

OVERVIEW

Environmental Impact Statement



OCEAN TRAWL FISHERY



NSW DEPARTMENT OF
PRIMARY INDUSTRIES



Introduction

Trawling off the NSW coast is an important fishery that supplies the Sydney Fish Market and many regional cooperatives and retail outlets with fresh fish. The operation of the current activity poses some key environmental, social and economic risks, particularly impacts on some shark species, species that have been identified as overfished and fish habitats.

These risks must be addressed for the activity to proceed in a sustainable way and for the necessary approvals to be granted. A number of actions have been proposed to address the risks, including implementation of closures and other refuge areas, recovery programs for overfished species, prohibition of trawling on reefs, changes to improve the selectivity of trawl gear, improved bycatch reduction devices and establishment of a scientific

observer program. The actions represent a balanced approach to securing the objectives sought for trawling and ecologically sustainable fisheries.

The Environmental Impact Statement for the Ocean Trawl Fishery (covering the Ocean Trawl Share Management Fishery and the Southern Ocean Fish Trawl Fishery) presents a thorough, frank and transparent assessment of the risks associated with the current activity and the measures proposed to address the risks.

Public exhibition of the Environmental Impact Statement for the Ocean Trawl Fishery provides an opportunity for the community to review the environmental performance of the activity of trawling and to have input into its future management.



The development of fishery management strategies and environmental impact statements

In December 2000, the NSW Government made changes to ensure that fishing activities in New South Wales are managed in an ecologically sustainable way. The changes require the development of fishery management strategies and associated environmental assessments for each major fishing activity, including the ocean trawl fishery.

The draft fishery management strategy and environmental impact assessment for each activity are joined together in an Environmental Impact Statement (EIS). Its structure is based on guidelines issued by the Department of Infrastructure, Planning and Natural Resources.

This overview presents a summary of the EIS, being the first chapter (Chapter A). Chapter B of the EIS reviews the existing operation of the activity, including where it occurs, the methods used, species taken, current management arrangements, and the socio-economics related to the activity. The risks associated with all aspects of the activity are assessed to identify those aspects that require

modification by the fishery management strategy. Together these chapters (Chapters A and B) comprise Volume 1 of the EIS.

Chapter C provides an outline of the main alternative management options to those of the existing activity and Chapter D provides details of the proposed management arrangements for the activity (i.e. the draft strategy). Chapter E presents an assessment of the potential impacts of implementing the draft strategy, that is, the extent to which the draft strategy mitigates the risks identified in Chapter B. Chapter F provides a justification for the preferred strategy, taking into account its implications in terms of environmental, social and economic factors.

This overview provides an introduction to the environmental assessment process. It briefly outlines the context within which the activity of ocean trawling currently operates, the management arrangements proposed in the draft FMS, and the findings of the environmental impact assessment.



The existing activity of ocean trawling

The ocean trawl fishery off NSW has two components, fish trawling and prawn trawling, both of which use a common type of fishing gear (the demersal trawl net). Most trawling for prawns occurs off the north coast and most trawling for fish occurs off the central and southern coasts, however there is overlap of the two methods in the area between Barrenjoey Point and Smoky Cape. There is also considerable overlap between ocean prawn trawling and ocean fish trawling in terms of the species caught and the operators who use each method.

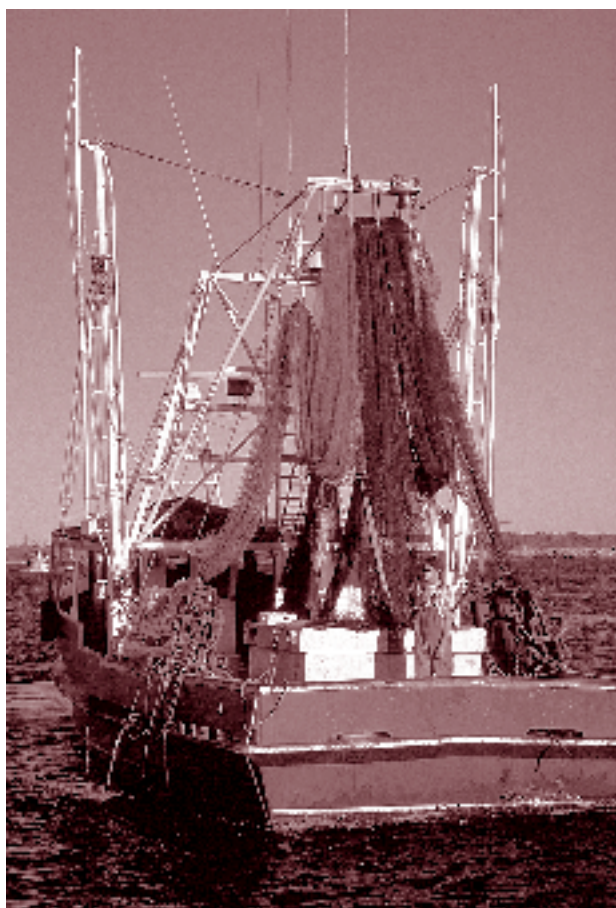
An Offshore Constitutional Settlement (OCS) agreement in December 1990 gave NSW jurisdiction over trawling in depths less than 4000 m (approximately 80 nautical miles from the coast) for waters between Barrenjoey Point (near Sydney) and the Queensland border. The Commonwealth retains jurisdiction for trawling outside 3 nautical miles south of Barrenjoey Point, while NSW currently has jurisdiction for trawling in waters within 3 nautical miles of the NSW coastline.

Approximately 100 fishing businesses hold an entitlement to operate in the fish trawl sector and around 310 fishing businesses hold an entitlement to operate in the prawn trawl sector of the ocean trawl fishery (note: the actual numbers vary over time). However, all endorsed fishing businesses do not operate in the fishery each year, which results in a significant level - about 30 to 40% - of latent (ie. unused or seldom used) fishing effort. Boats used in the fishery are generally 15 to 20 m in length, diesel powered, with modern fish-finding and navigation equipment.

Demersal trawl nets are similar in shape to a large flattened funnel, which is dragged along the seabed on suitable fishing grounds. Trawling cannot be successfully conducted on areas of high rocky reef, or where there are obstacles (such as shipwrecks or undersea cables) that could snag the net or attached gear. The mouth of the net is held open by the shearing action through the water of two 'otter boards' (trawl doors), while the catch accumulates in the rear section of the net, termed the 'cod-end'. Regulations prescribe the mesh size of netting allowed to be used for fish or prawn trawls and other characteristics of the boats and gear, and daily trip limits apply to some species. Trawlers are not permitted to operate within the habitat protection or sanctuary zones within established marine parks and several closures designed to protect juvenile king prawns apply around the mouths of major estuaries.

The ocean trawling fishery produces over 4,000 tonnes of seafood product annually and is valued at about \$36 million at first point of sale. The main species taken in prawn trawls are eastern king prawns, school prawns and octopus, while the main species taken in fish trawls are tiger flathead, silver trevally, fiddler shark and southern calamari. Significant quantities of school whiting, sand flathead and cuttlefish are landed by both methods. A large number of species are of secondary importance in the fishery.

Demersal otter trawling is a relatively unselective fishing method, capturing most of the mobile species in the path of the net, and retaining those, which are of a size that cannot escape through the meshes of the net. A significant issue for the NSW ocean trawl fishery has been the level of bycatch (i.e. fish that are caught in the net but not retained because they are under the minimum legal length or not commercially valuable), however the introduction of bycatch reduction devices in prawn trawl nets is helping to address the level of incidental capture.





Risk, response and predicted outcome

The following section briefly describes the risks of the ocean trawl fishery as they pertain to environmental, economic and social components (initial risk), the management responses proposed in the draft strategy to mitigate those risks (response), and a predictive assessment of the degree to which those measures may mitigate the risks (predicted outcome). This section is also summarised in Table A1.

In order to address any perceived problems with the existing operation of ocean trawling, it is first necessary to describe and evaluate the potential impacts arising from the manner in which ocean trawling is conducted. It is also necessary to attempt to isolate those elements of the operation that contribute the most to those impacts and to adjust those elements through the draft strategy.

Broadly, the operation of ocean trawling comprises nine component activities that have the potential for a variety of environmental, economic and social impacts. Those activities include:

- Trawling – the deployment, towing and retrieval of a trawl net by a fishing vessel
- Harvesting – the capture and retaining of fish for sale
- Discarding – the returning of unwanted catch to sea
- Contact without capture – the contact of the trawl net with components of the environment whilst being towed but which do not capture any part of the environment
- Loss of fishing gear – the partial or complete loss from vessels of nets, warps, otter boards, ropes or other equipment
- Travel to and from fishing grounds – the steaming of a vessel from port to fishing grounds and the return journey
- Disturbance due to presence in the area – the stationary vessel on the water whilst on-board activities take place
- Boat maintenance and emissions – the tasks that involve fuel, oil or other engine & hull related activities that could be accidentally be spilled or leaked into the sea or air
- Marketing – the sale of fish to an authorised fish receiver

These component activities of trawling can have both direct and indirect impacts on the environment. For example, the activity of harvesting has a direct impact on the abundance and productivity of primary and key secondary species and an indirect impact on oceanic food webs via the removal of some predators.

To address the risks, the draft strategy offers seven major long-term goals for the management of the fishery, which are supported by approximately 25 objectives and 64 management responses. It is important to note that a single management response can mitigate a variety of risks and therefore it is not necessary to formulate direct responses for each risk. The responses with a direct relationship to an environmental, economic or social component are described briefly below and summarised in Table A1.

The risk being assessed was the probability of the retained, non retained, threatened and protected species or the marine habitats and species assemblages becoming ecologically unsustainable within the next 20 years if the current operation of the fishery were to continue unchanged.

At the practical level due to data deficiency the reconciling of fisheries with conservation in the environmental assessments is based on a multi-stage ecosystem risk assessment. A risk matrix is derived based on the multiplication of likelihood and consequence. There is a strong interdependence between and difficulty in quantifying both likelihood and consequence in the data poor fisheries of NSW. Therefore the level of fishery impact (on the y-axis) is used as a surrogate for likelihood and the resilience of the parameter under consideration (on the x-axis) is used as a measure for consequence. A five-step gradient of risk is then defined within the matrix from low risk (high resilience x low fishery impact) to high risk (low resilience x high fishery impact). The risk level determined from the matrix is then related to the type and priority of the fisheries management action required to reduce risk or prevent risk increasing and the required future monitoring.

The fishery impact profile is fishery specific and relates to the activities of the fishery in five broad categories:- how much is caught; how is it fished; how many fishers catch it; what is caught; and where is it fished. This then leads to 12 or more factors such as catch trends, exploitation status, gear selectivity and refuge availability.

In the framework, resilience is described qualitatively based on biological characteristics of species. A suite of biological characteristics such as fecundity, life history strategy, geographic distribution, habitat specificity, population size, growth rate, longevity, age at maturity and diet specificity are used. A set of decision rules are determined for each characteristic that distinguishes between risk prone and risk averse traits. Then a final resilience is assigned according to the balance of risk prone versus risk averse characteristics a species possesses.

The individual characteristics or factors, which are used to determine both the resilience and the fishery impact profile for use in the risk matrix are given unequal weights based on their importance.

When dealing with non-biological components (geological habitats) the fishery impact profile remains the same as for the biological components (retained, bycatch, bait and threatened species) but the resilience measures change. As an example hard-ground habitats have medium to high resistance to the physical impact of trawl gear but have zero resilience to the damage caused by fishing gear. The recovery time of a rocky reef is measured in geological time scale and damage to the rocky structure is regarded as permanent.

Ecological impacts

The purpose of this section is to critically evaluate the available information on the ecological impacts of ocean trawling and the underlying mechanisms by which impacts occur. An understanding of these mechanisms is important for the evaluation of future impacts of ocean trawling, and for evaluating the extent and magnitude of existing impacts.

The major potential impacts of the ocean trawl fishery include growth and recruitment overfishing, disruption to ecological processes, impaired recovery of threatened species and damage to habitats. The degree to which these impacts occur varies depending on the resilience of a species or environmental component and the intensity of the fishing activities.

The risk assessment conducted on the existing ocean trawl fishery found that almost all activities of the fishery are likely to pose a risk to most components of the environment. In particular, trawling, harvesting and discarding pose the greatest risk to the components of the environment including primary and key secondary species, non-commercial bycatch species and habitats. Although not all aspects of the activity were found to affect all components of the environment, it was apparent that inappropriate gear selectivity, lack of stock assessments of the primary and key secondary species, poor understanding of discard composition and magnitude, knowledge gaps of biology and ecology of species and ecological interactions, lack of knowledge about the distribution and types of marine habitats with respect to trawling activities all pose a risk to

the environment.

It is important to note when reading the following sections that despite a detailed risk assessment on numerous components of the environment, the substantial knowledge gaps about the impacts of the fishery on the oceanic environment leaves a high level of uncertainty surrounding the activity. There are still many aspects that remain uncertain, and in the absence of scientifically rigorous data, this assessment has been necessarily cautious.

Further, the appraisal of the management responses in the draft strategy in the following sections has been made on the basis that the proposed research will be undertaken. Research will remove a high proportion of the uncertainty surrounding the activity and this assessment and allow a retrospective analysis of the accuracy of the assessment and the implementation of new management measures if necessary.

Fish retained by the fishery

Initial risk

Of the 43 species of finfish and shellfish assessed, five were at high risk, nine were moderately high, 12 were intermediate, one was moderately low and 13 were at low risk. All five species at highest risk were sharks due to their low biological resilience, low refuge availability, poor gear selectivity and inadequate stock assessments. Seven finfish and two shellfish made up those with moderately high risk. Some of these species are growth overfished or have declining catch trends, and low availability of refuges from fishing. Those species with intermediate risk include three shark species that have low biological resilience.

Issues arising

There are nine issues arising from the risk assessment for the species that are retained by the fishery. All the species with the highest level of risk were sharks. This group of species is recognised both nationally and internationally as being at risk from commercial fishing. Sharks are particularly vulnerable to trawling because their slow growth rate, long life span and life history strategy is not conducive to rapid recovery after populations have been depleted. Specific and immediate action should be implemented to reduce the high risk on these species.

Four of the species at moderately high risk are considered growth overfished, i.e. the size at which they are caught is too small. Direct action in the form of changes to gear selectivity is required for these species.

Many of the species that make up a large proportion of the landings of the ocean trawl fishery have either inadequate or no stock assessments. Therefore, there is no quantitative data on which to base more precise management measures. This is a major obstacle to reducing the risk for primary and key secondary species.

There are a number of species in the ocean trawl fishery where size at first capture is below their size at maturity (e.g. silver trevally and tiger flathead). Better selectivity of fish trawl gear should in the longer term improve the yield from the fishery and reduce the catch of small fish for most species.

The bycatch of commercially important species (ie. individuals below the minimum legal length) has received insufficient attention in the ocean trawl fishery, as there is no information on the quantity, composition, frequency and temporal and spatial variability of these discards. This is a source of unaccounted mortality, which means regular assessments of the status of the stocks of some of the key ocean trawl species will be inadequate. It will be important for future stock assessments to take this mortality into account.

While the use of bycatch reduction devices by all ocean prawn trawlers were made mandatory in July 1999, there has been little work done to assess the effectiveness of the devices under normal commercial trawling conditions. There has been no onboard monitoring of ocean prawn trawlers since the compulsory introduction of bycatch reduction devices.

There are a number of key species caught in the ocean trawl fishery that are also taken in large quantities in the Commonwealth, Queensland and Victorian fisheries. There are different management regimes across the Commonwealth and State jurisdictions, with quota management in the South East Fishery and effort control management in NSW and the other States. The differing management regime in the above fisheries increases the risk of species with common stocks becoming ecologically unsustainable because the controls do not complement each other.

The department's catch database has a number of limitations which reduces its capacity to provide reliable information on which to base appropriate management regimes, such as no separate reporting of landings from Commonwealth and State fisheries prior to 1997. This is a major obstacle to reducing the risk of the key species in the ocean trawl fishery. Improving the way information is recorded on the catch returns, coupled with validation

of reported landings by independent observers either on vessels and/or at local fish cooperatives would greatly increase the reliability of the database.

There are a number of substantial knowledge gaps that hinder the ocean trawl fishery from being managed and fished in an ecologically sustainable manner. Specific knowledge is needed on the location of trawl grounds for each sector of the fishery, the frequency the grounds are fished and by how many fishers. There is little to no knowledge on the ecology and basic biology of many of the primary and key secondary species. Research on the interactions among fish species and non-target species, interactions of fish with the environment and habitats, stock and community structure, and spatial and temporal complexity of fish stocks has received little attention in the ocean trawl fishery.

Response

The draft strategy contains a number of responses that address the issues for the retained species. The extent to which the risks overall have been reduced will depend on the effectiveness of the combined management controls in the draft strategy and their effective implementation. The major programs in the draft strategy to address these risks can be divided into the following:

Management:

- Implementation of refuge area closures and other refuge areas - these will create refuges for adult populations and spawning/pupping areas from the direct effects of fishing and for depleted stocks of some species to rebuild.
- Fishing effort – there is a stated intent to reduce the number of endorsements, although the draft strategy does not specify the level or the mechanism that would be used to achieve it. The proposal is to establish a ten year effort target for restructuring.
- Recovery programs for overfished species – the draft strategy includes recovery actions for one overfished species and provides for the development of recovery programs for any other species later identified as being overfished.
- Changes to gear selectivity – changes in the short term to mesh size and cod end diameter to select species at more appropriate sizes (apart from on specified school whiting grounds), and further changes in all areas based on the results of a proposed research program.

Research:

- Observer program – will collect biological information on shark species and commercial discards of other retained species, and record data the quantity and composition of bycatch species; determine exploitation status of these species.

Monitoring:

- Monitoring landings – age/length, sex composition and quantity of landings of primary, key secondary and secondary species.

Predicted outcome

These management responses will result in a minor reduction in risk for sharks and most species at moderately high risk. A few species at moderately high risk will have a major to moderate reduction in risk. Some of the management controls in the proposed strategy only reduce risk by a minor degree. For many of the management controls details on the specific mechanisms to be used are to be developed during the implementation of the strategy. A lot rests, therefore, on the expectation that the details of the implementation arrangements including research and monitoring will be adequate to fulfil the goals and objectives stated in the strategy and thereby reduce risk.

Fish not retained by the fishery – ‘bycatch’

Initial risk

The risk assessed is the probability of bycatch species becoming ecologically unsustainable within the next 20 years if the current operation of the fishery were to continue unchanged. The same methodology for determining risk levels for the retained species was used for this component of the environment.

Based on observer studies done in the 1990s it is estimated that over 60% of non-commercial bycatch species (i.e. species that have no commercial value) are at high or moderately high risk. This is primarily due to their very low survival after trawling and handling on deck and no or few known refuges from fishing. There is no information about species of commercial importance that are discarded (i.e. due to being undersized) but their risk level would be the same as the adults of these species – moderate to high.

Issues arising

Six issues arise from the risk assessment on bycatch. Bycatch consists of a large number of species, not all of which will be encountered or caught by every trawl.

Therefore, the best approach to managing this type of bycatch for the ocean trawl fishery is to minimise bycatch as a whole. The wide range and lack of information about these species means that reducing bycatch on a species specific basis will largely be ineffective except for some commercial bycatch species.

There is some historical information on the bycatch of commercially important species, however, there is insufficient quantified information on a number of key bycatch variables (e.g. non-commercial bycatch and post bycatch reduction device introduction). Information needed for better management includes the spatial and temporal variability in the abundance and diversity of bycatch species, the survival of species after they have been discarded and the factors that contribute to their survival. In addition, the effectiveness of the current compulsory bycatch reduction devices used in the fishery needs to be assessed in terms of how well they reduce all bycatch, but with a particular emphasis on non-commercial species.

Changes to gear selectivity should be monitored to determine whether it results in either major differences in composition of species and/or changes in the quantities of bycatch either positively or negatively.

Currently bycatch reduction devices are only compulsory in prawn trawling. Such devices are unsuitable for fish trawlers because their design would necessarily exclude many of the key species that fishers target. Consequently, different methods of reducing bycatch in fish trawling are needed. A better understanding of the variability in the composition and quantity of bycatch caught in fish trawls will enable specific methods to be developed to reduce unwanted catch.



There is currently no quantified information on potential effects of discards from the ocean trawl fishery providing a source of food for marine scavengers such as sea birds, sharks and marine mammals. Such information is needed to determine whether additional management measures are necessary.

Response

Six types of management controls are proposed in the draft strategy to reduce risk to bycatch species. Of these, time and area closures and improved bycatch reduction devices will provide the greatest reduction in overall risk to bycatch. Gear selectivity will be effective for a portion of bycatch species. Because so little is known about bycatch species and discarding patterns, the observer program will play a key role in reducing risk for these species.

The major programs in the draft strategy to address the risk to all bycatch species can be divided into the following:

Management:

- Additional and improved bycatch reduction devices – those bycatch reduction devices found to be more effective at reducing bycatch without significant loss of primary and key secondary species will be promoted to fishers as the best options to use or implemented on a mandatory basis
- Closures of all reef areas
- Closures at river entrances during high flow – closures near the mouths of rivers during periods of floods will reduce catches of small fish that have moved from those estuaries
- Improve gear selectivity – this will reduce the capture of undersized commercial species and some non-commercial species. It will be especially effective for fish trawl gear as they cannot use conventional bycatch reduction devices like prawn trawlers
- Recovery programs – development of recovery programs for species determined as overfished (e.g. silver trevally, redbfish and gemfish) will potentially address the capture of undersize individuals

Research:

- Observer program – to assess the effectiveness of the range of bycatch reduction methods implemented in the draft strategy and quantify discard patterns of many non-commercial species and hence determine if the objectives of the management have been achieved

Monitoring:

- Monitor catches – monitoring the size and age composition of both commercial and non-commercial species will provide information that will assist in identifying areas and times of high bycatch and facilitate improvements in the management regime

Predicted outcome

These management responses will result in a minor to moderate reduction in the risk to bycatch species. The fishery closures and improved bycatch reduction devices will provide the greatest reduction in overall risk. Changes to gear selectivity will be effective for a portion of the catch.

Threatened and Protected Species and Communities

Initial risk

The risk assessed is the probability that any aspect of the fishery would impede the conservation and recovery of a threatened species. The assessment determined that all threatened and protected fish species were at low or moderately low risk. The risk of the fishery impeding the conservation and recovery of threatened marine mammals and reptiles was low to moderately low, for threatened seabirds moderately low and low for the endangered little penguin population at Manly. These low risks are primarily due to the apparently low rate of interaction between the fishery and these species and communities.

Issues arising

On-going monitoring of the interaction between the fishery and threatened species is required to ensure that the level of impact on these species does not increase in the future. Such monitoring should quantify the species, type of interaction (e.g. direct capture, boat strike, etc) and outcome (ie. level of injury, if any, endured by the organism).

The dependence of threatened species on the discards of the fishery should be investigated. More information is needed in order to quantify the importance of trawl discards in the diets of threatened species. Any future changes to fishing practices, such as closures, could adversely affect threatened species if they have become dependent on the discards of the fishery as a source of food.

The strategy will need a mechanism to respond to future listings of species under the threatened species legislation. Such a mechanism will be necessary to ensure any

species regularly caught by the fishery is protected in a timely manner.

Response

The measures proposed to mitigate risk to threatened and protected species are focussed on obtaining better information on interactions between fishers and these species in the fishery. The major programs in the draft strategy to address the risk to threatened and protected species can be divided into the following:

Management:

- Mandatory reporting of fishers' interactions with threatened species – changes to monthly reporting forms to promote the recording of interactions between fishers and threatened species will assist in improving the information base and identifying potential problem areas
- Implement actions required in accordance with recovery plans for threatened species or threat abatement plans – adherence to the provisions in such plans will promote the recovery of these species
- Promote fishing techniques that avoid interaction with protected fish and threatened species – these practical measures could lead directly to reduced catches of threatened species and increased survival of certain threatened species caught by trawlers.

Research:

- Observer program – independent reporting and quantification of the frequency, type and potential outcome of fishers' interactions with threatened species

Monitoring:

- Record interactions between fishers and turtles – to quantify to what extent interaction with marine turtles occur in the fishery and the need for specific mitigation measures.

Predicted outcome

In general, risks to threatened species from trawling under the present management arrangements are low to moderately low and there is no change to these risks under the draft strategy. Given the low level of risk the measures contained in the draft strategy are considered adequate provided that the information obtained is fed back into other management responses (such as for closed areas) and used to reduce impacts. It should be noted that fisher self-reporting of threatened species interaction carries with it an element of potential bias against mentioning them, and will require verification from the observer program.

Marine Habitats

Initial risk

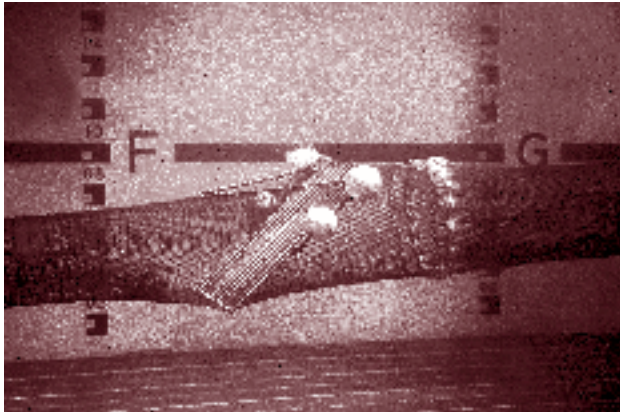
The risk assessed for marine habitats is the likelihood that marine habitats will be degraded by the current activities of the fishery such that populations and/or stock levels of species associated with these habitats will become ecologically unsustainable within the next 20 years.

Three habitat types were assessed as being at a high level of risk – hard-ground low vertical reef; sessile animals and plants living on low level reef; and sessile animals and plants living in soft ground (sand, mud and gravel). These habitats are readily accessible to trawling and suffer permanent (low level reef) or long term damage due to the slow growth of many of the sessile animals making up these habitats. Soft ground habitat, such as sand, mud and gravel were at moderately high risk as the intensity and frequency of trawling on these habitats is unknown. Hard ground reef greater than 2 metres high and its associated biota were assessed at intermediate risk from trawling due to the greater difficulty trawlers have in accessing this type of habitat.



Issues arising

There were four major issues arising from the risk assessment of marine habitats. Of primary concern were fishing practices that cause irreversible damage. The trawl fishery has expanded its operations onto hard-ground low reef habitats by using modified trawl gear that are



equipped with large bobbins/rollers as indicated by the reef fish species being recorded on the fishers returns. This expansion is likely to be causing major impacts on these habitats. If this degradation continues it is likely that productivity will decrease and the sustainability of some species may be threatened.

Adequate refuge areas from trawl fishing are needed to conserve habitats. In particular there is currently limited protection for soft-sediment habitat, low reef and habitat forming animals and plants that live in these habitats from the impacts of fishing. There is a need to protect representative areas of these habitats if risks are to be mitigated.

Trawl fisheries on the continental slope and shelf are managed by several State and Federal government agencies that have different management regimes. Therefore, the effectiveness of management initiatives of one jurisdiction could be undermined by the lack of consistency of another. Consequently, widespread habitat degradation can continue to occur unless a common approach to management is adopted.

Four major information gaps were identified. These are i) identification of fishing grounds and mapping the distribution of fishing effort, ii) identification and mapping the distribution of broad habitat types, iii) assessment of the magnitude of fishery impacts on habitats, iv) lack of biological and ecological knowledge for habitats made of living animals. It is essential that these information gaps be addressed in the draft strategy.

Response

There were five management responses that relate to mitigating the risk to marine habitats. These can be divided into the following:

Management:

- Establishment of refuge areas – as a precautionary measure a series of closures to will be implemented to protect a range of habitats until more information about the different types and spatial extent of habitats is gathered, including closing all waters beyond the 1,100 metre depth contour
- Closure of all reefs – the closure of all reefs (i.e. all hard rock) is a firm step to reducing the risk on these habitats and will have flow on effects to fish productivity and ecological sustainability
- Modification of trawl gear – the closure of reefs will make the use of bobbin gear redundant in the fishery. Furthermore, the restriction on the ground chains (number and gauge) will lessen potential impacts on soft ground habitat

Research:

- Map habitat types – initial work of identifying habitats on trawl grounds will be conducted in conjunction with mapping trawl grounds
- Promotion of research on habitat issues – part of the research plan of the draft strategy is to promote research into this area but no details are given

Monitoring:

- None proposed given the difficulty and high cost of such work.

Predicted outcome

Overall, the draft strategy will have a minor to moderate influence in reducing the risk to marine habitats. A significant reduction in risk levels for some habitats will be achieved by closing all reefs and waters deeper than 1100m to trawling but more detail on other habitats is required for a full assessment.

Species assemblages, species diversity and ecological processes

Initial risk

The risk assessed for species assemblages, species diversity and ecological processes is the likelihood that these components will be degraded or impaired by the current activities of the fishery such that they will become ecologically unsustainable within the next 20 years. Two

species assemblages were identified as being at potential risk – macroalgal assemblages and bottom dwelling mobile invertebrates. Both of these assemblages are closely associated with the habitats that support the species harvested by the fishery. Therefore, any impact by the fishery on these habitats will also impact these assemblages.

Species diversity is the variety of organisms between and within marine species. Given the poor knowledge of the spatial and temporal patterns of species diversity for major groups of animals and plants in marine waters, risk relating to species diversity can only be determined at the largest scale of ecosystem components. The risks to species diversity are closely linked to the risks to habitats and ecological processes.

An ecological process, broadly defined, is any process that affects the distribution and abundance of living organisms. These processes include interactions such as competition, predation, parasitism and physiological effects of temperature, light, nutrient availability on individual organisms. Ecologists are generally concerned with the cumulative effects of such interactions at the population or species assemblage level. Fisheries management takes into account the effects of fishing on parts of the system other than the harvested species, and acknowledges that effects on these other parts of the system may also have consequences for target species. Of the nine major ecological processes considered, five were considered at high risk from activities of the fishery and two were at intermediate risk.

Issues arising

The major issues arising from the risk assessment of these components of the environment focus on the lack of information about how they operate in the ocean environment. In all these areas there is an inadequate knowledge base on which to determine effective management action. A better understanding of the interactions between ecological processes and commercial and non-commercial species is urgently needed, although the complexity, difficulty and high cost of obtaining such information must be acknowledged. The long term ecological sustainability of the exploitable fish assemblages of the fishery is likely to be jeopardised without more detailed knowledge of the ecological processes they depend on.

Because habitats are critical for maintaining species assemblages, sustainable ecological processes and biodiversity, habitat loss and fragmentation are the greatest threats to these components becoming unsustainable.

Substantial efforts must be made in a number of areas to conserve and, where appropriate, restore lost habitats due to the activities of the fishery. Until the spatial and temporal extent of trawl grounds, species assemblages, interactions between trawling and ecological processes and the level of intensity of trawling on these grounds are known, refuges will be needed to protect species biodiversity, species assemblages and ecological processes. The draft strategy should be sufficiently precautionary to ensure the proposed management regime will enable the best possible chance of the various components of the ecosystem to recover in the face of an unexpected outcome.

Response

Six management responses contribute to the conservation of marine habitats, and protection of species assemblages, diversity and ecological processes. These can be divided into the following:

Management:

- Establish refuge areas and protect marine habitats – there is a commitment to develop strategies to establish refuge areas and to manage the fishery consistently with other management programs that seek to protect marine habitats, such as marine parks
- Close all reefs and depths exceeding 1100m – this will provide substantial protection to important habitats that are essential for the sustainability of ecological processes and diversity
- Modification of trawl gear – the restriction on ground chains (number and gauge) will lessen impacts on habitats and species diversity and restrictions on bobbin gear will also minimise the ability for fishers to access a variety of habitats

Research:

- Map habitats – there is a strong commitment to mapping habitat types within and near the trawl grounds of the fishery
- Map trawl grounds and frequency of trawling on these grounds – as part of mapping habitats the draft strategy proposes to map all trawl grounds and determine the intensity of trawling on each ground

Monitoring:

- None proposed given the complexity, difficulty and high cost of such work

Predicted outcome

The risk to species assemblages and species diversity will

be reduced to some extent provided the commitment to conserve the diversity of marine habitats is fulfilled. Until details of the proposed closures are known, the level of risk reduction for these components will be uncertain. It is also difficult to quantify to what extent the risk to ecological processes is reduced for two reasons. First, there is little actual information on the impact of the current activity to ecological processes, making it difficult to quantify the extent to which impacts would be reduced under the draft strategy. Second, the draft strategy requires the development of the detailed arrangements for implementing several key responses (e.g. the closures). Whilst the detailed arrangements will need to be adequate to fulfil the goals and objectives stated in the strategy, making assessment of the outcome is difficult until those details are known. Overall, the management responses regarding establishing refuge areas and research on the impacts of the fishery on ecological processes should be given a high priority. Furthermore, monitoring the effectiveness of closures in enhancing ecological sustainability for components of the environment assessed would be required to determine the effectiveness of these management responses.

Economic

Initial risk

The ocean trawl is the most valuable commercial fishery in NSW. In the 1997/98-2001/02 period, the prawn trawl and fish trawl components of the fishery had annual average revenues of \$24.65m and \$4m respectively.

Out of 330 (311 prawn trawl and 99 fish trawl) businesses holding endorsements to fish in the fishery, 158 did not report any catch in 2001/02. The fishery comprises predominantly one person businesses forming teams, with partnerships between fishers, and a limited amount of corporate involvement. Businesses in the fishery are highly variable in their levels of capital investment, ranging from \$240,000 to \$300,000 per business, and differ according to the diversity of business activities and assets. The total capital investment in the 252 active ocean trawl fishing businesses is estimated at approximately \$73 million.

An economic survey of businesses in 1999/2000 indicated that an economic surplus existed for 41% of ocean trawl fishing businesses. The remaining 59% of ocean trawl fishing businesses were operating below long-term viability levels. There is substantial overcapacity in the fishery, reducing the economic performance and not generating

sufficient economic rent. Currently the ocean trawl fishing businesses are not required to meet full management costs.

The fishery is now facing a number of risks, including:

- excess active fishing effort
- potential activation of latent effort
- ineffective control of total effort levels
- lack of economic incentives to fishers to reduce fishing effort
- increasing operational, management and the costs of restructuring and
- lack of access security for long-term business certainty

Response

The FMS aims to address these issues by proposing a number of management responses, and these have been assessed as follows:

- the move to category 1 shares provides more security of access for fishers than the current *restricted fishery* regime or the former proposal to implement category 2 shares, and increases the capacity of fishers to trade shares in access rights
- A further reduction in active fishing capacity is needed due to excess active fishing effort
- the intent to limit latent effort is stated, but the level of structural adjustment or the means to achieve it remain to be determined. Limiting the activation of latent fishing capacity can occur through a range of adjustment tools, such as the minimum shareholdings limits, higher requirements for new entrants, surrenders, and buybacks – each tool would have different implications for fishers if implemented
- The draft strategy proposes the establishment of ten-year target for fishing effort. As current active fishing effort is above the profit maximising level, the active effort needs to be set in the fishery
- the total management charges for an average fishing business are estimated to increase from current \$2,035 to \$4,620 per annum, assuming an increase in management charges due to the new programs in the FMS and adjustment initiatives reducing business numbers in the management cost levy base
- vessel capacity restrictions, such as horsepower and other unitisation rules, would remain in place to avoid substitution to uncontrolled inputs. Area and time closures are necessary for maintaining sustainable fish and prawns stocks

- the draft strategy intends to evaluate whether a limit on the number of days/nights fished is appropriate. This would have a positive impact on controlling total effort in the fishery. Ideally the days and nights allocated to each business would be tradable to realise economic efficiency. Equity would need to be a key consideration when considering an allocation of days/nights, for example, having regard to share holdings and past restrictions on vessel capacity
- the potential economic benefits of rebuilding any overfished species may be significant, but these benefits will largely depend on the rate of recovery and they must be weighed against the costs of recovery programs
- the draft strategy specifies a performance measure to monitor the commercial viability of commercial fisheries at the fishery level and to move from a gross return to a net return indicator. Developing performance measures for monitoring viability at the individual fishing business level is not recommended as it may be problematic from a confidentiality perspective
- full incorporation of effective and efficient management requires a framework for improving the delivery of fishery management services

Predicted outcome

In summary, the draft strategy reflects the current move to category 1 share management which will provide a secure, long term property right for fishers. It signals the intent to limit latent effort, however the way that this will be achieved must be addressed if viable fisheries are to be achieved. Fishing businesses remaining in the fishery in the long term will likely incur costs in reducing fishing capacity depending on the adjustment tools used, the extent of restructuring and the pace of adjustment. Limitation of total effort could be an issue as fishers faced with increased management charges have an incentive to increase their effort, although this should be offset if returns to fishers improve as a result of restructuring.

A regime with a more specific limited number of days/nights per fisher may be preferred to support a structural adjustment plan and to augment category 1 share management. Other available management strategies that provide fishers with more incentives, in addition to moving towards category 1 share management, warrant further investigation. For example, implementing more advanced input and output control management systems should be evaluated during the next 5 years, taking account of the outcomes of adjustments in fishing effort and improvements in gear.

Fishing capacity and fishing effort levels must be addressed

if a viable fishery is to be achieved in the long term. It is important that the strategy provide for a high level of industry involvement in decision making with regard to structural adjustment and that decisions to improve long term viability are implemented.

Social Impacts

Initial risk

A social profile of ocean trawl fishers revealed fishers to be an aged, highly resident population, with substantial fishing experience and strong family involvement with fishing. Approximately 60% of prawn trawl and 30% of fish trawl fishers were insistent about their identity as fishers and were unable, or unwilling, to consider re-training.

Between 803 and 1,314 persons (full-time and part-time) were employed in the fishery in 2001/02. About 40% of ocean trawl fishers had estimated dependents of 370 - spouses, children, stepchildren, parents, grandparents and others.

Approximately 73-74% of ocean trawl fishers who responded to survey have 100% income from fishing. Part-time fishing involvement is limited. Fishers contribute from 68-92% to the average household income.

The review of current operational arrangements shows that people who depend on the ocean trawl fishery are facing a number of risks. The major risks are: loss of jobs; decreasing incomes; lack of alternative employment opportunities; insufficient involvement of fishers in management; conflicts; insecurity and uncertainty; and inadequate information to monitor social aspects of the fishery.

Response

The draft strategy proposes a number of management responses to address the key social issues in the fishery. The potential social impacts of implementing the draft strategy are:

- the category 1 share scheme provides increased security and therefore more certainty and security for fishers. It will also increase the incentives for fishers to add value to their shares as a form of investment or superannuation;
- fishing will be seen more as a commercial activity than a lifestyle, which may have negative impact on some fishers as their main objective is not maximising economic returns from the fishery;

- the major social impact involves the potential displacement of fishers and employees, due to removal of overcapacity in the fishery. Fishing lifestyle, old age, lack of skills to start alternative businesses, and lack of alternative employment opportunities are major impediments for fishers who may wish to leave the fishery. On the other hand, structural adjustment would provide the basis for a viable commercial fishery, with more secure opportunities for investment, jobs and value adding, and would enable elderly fishers to retire with a payment from the sale of shares
- there may be some reduction in conflicts, as allocation of access rights and compliance issues are comparatively well addressed in the draft strategy, reflecting an improvement on previous arrangements; and monitoring of social aspects in the fishery is likely to be

to leave the fishery or reduce their fishing operations. However, crew members will be displaced with a resultant loss of income.

Outgoing fishers may face difficulties in finding alternative employment or business opportunities, though some fishers are latent in the ocean trawl fishery as they fish elsewhere and others may take the opportunity to retire. The nature of the fishery will change. Fishers who remain in the fishery will see fishing more as a commercial activity than a lifestyle, being able to develop long-term business plans and increase their economic returns if firm decisions are made to improve the economic health of the fishery. These changes will have flow-on effects in local and regional communities where there is a substantial commercial fishing fleet.



improved, if an increased emphasis on socio-economic research programs is implemented

Predicted outcome

In summary, the move to the category 1 share scheme provides significantly greater security and certainty for fishers, their families and local communities. However, effort reduction leads to displacement of a number of fishers, although the impact of this will depend on the scale and pace of many changes. Fishers with ownership in a licence will be able to sell their shares, if they wish

Indigenous issues

Initial risk

The review of existing information and responses to surveys from Aboriginal communities made it apparent that ocean fishing is part of their cultural identity. Most often, the fishing described is inshore fishing, based on beaches or rock platforms, although there is no doubt that some people also historically fished the ocean from canoes and

continued this tradition as ocean fishing from small boats in contemporary times. This fishing is for subsistence and socio-cultural purposes. People fish to feed their families, but also to meet obligations for looking after other people in their community, either as part of daily routines, or for special events such as funerals. Aboriginal Elders still pass on stories and information about places and species of traditional importance to their children and grandchildren.

The views expressed by local Aboriginal community representatives during this assessment process and



other recent research on Indigenous fishing indicated a strong community perception that Aboriginal fishers consider themselves as custodians of valuable natural resources, who participate in fishing activities both for subsistence reasons and to continue to transfer cultural values and ecological knowledge. They also expressed strong interests in rights to access ocean resources, in the sustainability of ocean fisheries, and interests in the well being of particular species. Broadly, totemic marine species were thought to be at moderate risk due to the current operation of the fishery, but it was also recognised that the relationship between those species and the fishery was poorly understood.

The existence of commercial ocean fisheries, such as the ocean trawl fishery, does not in itself detract from Aboriginal access to traditional fisheries. Community members believe, however, that the low representation of Aboriginal people in the commercial sector, the regulation of the commercial fishery and the imposition of strict bag limits for non-commercial fishers disadvantages them and conflicts with traditional fishing customs.

Only one Aboriginal person is currently known to hold a commercial licence in the ocean trawl fishery and there

appears to be little direct engagement between Aboriginal people and the commercial ocean trawl sector. During consultation, Aboriginal people have expressed strong views that the wealth generated from use of marine resources (including, but not restricted to the ocean trawl fishery) does not accrue fairly and that Aboriginal people have been disadvantaged in their participation in the commercial sector. It was also apparent that Aboriginal people do not participate because they do not have the capital to invest in commercial vessels and equipment.

The physical evidence of past ocean fishing practices is (poorly) preserved in midden sites on headlands and behind ocean beaches along the NSW coast. There are also places of contemporary value, where social activities associated with fishing have occurred within memory and continue to occur. There is minimal risk that the operation of the ocean trawl fishery will impact on these archaeological sites or other sites of cultural value.

In addition to addressing some concerns about participation in commercial fisheries, the draft strategy is viewed as an opportunity to raise awareness about Aboriginal fishing practices, to improve communication and to support in implementing many of the actions within the Indigenous Fisheries Strategy.

Response

The draft strategy proposes to address Indigenous issues as they relate to the ocean trawl fishery by:

- including a section early in the document that describes the role of the Indigenous Fisheries Strategy and the aspirations and some of the constraints relating to Indigenous people becoming more involved in commercial fishing
- managing the fishery in a manner that is consistent with the Indigenous Fisheries Strategy and Implementation Plan
- modifying the activity of ocean trawl fishing, where relevant, in response to new information about areas or objects of cultural significance
- continuing to provide a dedicated position on the Ocean Trawl Management Advisory Committee for an Indigenous person

Predicted outcome

The initial risks due to the current fishery were generally low for most aspects of Aboriginal culture, and so there was limited need for changes under the draft strategy. In particular, there was a low risk to: the physical evidence of past Aboriginal land use; locations that are associated with stories about the landscape or with personal and community totemic associations with the natural world; and distribution of Aboriginal foods and medicines in the marine landscape. Under the draft strategy, these risks will not be increased and in some cases will decrease further due to involvement of Aboriginal people in the Management Advisory Committee, and as better information about species of concern to communities along the whole coast become better documented and Indigenous participation in fishery management is enhanced.

The assessment reported moderate risk to marine totem species and to Aboriginal socio-economic participation in the commercial fishing sector. There is limited detailed documentation about Indigenous totem species in the NSW marine environment and until such information is available, there is little that can be changed through the

ocean trawl strategy. The draft strategy may facilitate enhanced opportunities for economic participation and skill development, in association with the actions that are priorities in the Indigenous Fisheries Strategy and are further explored in the Indigenous commercial fishing opportunities action plan. Adoption of key recommendations of the Indigenous Fisheries Working Group will help to open up opportunities and reduce the risk that commercial fishing strategies present to Indigenous rights.

European heritage sites

The assessment of the existing activity found that there was a very low potential for the fishery to interact with, or impact on, heritage items of known historical significance, primarily shipwrecks. Continuation of the fishery as proposed under the draft strategy will not increase the risk of impacts on these items.





Justification for the draft strategy

The EIS highlights the importance of the ocean trawl fishery in terms of employment, supply of seafood to the community and economic benefits. The fishery directly employs between 800 and 1300 people, and produces over 4,000 tonnes of seafood annually, valued at about \$36 million at first point of sale. The economic and employment flow-on effects to local and regional communities are significant, and across the fishery the multiplier values range from 1.5-2.0 (i.e. every dollar spent directly in the fishery is worth \$1.5-\$2 in the community).

The nature of trawl fishing, and the large number of species captured by the fishery, demand that selectivity and bycatch issues are appropriately addressed, and the draft strategy proposes means to investigate these issues and develop effective responses. The draft strategy also provides for a significant improvement in the information base for the fishery, and the development of assessments of the status of the stocks of the important species. Another major issue for trawl fisheries is that of habitat protection, and the draft strategy commits to the mapping

of trawl grounds and the closure of sensitive habitat areas. Ongoing assessment of the impacts of significant management reforms is also proposed under the draft strategy.

The draft strategy contains a range of immediate and short term actions, and establishes a range of programs that will require ongoing consultation with key stakeholders and the conclusion of implementation details. A significant level of work will be required to undertake the tasks which the EIS has found as being crucial to the long term sustainable management of the ocean trawl fishery. In order to ensure that the fishery operates in an ecologically sustainable manner into the future and that the environmental risks are meaningfully reduced, it will be important to ensure that the strategies and plans subsequently developed under the fishery management strategy are implemented so as to fulfil the stated goals and objectives. With this major qualification, the EIS concluded that the range of measures are consistent with the principles of ecologically sustainable development.

The environmental impact statement summary table

* It is important to note that many components are related and as such the listed programs address more components than is possible to list in table format

Component	Sub-Component	Current Risk Level#	Number of entities	Potential risk reduction by draft FMS	Issues arising from Risk Assessment	*Programs in draft FMS to mitigate risk
Ecological	Primary, key secondary & secondary species ^A (includes discards of under-sized commercial species)	H	5	Minor	<ul style="list-style-type: none"> - Elasmobranchs at highest risk - Action needed on moderately high risk species - Lack of stock assessments - Inappropriate gear selectivity - Poor understanding of discarding - Limited knowledge of the effectiveness of BRD (bycatch) - Inconsistent management regimes - Poor data quality - Information gaps 	<p><i>Management:</i> implement closures & refuge areas, recovery programs for overfished species; change gear</p> <p><i>Research:</i> observer study to collect information on elasmobranchs, primary & key secondary species</p> <p><i>Monitoring:</i> age/length, sex composition, quantity of landings, exploitation status</p>
		MH	9	Moderate - Major for few species Minor most species		
		I	12	Minor		
		ML	1	Unchanged		
		L	13	Unchanged		
<i>Section in EIS</i>		B2.3(b)(ii) Table B2.18	E 1.2(a) Table E1.3	B2.3(c)	D3(b) Table E1.3	
Ecological	Bycatch ^A (non-commercial species)	H	43	Minor - Moderate	<ul style="list-style-type: none"> - No quantification of non-commercial species bycatch - Limited knowledge of the effectiveness of BRD - Evaluation of changed gear selectivity to changes in weight & composition of bycatch - Limited bycatch reduction methods for fish trawls - Information gaps about food provisioning to scavengers & survival of discards 	<p><i>Management:</i> additional BRD requirements, closures at river entrances particularly during high flow, identify areas & times of high bycatch, improve BRDs, improve gear selectivity, prawn counts, recovery programs, code of conduct</p> <p><i>Research:</i> observer program</p> <p><i>Monitoring:</i> monitor catches</p>
		MH	93	Minor - Moderate		
		I	7	Unchanged		
<i>Section in EIS</i>		B2.4(c) Table	E 1.3(a) Table E1.12	B2.4(d)	D3(b) Table E1.12	

The environmental impact statement summary table (cont.)

Component	Sub-Component	Current Risk Level [#]		Potential risk reduction by draft FMS	Issues arising from Risk Assessment	*Programs in draft FMS to mitigate risk	
		Risk Level [#]	Number of entities				
Ecological	Threatened species, populations & communities ^A	Birds:		No Change	<p>Applying to all species groups:</p> <ul style="list-style-type: none"> - need for on-going monitoring of interactions between fishery and threatened species - need to investigate dependence of threatened species on discards - need for a mechanism to incorporate future listings into management 	<p>*Programs in draft FMS to mitigate risk</p> <p><i>Management:</i> mandatory reporting of fishers' interactions with threatened species, implementation actions required in any recovery plans for threatened species</p> <p><i>Research:</i> observer program</p> <p><i>Monitoring:</i> interactions between fishers & turtles, intensity of interaction with threatened species</p>	
		ML	26				
		<i>Mammals:</i>					
		ML	4				
		L	3				
		<i>Reptiles:</i>					
		ML	0				
		L	4				
		<i>Fish:</i>					
		ML	2				
		L	5				
		<i>Populations:</i>					
		ML	1				
		L	0				
<i>Section in EIS</i>		B2.5(a)	E1.4(a)(b)	B2.5(c)	D3(b)		
Marine habitats ¹		<i>Geological:</i>		<ul style="list-style-type: none"> - Need to eliminate fishing practices that destroy habitat - Need for adequate refuge areas to conserve habitats - Non-complementary management regimes between jurisdictions - Major information gaps 	<p><i>Management:</i> refuge areas, close all reefs, modify gear, cross jurisdiction consultation, close depths >1100m</p> <p><i>Research:</i> map habitats, promote research on habitat associations, prohibit bobbins</p> <p><i>Monitoring:</i> none proposed</p>		
		H	1				
		MH	1				
		I	1				
		L	0				
<i>Biological:</i>		Minor to Moderate					
		H	2				
		MH					
		I	1				
		L	1				
<i>Section in EIS</i>		B2.7(c)(iii)	E1.6(a)(b)			B2.7(d)	D3(b) Table E.1.19

The environmental impact statement summary table (cont.)

Component	Sub-Component	Current Risk Level [#]	Number of entities	Potential risk reduction by draft FMS	Issues arising from Risk Assessment	*Programs in draft FMS to mitigate risk
Ecological	Ecological processes ²	H	1	Minor to Moderate	<ul style="list-style-type: none"> - Establish refuge areas - Lack of knowledge impacts on ecosystem & ecological processes & associated management 	<p><i>Management:</i> refuge areas, close depths >1100m, closures to protect marine habitats, close all reefs, prohibit bobbins</p> <p><i>Research:</i> map habitats</p> <p><i>Monitoring:</i> none proposed</p>
		MH	1			
	Species assemblages	I	5	<ul style="list-style-type: none"> - Conserve marine habitats - Establish refuge areas 	<ul style="list-style-type: none"> - Excess fishing effort - Potential activation of latent fishing effort - Insufficient controls on fishing effort - Lack of economic incentives to fishers to reduce fishing effort - Increasing operating, management and restructuring costs - Lack of access security for long-term business certainty 	<p><i>Management:</i> limiting endorsement numbers, strategies to maximise economic return, school whiting specifications, process to establish maximum level of fishing effort, cross-fishery & cross-jurisdictional consultation</p> <p><i>Research:</i> feasibility of performance measure for viability</p> <p><i>Monitoring:</i> monitor landings between sectors</p>
		L	2			
Species diversity	H	‡	<ul style="list-style-type: none"> - Establish refuge areas 			
	Section in EIS	H	‡			
Biophysical	Section in EIS	B2.6(a)(iii), (b),(c)(ii)		E1.5(a)(b)	B2.6(d)	D3(b)
		Water quality	L	‡	None	Not necessary
		Noise/light	L	‡	None	Not necessary
		Air quality & greenhouse gases	L	‡	None	Not necessary
Economic	Section in EIS	B3(c)(d)		E2	B3(d)	
		Fishery viability	H	‡	<ul style="list-style-type: none"> - Excess fishing effort - Potential activation of latent fishing effort - Insufficient controls on fishing effort - Lack of economic incentives to fishers to reduce fishing effort - Increasing operating, management and restructuring costs - Lack of access security for long-term business certainty 	<p><i>Management:</i> limiting endorsement numbers, strategies to maximise economic return, school whiting specifications, process to establish maximum level of fishing effort, cross-fishery & cross-jurisdictional consultation</p> <p><i>Research:</i> feasibility of performance measure for viability</p> <p><i>Monitoring:</i> monitor landings between sectors</p>
	Section in EIS	B4.6		E3.1(b)	B4.1-6	D3(b)

The environmental impact statement summary table (cont.)

Component	Sub-Component	Current Risk Level [#]	Number of entities	Potential risk reduction by draft FMS	Issues arising from Risk Assessment	*Programs in draft FMS to mitigate risk
Social	Social capital	I	‡	Minor	- Excess fishing effort - Loss of fishing lifestyle - Lack of alternative employment opportunities - Conflict - Uncertainty - Lack of secure property rights - Inadequate information on social aspects of the fishery	<i>Management:</i> manage multiple use trawl grounds, depth limitation for prawn trawlers, implement category 1 share management provision <i>Research & Monitoring:</i> Surveys to collect social & economic information
	<i>Section in EIS</i>	B5.1(d)		E4.1	B5.1(a-d)	D3(b)
	Health & safety	L	‡	No Change	None	Not necessary
	<i>Section in EIS</i>	B5.2(c)		E4.2	B5.2(a-b)	
	Indigenous	L	‡	No Change	- Continued access to fishery resource	<i>Management:</i> Manage consistently with Indigenous Fishing Strategy
	<i>Section in EIS</i>	B5.3(f)		E4.1	B5.3(a-e)	D3(b)
	European heritage	L	‡	No Change	None	Not necessary
	<i>Section in EIS</i>	B5.4(b)		E4.1	B5.4(a)	

H - high, MH - moderately high, I - intermediate, ML - moderately low, L - low

A - numbers in risk level columns refer to the number of species with that level of risk

- Risk level due to current activity of the fishery

1 - numbers refer to number of habitat types

2 - numbers refer to number of ecological processes

‡ - level of risk for single entities



How the environmental impact statement was developed

This EIS was developed using a modified framework of the generic risk management process (AS/NZS 4360) acknowledged by Standards Australia and Standards New Zealand. AS/NZS 4360 uses a seven-step process for risk management, but this EIS has added an eighth step in that following the treatment of risk (i.e. the draft strategy), it has re-evaluated the level of risk that would eventuate if the management strategy was to be implemented.

As well as satisfying the environmental assessment requirements of the NSW *Environmental Planning and Assessment Act 1979*, the EIS will also be submitted to the Commonwealth Government to meet the assessment requirements for the *Environment Protection and Biodiversity Conservation Act 1999*.

Development of the draft strategy

The draft strategy for Ocean Trawl was compiled with significant input from the Ocean Prawn and Ocean Fish Trawl Management Advisory Committee. The Management Advisory Committee includes elected representatives from the two fisheries and appointed representatives from the recreational fishing sector, the NSW Nature Conservation Council and NSW Department of Primary Industries. Input on the proposed management arrangements was also sought from all fishers endorsed in the ocean trawl fishery through a specifically designed overview paper, and the Ministerial Advisory Councils on Commercial Fishing (which includes representatives from other NSW commercial fisheries) and Recreational Fishing.

The draft strategy for ocean trawl fishery contains the proposed rules for management of the fishery, but it is much more than a collection of rules. The draft strategy contains the objectives for the fishery, a detailed description of the way the fishery operates, and describes the management framework for at least the next five years. It also outlines a program for monitoring the environmental, social and economic performance of the fishery, establishes trigger points for the review of the strategy, and requires regular reporting on performance in order to ensure that the strategy meets its objectives.

Development of the environmental impact assessment

It is important to understand that the environmental impact assessment and the strategy have been developed concurrently, in a series of steps. The draft strategy assessed here is in fact the second draft of the strategy. The process has been designed to give early feedback to the MAC and allow a response to the predicted environmental impacts of the management proposals. Each draft of the strategy is then modified to ensure that the proposed management framework appropriately addresses the environmental impacts identified during the assessment process.

One difference between assessing the impacts of an existing fishing industry and assessing, for example, a new building development is that the activity being assessed already exists. Consequently, changes to fishing practices and levels of harvest will have direct social and economic impacts on already-established fishing and related industries. It is important that when the impacts of proposed changes are assessed time is allowed, where appropriate, for industry to adjust to any required changes.

The assessment of fishery impacts is also much more difficult than is the case with many other natural resources because, in comparison to our knowledge of terrestrial resources, much less is known about aquatic ecosystems. The environmental assessment acknowledges such uncertainty and, where there is little information upon which to draw definitive conclusions, the precautionary principle is applied. The precautionary principle, a key component of the principles of ecologically sustainable development, states that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent that environmental degradation.



Consulting the community

You are invited to comment on the Environmental Impact Statement on the Ocean Trawl Share Management Fishery and the Southern Ocean Fish Trawl Fishery in NSW, which is on public exhibition until 10 September 2004. The full EIS can be viewed at offices of the NSW Department of Primary Industries, the head office and regional offices of the Department of Infrastructure, Planning and Natural Resources, NSW Government Information Service, local councils and the Sydney office of Environment Centre (NSW) during normal business hours. A paper or CD copy can be purchased for \$25 (includes GST) by contacting the Department of Primary Industries on 1300 550 474. It is also available on the NSW Department of Primary Industries website at www.fisheries.nsw.gov.au.

For more information, visit: www.fisheries.nsw.gov.au

Would you like to comment?

Write to: Environmental Impact Statement Submission

Ocean Trawl Fishery

PO Box 21

CRONULLA NSW 2230

Fax: (02) 9527 8576 (marked attention "Ocean Trawl EIS Submission")

Email: oceantrawl.eis@fisheries.nsw.gov.au

If you wish your submission to remain confidential, it should be so marked.

Comments must be received by 10 September 2004.



NSW DEPARTMENT OF
PRIMARY INDUSTRIES