocean Perch north of Barrenjoey Headland (1 January – 31 March – 500kgs/trip; 1 April – 31 December – 1,000kgs/trip); Ocean Perch south of Barrenjoey Headland (300kgs/trip).

Information on other species catches is available through compulsory daily catch and effort logbooks, as well as a targeted three-year scientific observer program which commenced in September 2007 (MacBeth and Gray, 2016). Catch and stock status are monitored against the framework of trigger points in the FMS, as well as the annual stock status assessments (e.g. Stewart et al, 2015; DPI, 2017b).

Of the main other species assessed under criterion 2A(i) above, Snapper and Gummy Shark are listed as primary species under the FMS, while whitefin swell shark, Eastern fiddler ray, Draughtboard shark and Port Jackson shark could be considered captured under the generic key secondary species category of “Shark spp”. Bigeye Ocean Perch and Ribaldo are not listed as a primary or key secondary species.

In practice, species specific assessments of status are made of Snapper, Gummy Shark and Ocean Perch (group) (DPI, 2017b). No species specific assessments are made of the shark/ray species or Ribaldo in NSW.

Bigeye Ocean Perch, Gummy Shark and Ribaldo are all assessed and managed as part of the SESSF. OTLF catches of each species are relatively small in comparison to the catches in the SESSF. Each of these species is assessed as being not overfished and existing measures appear sufficient to ensure OTLF catches do not hinder recovery (if required).

For Snapper, Stewart (2015) notes that the size at which 50% of females mature in NSW is around 25cm, so the minimum legal size of 30cm should allow a substantial portion of individuals the opportunity to spawn before recruiting to the fishery. Fowler et al (2016) conclude that the portion of the stock in NSW waters is not overfished. Accordingly, there is some evidence to suggest that, even if there is uncertainty around status at the stock-wide level, the measures in place for the OTLF will serve to ensure the stock remains above PRI.

The main uncertainty appears to be the status of the individual shark species harvested in the fishery, and whether measures are sufficient to maintain stocks above PRI. There have been no species specific assessments to determine status against PRI and no species specific ecological risk assessments at the fishery level. IUCN assessments at the species-wide level suggest Eastern Fiddler Ray, Draughtboard Shark and Port Jackson Shark are unlikely to be threatened by current levels of fishing, while the outcomes of Zhou et al (2013) provide a plausible argument that the impacts of the OTLF are likely to sufficiently low as to not result in Whitefin Swellshark falling below PRI. Moreover, in January 2017, NSW introduced a weekly trip limit of 750kg of whole sharks, or 500kg if the sharks are headed and gutted. Accordingly, we have scored this SI medium risk.

Nevertheless, we note the fishery would be considerably better positioned against this indicator with a species specific assessment of risk at the fishery level. The outcomes of the BAP are also likely to better position the fishery against this PI by addressing excess harvesting capacity.

(b) Management strategy evaluation

MEDIUM RISK

There is some objective basis for confidence that the measures will work for some species (e.g. Bigeye Ocean Perch, Gummy Shark, Ribaldo), while for others information is more limited (e.g. individual shark species). The observer program provides useful data from a three year study that appeared representative of commercial fishing effort (Macbeth and Gray, 2016). There is a plausible argument that the input controls currently in place (e.g. vessel restrictions, gear restrictions, weekly shark limit, prohibition on shark finning, spatial and temporal closures) will work to maintain stocks above PRI, particularly in light of efforts to address excess harvesting capacity. Nevertheless, additional information would be required to provide an objective basis for confidence for shark species.

(c) Shark-finning

MEDIUM RISK

On 29 November 2016, a regulation was put in place to ban shark-finning in NSW waters (see http://www.dpi.nsw.gov.au/data/assets/pdf_file/0005/630707/Section-8-Notification-Fishing-Closure-Prohibition-on-Shark-Finining.pdf). Fins are required to be naturally attached. No specific information on rates of compliance were found. Evidence of high compliance with the new regulation may result in a lower risk score.

CRITERIA: (iii) Information on the nature and amount of other species taken is adequate to determine the risk posed by the UoA and the effectiveness of the strategy to manage other species.

(a) Information

MEDIUM RISK

⁴ https://www.dpi.nsw.gov.au/data/assets/pdf_file/0004/639778/Section-8-Notification-Conditions-for-taking-certain-shark-species-harvested-in-the-Ocean-Trap-and-Line-Fishery-February-2017.pdf

The OTLF is a multi-species fishery with numerous retained species. Commercial catches are recorded in compulsory commercial logbooks. The scientific observer program was implemented based on a risk framework that identified ocean line fishing methods as the highest priority in the state (Scandol, 2005). The three-year scientific observer program provided robust data on which to determine main other species, albeit data were reported in numbers rather than weight (MacBeth and Gray 2016).

There are a number of sources of information that document assessments of stock status for main other species of the OTLF, including NSW (Stewart et al 2015, DPI 2017b) and Commonwealth/FRDC reports (ABARES, 2016, Stewardson et al., 2016).

The main weaknesses are a lack of ongoing independent monitoring to validate fisher reporting and catch composition, particularly given that 119 different species (or groups) were caught during the 88 set/trotline days observed (Macbeth and Gray 2016), and the lack of species specific assessments for some main other species. At this stage, the information has not been sufficient to assess the impact of the fishery on some individual shark species with respect to status.

Nevertheless, there is sufficient information to support the strategy for management of main other species.

PI SCORE

MEDIUM RISK

2B: Endangered Threatened and/or Protected (ETP) Species

CRITERIA: (i) The UoA meets national and international requirements for protection of ETP species. The UoA does not hinder recovery of ETP species.

(a) Effects of the UoA on populations/stocks

MEDIUM RISK

An Environmental Impact Statement (DPI 2006b) conducted by NSW DPI found that of the 18 threatened species of fish likely to interact with the OTLF, only three were at any risk from overfishing; Grey Nurse Shark (*Carcharias taurus*), Black Rockcod (*Epinephelus daemeli*) and White Shark (*Carcharodon carcharias*). These were determined to be high, moderately-high and moderate risk respectively. The risk of the OTLF fishery to ETP species of birds, marine mammals and reptiles was assessed as moderately low. In 2012, Scalloped Hammerhead Shark (*Sphyrna lewini*) was listed as an endangered species and the Great Hammerhead Shark (*Sphyrna mokarran*) was listed as a vulnerable (DPI, 2017a). In 2013, Harrison's Dogfish (*Centrophorus harrissoni*) and Southern Dogfish (*C. zeehaani*) were listed as Conservation dependent under the EPBC Act.

DPI (2017a) reported ETP interactions for the OTLF from 2012 to 2016. The only reported interactions with setlines were for hammerhead sharks, with 20 mortalities of Scalloped Hammerhead and 4 mortalities of the Great Hammerhead sharks over the 5-year period. Regarding the sustainability of current levels of harvest of hammerhead sharks in Australia, Sempendorfer et al (2014) concluded that "annual harvest levels for a period of three years from 14 September 2014 are sustainable and unlikely to be detrimental to the species". Notably, for the endangered species Scalloped Hammerhead Shark, this was based on annual estimates of total catch of 200 t across Australia, and as such the 20 Scalloped Hammerhead Sharks caught over a 5-year period in the OTLF would suggest that the fishery provides a very minor contribution to total catch and is thus unlikely to be preventing recovery.

The 3-year observer study (Macbeth and Gray 2016) provides independent estimates of ETP interactions for the setline sector of the OTLF fishery from 88 observed fishing days. Observed interactions included: 2 Grey Nurse Sharks released alive, 4 Great White Sharks released alive, 2 Eastern Blue Devilfish discarded dead, 3 Eastern Blue Groper discarded dead, 2 Great Hammerhead Sharks discarded dead, and 17 Southern Dogfish (15 on one day) discarded dead. In total, 30 interactions across 6 different species were observed.

More than half of the total observer interactions were with Southern Dogfish, *C. zeehaani*, and the great majority of those were captured on one day. AFMA has a rebuilding strategy in place for several dogfish species including *C. zeehaani*. NSW has its own strategy to assist with stock rebuilding, which includes a prohibition on the retention of Harrison's Dogfish and Southern Dogfish and a 15 kilogram whole weight limit for Endeavour Dogfish and Greeneye Spurdog (DPI 2017a). DPI (2012) reported that "for Southern dogfish, the depletion estimate for the entire eastern population is about 10% of the unfished biomass remaining, with the greatest level of depletion occurring south of the NSW/VIC border. Like for Harrison's dogfish, the area north of Barrenjoey Headland indicates that there has been less depletion (estimated level around 30%) than elsewhere for this population". Given that areas of NSW are less likely to be depleted, it is possible that the capture of 15 Southern Dogfish in one day was not reflective of a highly depleted population at the local scale. Nevertheless, although statewide catches may be uncertain, the evidence from the 3-year observer program suggests that interactions are relatively infrequent events and the known direct effects from the fishery are probably at least unlikely to hinder recovery.

While independent observer data suggest that ETP interactions in the OTLF fishers are under-reported for species other than hammerhead sharks, it also confirms that interactions with ETPs are relatively rare events in the setline sector of the OTLF. From the available fishery-dependent and fishery-independent data, it is reasonable to conclude that the fishery at least unlikely to be hindering recovery of ETP species. However, it must be noted that observer data were collected for only a three year period, that interactions with ETPs were highly variable events, and fisher-dependent data appears unreliable for most species. As such, this SI can only be scored as medium risk.

CRITERIA: (ii) The UoA has in place precautionary management strategies designed to:

- meet national and international requirements; and
- ensure the UoA does not hinder recovery of ETP species.

(a) Management strategy in place

MEDIUM RISK

The fishery has a strategy in place to monitor, assess and manage its impact on ETP species including:

- Limited entry;
- Gear restrictions, including limitations on the number of hooks and mandatory use of circle hooks;
- Catch controls (e.g. no retention of some species);
- Spatial closures;
- A number of gear restrictions applying in or near critical habitat of Grey nurse shark (DPI, 2017a).
- Compulsory reporting of all ETP species interactions in logbooks;
- A 3-year independent observer monitoring program including ETP species interactions;
- Analysis of impacts through an Environmental Impact Statement (DPI, 2006b);
- NSW strategy for rebuilding dogfish populations (DPI, 2012);
- Prohibition on shark finning; and
- Regulated commercial weekly and total catch limit applying to certain shark species.

There remains some uncertainty in the assessment of ETP interactions due to: under-reporting of ETP interactions in logbooks; high variability in observed ETP interactions during the 3-year study, and; the lack of ongoing observer coverage. Nevertheless, substantial management measures have been implemented by NSW DPI to limit the impact of the fishery on ETP species. These measures should be sufficient to ensure that the fishery does not hinder the recovery of the species, and thus this SI is scored medium risk.

(b) Management strategy implementation

MEDIUM RISK

There is an objective basis for confidence that the management measures are likely to work, however in the absence of ongoing observer coverage, and with under-reporting in commercial logbooks, there is currently insufficient evidence to demonstrate that the strategy is being implemented successfully. As such this criterion is assessed as medium risk on the basis that a plausible argument exists that the measures are likely to work.

CRITERIA: (iii) Relevant information is collected to support the management of UoA impacts on ETP species, including:

- information for the development of the management strategy;
- information to assess the effectiveness of the management strategy; and
- information to determine the outcome status of ETP species.

(a) Information

MEDIUM RISK

Substantial quantitative information on ETP interactions was derived from the 3-year observer study (Macbeth and Gray 2016). However, there was a high degree of variability in the information that generates uncertainty in the projections of interactions (Macbeth and Gray 2016). For example, there were several interactions with white sharks and grey nurse sharks in one year only. Further, there were clear discrepancies between the independent observer data and ETP interactions reported by fishers (DPI 2017a). While the variability in observer data and the poor reporting by commercial fishers suggests that improvement is required in ETP reporting, the observer data did provide a basis for confidence that ETP interactions are relatively rare, and the fishery is unlikely to be hindering recovery of ETP species. On this basis, this SI is scored medium risk.

PI SCORE

MEDIUM RISK

2C: Habitats

CRITERIA: (i) The UoA does not cause serious or irreversible harm to habitat structure and function, considered on the basis of the area(s) covered by the governance body(s) responsible for fisheries management

(a) Habitat status

LOW RISK

Setlines are considered a largely passive gear type that cause minimal impact onto benthic marine habitats. The EIS assessed the risk to marine habitats from the OTLF as low (DPI 2006b). It is reasonable to conclude that given the relatively limited spatial footprint and intensity of the fishery, and the passive nature of the gear, the setline sector of the OTLF is highly unlikely to cause serious or irreversible harm to habitat structure and function.

CRITERIA: (ii) There is a strategy in place that is designed to ensure the UoA does not pose a risk of serious or irreversible harm to the habitats.

(a) Management strategy in place

LOW RISK

The EIS (DPI 2006b) formed the basis for assessment of the ecological risks for the fishery. As a result, critical habitats for grey nurse sharks were identified and closures subsequently developed to protect these species. Although not specifically determined to protect habitats from the impacts of the OTLF, gear restrictions limit the impacts of the setline fishery inside 3 nm. Other fishery-specific and general closures (e.g. Marine Parks) as well as the limitations on vessels and gear, are further measures to limit the impact of the fishery on habitats.

Together, these measures are likely to be considered at least a partial strategy to ensure the UoAs do not cause serious and irreversible harm to habitats.

(b) Management strategy implementation**LOW RISK**

There is an objective basis that the management strategy will work based on the type of gear used, the limited scale and intensity of the fishery, and the fishery-specific and general area closures that impact the available fishery area.

CRITERIA: (iii) Information is adequate to determine the risk posed to the habitat by the UoA and the effectiveness of the strategy to manage impacts on the habitat.

(a) Information quality**LOW RISK**

The major habitat types and their distribution have been mapped within NSW waters (Davies et al. 2007, 2008a&b, Jordan et al. 2009). While the “low risk” assessment of the impact of the OTLF in the EIS (DPI 2006a) pre-dated these studies, considering the scale and intensity of the fishery, the available data are adequate to determine the risk posed to the habitat by the fishery, and as such this criterion is assessed as low risk.

(b) Information and monitoring adequacy**LOW RISK**

Given the scale and intensity of the fishery and the passive impact of the setline gear type, information is broadly adequate to understand the main impacts of gear on the main habitats. This was assessed through the EIS process (DPI 2006b), albeit that the assessment pre-dated the mapping of habitat types for the fishery.

PI SCORE**LOW RISK**

2D: Ecosystems

CRITERIA: (i) The UoA does not cause serious or irreversible harm to the key elements of ecosystem structure and function.

(i)(a) Ecosystem Status**LOW RISK**

Serious or irreversible harm in the ecosystem context should be interpreted in relation to the capacity of the ecosystem to deliver ecosystem services (MSC, 2014). Examples include trophic cascades, severely truncated size composition of the ecological community, gross changes in species diversity of the ecological community, or changes in genetic diversity of species caused by selective fishing.

Observer data from a 3-year study of the OTLF that included the setline sector, reported at least 119 different species (or groups) were caught (87 species retained) during the 88 fishing days. A number of limitations have been placed on the fishery to minimise its impact, including vessel and gear restrictions and area closures. Of the main retained species, the fishery does not appear to be substantially impacting those where there is uncertainty over their status, at least not to the point of hindering recovery. While there is some uncertainty over ongoing ETP reporting by fishers, ETP interactions are relatively rare and the impacts are unlikely to be preventing recovery of their respective populations.

Of the species harvested by the setline sector of the OTLF, sharks are arguably the most at risk from an ecosystem perspective. Savina et al. (2013) developed an Atlantis ecosystem model to examine the impacts of the NSW trawl fishery, including the harvest of sharks. The model indicated that despite high levels of fishing effort, including the removal of sharks, the functional biodiversity of the ecosystem has been maintained. Given the relatively minor impact of the OTLF compared to the offshore trawl fishery, it is reasonable to conclude that the removals by the OTLF are highly unlikely to disrupt the key elements underlying ecosystem structure and function to the point of serious or irreversible harm.

CRITERIA: (ii) There are measures in place to ensure the UoA does not pose a risk of serious or irreversible harm to ecosystem structure and function.

(a) Management Strategy in place**LOW RISK**

The fishery has in place measures that can be considered at least a partial strategy to ensure that the fishery does not impact on the ecosystem to cause serious and irreversible harm. The strategy includes: limitation on fishing effort through licence limitation, gear and vessel restrictions and area closures; assessment of the stock status of primary and secondary main species; recovery strategies for overfished stocks; protection of critical habitats for ETP species (e.g. grey nurse shark); ban on shark finning, and; a fishery observer program that provides an independent assessment of catch composition and ETP species interactions.

(b) Management Strategy implementation**LOW RISK**

There is evidence that the management strategy is working based on the data obtained from the 3-year observer study. While not directly examining the impacts of the OTLF fishery, the results from Atlantis ecosystem modelling for the trawl sector imply that the OTLF is highly unlikely to be causing significant or irreversible harm to the ecosystem (Savina et al. 2013). Notably, several of the key species harvested by the OTLF are shared stocks with the Commonwealth Trawl Sector (CTS), and the ERA for the CTS indicated only a low impact on the ecosystem by this fishery. Given the scale and intensity of the OTLF, and the passive nature of the gear type used compared to trawl, it is certain the OTLF is having an even smaller impact on the ecosystem.

This provides an objective basis for confidence that the partial strategy for the OTLF will work and some quantitative evidence that the measures are being implemented successfully.

CRITERIA: (iii) There is adequate knowledge of the impacts of the UoA on the ecosystem.

(a) Information quality

MEDIUM RISK

The key elements of the ecosystem where the OTLF operates have been identified (e.g. OTLF EIS, Macbeth and Gray 2016). While habitat mapping is broad scale, it is likely to be sufficient for the scale and intensity of the fishery. However, there are some limitations in the available information: bycatch are not reported in commercial logbooks; there appears to be low reliability in the reporting of ETP interactions for all species other than hammerhead sharks, and, while observer data provide accurate and reliable measures of catch composition and ETP interactions, the observer program is not ongoing. As a consequence, this SI is assessed as medium risk.

(b) Investigations of UoA impacts

LOW RISK

While there have been no direct investigations on the impacts of the OTLF on the ecosystem, the main impacts of the fishery can be inferred from existing information. This includes assessments of stock status for target and main other species (Cordue 2015, DPI 2017b and others), fishery-dependent and fishery-independent measures of ETP interactions (Macbeth and Gray 2016, DPI 2017a), and ecosystem modelling (Savina 2013).

PI SCORE

LOW RISK

COMPONENT 3: Management system

3A: Governance and Policy

CRITERIA: (i) The management system exists within an appropriate and effective legal and/or customary framework which ensures that it:

- Is capable of delivering sustainability in the UoA(s); and
- Observes the legal rights created explicitly or established by custom of people dependent on fishing for food or livelihood.

(a) Compatibility of laws or standards with effective management

LOW RISK

The OTLF is managed under the NSW Fishery Management Act 1994 (Act) and regulations made under this Act. NSW DPI is the State Government agency responsible for the administration of the Act.

The Act seeks to provide for ecologically sustainable development for the fisheries of NSW through the achievement of its stated objectives, which are to conserve, develop and share the fishery resources of the State for the benefit of present and future generations. The Act is aimed at achieving sustainable fisheries in accordance with Components 1 and 2.

(b) Respect for Rights

LOW RISK

In recognition of Aboriginal peoples' cultural fishing needs and traditions, several significant Act amendments commenced in early 2010. They included:

- Extending the objects of the Act to now explicitly recognise the connection Aboriginal people have with the fisheries resource;
- The addition of a definition of Aboriginal Cultural Fishing to enable Aboriginal people to take fish or marine vegetation for cultural fishing purposes;
- The establishment of the Aboriginal Fishing Advisory Council (section 229) to ensure that Aboriginal people play a part in future management of the fisheries resource;
- Specific provisions under Section 37(c1) of the Act for issuing authorities for cultural events where fishing activities are not consistent with current regulation. This provision caters for larger cultural gatherings and ceremonies.
- Aboriginal persons becoming exempt from paying a recreational fishing fee under 34C of the Act.

CRITERIA: (ii) The management system has effective consultation processes that are open to interested and affected parties. The roles and responsibilities of organisations and individuals who are involved in the management process are clear and understood by all relevant parties.

(a) Roles and Responsibilities

LOW RISK

The Organisations and individuals involved in the management process have been identified. Functions, roles and responsibilities are explicitly defined and well understood for key areas of responsibility and interaction. The Minister responsible for administering the Fishery Management Act 1994 is ultimately responsible for the management of NSW commercial fisheries. The NSW DPI undertake day to day management of the EGF and act as a primary advisor to the Minister. Other groups may also provide advice to the Minister or through the DPI, including the Ministerial Fisheries Advisory Council (MFAC), the Commercial Fishing NSW Advisory Council and the NSW Total Allowable Catch Setting and Review (TAC) Committee. For more information see:

<http://www.dpi.nsw.gov.au/fisheries/commercial/consultation>

(b) Consultation Process

LOW RISK

New consultation arrangements were introduced in November 2012 following an Independent Review of NSW Commercial Fisheries Policy, Management and Administration. In addition to the Deputy Director General DPI Fisheries, who acts as the primary advisor to the Minister, key groups involved in the consultation process include:

- **Ministerial Fisheries Advisory Council (MFAC)** - established to provide cross-sectoral advice on strategic policy issues to the Minister for Primary Industries. It includes representatives from the commercial, recreational, indigenous, aquaculture and conservation sectors and has an independent chair;
- **Commercial Fishing NSW Advisory Council** - the council is the key advisory body providing ongoing expert advice to Government on matters relevant to the sector; and
- **NSW Total Allowable Catch Setting and Review (TAC) Committee** - The TAC Committee is a statutory body established under the provisions of the Fisheries Management Act 1994 (the Act). It is required to determine and keep under review total allowable catch (or fishing effort) levels, as required. It gives effect to the objects of the Act having regard to all relevant scientific, industry, community, social and economic factors. Membership of the TAC Committee includes an independent Chairperson, a natural resource economist, a fisheries scientist and a person with appropriate fisheries management qualifications.

Task based and time-limited working groups may also be formed on an as needs basis to provide expert advice on specific issues. Working group members are appointed by the Deputy Director General, DPI Fisheries based on skill and expertise relevant to the tasks assigned to the working group. Current working groups include a Baitfish Working Group and a NSW Lobster Industry Working Group.

Where substantive changes are proposed to management arrangements, public consultations occurs through the release of a Regulatory Impact Statement (RIS) which sets out the proposed changes, likely impacts and alternative options considered.

Accordingly, the management system has processes in place to regularly seek and accept information from interested parties.

For more information on the full process see: <http://www.dpi.nsw.gov.au/fisheries/commercial/consultation>

CRITERIA: (iii) The management policy has clear long-term objectives to guide decision making that are consistent with the outcomes expressed by Components 1 and 2, and incorporates the precautionary approach.

(a) Objectives

LOW RISK

The objectives of the Act include:

- a) to conserve fish stocks and key fish habitats, and
- b) to conserve threatened species, populations and ecological communities of fish and marine vegetation, and
- c) to promote ecological sustainable development, including the conservation of biological diversity,

and, consistently with those objectives:

- d) to promote viable commercial fishing and aquaculture industries, and
- e) to promote quality recreational fishing opportunities, and
- f) to appropriately share fisheries resources between the users of those resources, and
- g) to provide social and economic benefits for the wider community of New South Wales.

These objectives are consistent with Components 1 and 2.

PI SCORE

LOW RISK

3B: Fishery Specific Management System

CRITERIA: (i) The fishery specific management system has clear, specific objectives designed to achieve the outcomes expressed by Components 1 and 2.

(a) Objectives

MEDIUM RISK

Fishery specific objectives for the OTLF are set out the FMS (DPI, 2006a). These include:

- Managing the OTLF in a manner that promotes the conservation of biological diversity in the marine environment
- Maintaining stocks of primary and key secondary species harvested by the OTLF at sustainable levels
- Promoting the conservation of threatened species, populations and ecological communities likely to be impacted by the operation of the OTLF
- Appropriately sharing the resource and carry out fishing in a manner that minimises negative social impacts
- Promoting a viable OTLF, consistent with ecological sustainability
- Facilitating effective and efficient compliance, research and management of the OTLF
- Improving knowledge about the OTLF and the resources on which it relies.

Additional fishery specific objectives and associated performance indicators and trigger points are set out in the SMP.

While these objectives are consistent with the outcomes expressed by Components 1 and 2, the main uncertainty is the extent to which the objectives as set out in the FMS actively guide management of the OTLF given the age of the document and the extent to which they have been superseded by other management initiatives (e.g. the BAP). We have scored this SI medium risk on the basis that objectives consistent with Components 1 and 2 are at least implicit within the management system, although we note that confidence in the scoring would be strengthened with additional evidence that the objectives in the FMS continue to be actively used.

CRITERIA: (ii) The fishery specific management system includes effective decision making processes that result in measures and strategies to achieve the objectives.

(a) Decision making

MEDIUM RISK

Under the NSW State Government's fisheries decision-making process, the Fisheries Minister has ultimate responsibility for the management of the fishery and is empowered to make changes to the Fisheries Regulations and Management Plan. The Minister is advised by the NSW DPI and MFAC who, in turn, seek input from stakeholders and technical working groups.

The extent to which the management system could demonstrate that it has responded over time to serious issues identified in relevant research, monitoring and evaluation in a timely, transparent and adaptive manner appears variable. For example, the target species assessed here, Pink Ling, was classified by ABARES as subject to overfishing between 2004 and 2008, and as uncertain as to whether overfishing was occurring between 2009 and 2014 (Helidoniotis et al, 2017). Although catches in NSW fisheries have historically been substantially smaller than those in Commonwealth fisheries, we are not aware of any limits on catch applied outside 3nm or other measures to assist in recovery.

Nevertheless, there do appear to be some examples in which the management system has responded to serious issues – for example, measures recover populations of dogfish and specific area closures implemented for the protection of critical habitats for grey nurse sharks. Given that there is some evidence that the management system responds to serious issues we have scored this SI medium risk. There appears to be insufficient evidence that the management system responds to all serious and other issues consistent with the low risk SG.

(b) Use of the Precautionary approach

MEDIUM RISK

The use of the precautionary approach is required under the Act. There appears to be some evidence of precautionary approaches being used including the prohibition of the retention of some dogfishes throughout NSW despite available evidence indicating that stocks north of Barrenjoey Point may be above PRI. Nevertheless, it is not clear that the precautionary approach is applied across all components of the management system – for example, action to rebuild stocks is required only after being listed as 'overfished' under the FMS and substantial latent harvesting capacity still exists (albeit being dealt with through the BAP). Moreover, there seems to have been limited response to the Pink Ling stock being classified as uncertain as to whether overfishing was occurring (e.g. ABARES, 2009 to 2014; Chick, 2015). To that end, the low risk SG does not appear to be met.

(c) Accountability and Transparency

LOW RISK

Information on the fishery's performance is available on the NSW DPI website, primarily through public reports of performance against the FMA trigger points (e.g. DPI, 2016), stock status assessments (e.g. Stewart et al, 2015, DPI, 2017b) and periodic reviews against the *Guidelines for the Ecologically Sustainable Management of Fisheries* by the Commonwealth environment department (DPI, e.g. 2017a). Research reports relevant to the fishery are also available through the NSW DPI website (e.g. Macbeth and Gray 2016) and websites of external funders (e.g. the Commonwealth Fisheries Research and Development Corporation). The findings of relevant research are discussed through the consultative structure described in Figure 3, and explanations are provided for any management actions or lack of action. Where significant management changes are required, a RIS is released calling for public comment. The RIS provides an explanation of the background to the proposed changes and alternative options considered.

CRITERIA: (iii) Monitoring, control and surveillance mechanisms ensure the management measures in the fishery are enforced and complied with.

(a) MCS Implementation

LOW RISK

The NSW fisheries compliance program is led by the NSW DPI Fisheries Compliance Unit (FCU), which is focused on optimising compliance with the Act, the *Marine Estate Management Act 2014* and their associated regulations (DPI, 2017a). The FCU is separated into seven geographic compliance zones, with a State-wide Operations and Investigations Group that undertakes major/complex investigations, and the Conservation and Aquaculture Group that provides specialist capabilities in aquatic habitat compliance management. NSW DPI Fisheries Compliance Plans are regularly reviewed for progress against the objectives of the Australian Fisheries National Compliance Strategy (AFNCS).

The MCS system in the OTLF primarily comprises commercial logbooks, at sea and land-based fisheries inspections of all sectors by the DPI Fisheries Officers, occasional observer coverage, clear sanctions set out in legislation enforceable through the courts and promotion of voluntary compliance through education. Additionally, there is a specific PI in the FMS: facilitate effective and efficient compliance, research and management of the Offshore Trap and Line Fishery with a trigger point of exceeding 10% for major and 20% for minor (of all inspections) offences. This PI is assessed at least biennially and compliance statistics are reported annually on the DPI website.

Significant prosecutions and rates of compliance are publicly reported on the NSW DPI website⁵. The compliance system appears to have an ability to enforce relevant management measures and rules.

(b) Sanctions and Compliance

MEDIUM RISK

Sanctions to deal with non-compliance are set out in the Act and the NSW Fisheries Compliance Enforcement Policy and Procedure document (DPI, 2011). Some evidence exists that fishers comply with the management system, albeit interactions with ETP species appear to be under-reported and rates of compliance are lower than might be expected from a highly compliant fishery. DPI (2017a) report that rates of compliance in the four-year period from 2012-13 to 2015-16 ranged from 73.9% to 81.2% in the OTLF. Rates of compliance calculated using information from inspections completed by NSW DPI Fisheries Officers when undertaking inspections of fishers and fishing gear in the OTL Fishery. Accordingly, we have scored this SI medium risk.

⁵ <http://www.dpi.nsw.gov.au/fishing/compliance/fisheries-compliance-enforcement>

CRITERIA: (iv) There is a system for monitoring and evaluating the performance of the fishery specific management system against its objectives.

There is effective and timely review of the fishery specific management system.

(a) Evaluation coverage

LOW RISK

Performance of the management system is monitored against the trigger points in the FMS, as well as through annual stock status assessments. The FMS sets out operational objectives and performance indicators across the main elements of the management systems: target species, byproduct species, bycatch species, ecosystems and social indicators. In addition, NSW DPI Fisheries Compliance Plans are regularly reviewed for progress against the objectives of the Australian Fisheries National Compliance Strategy (AFNCS) (DPI, 2017a). Accordingly, there are mechanisms in place to evaluate key parts of the management system.

(b) Internal and/or external review

MEDIUM RISK

The fishery is subject to occasional external review by the Commonwealth environment department under the Environment Protection and Biodiversity Conservation Act 1999. Generally, assessments have occurred every three years, with the current assessment being conducted in 2017. The extent to which the fishery management system has been subject to regular internal review is somewhat unclear. Performance against the FMS was to be subject to biennial review under the MAC. However, the plan for reviews under the new consultative structure is not available publicly. Notwithstanding that, it is clear that at least occasional reviews performance against the FMS have occurred (e.g. DPI, 2016). Accordingly, we have scored this SI medium risk.

PI SCORE

MEDIUM RISK

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