# 7 Assessment of the Declared Commercial Fishing Activities

## 7.1 Introduction

The panel's Terms of Reference required it to assess and advise on two declared commercial fishing activities particularly the potential for the activities to result in adverse environmental impacts. The assessment related to:

- the likely nature and extent of direct interactions of the mid-water trawl activity (MTA) and the fish processing activity (FPA) with species protected under the *Environment Protection and Biodiversity Conservation Act 1999* (Cwlth) (EPBC Act), particularly seals, dolphins and seabirds
- the potential for any localised depletion of Small Pelagic Fishery (SPF) target species, arising from the MTA and the FPA to result in adverse impacts to the Commonwealth marine environment, including the target species' predators protected under the EPBC Act.

Based on its assessment of those issues, and consideration of the proposed management of the MTA and the FPA, the panel has provided advice on actions that could be taken to avoid, reduce and mitigate adverse environmental impacts of the DCFA and on scientific research and monitoring that could reduce uncertainties about those impacts.

A summary of the panel's assessment, guidance on interpretation of the outcomes of the assessment and the panel's advice, and concluding comments, are provided below.

## 7.2 The mid-water trawl activity

## 7.2.1 Assessment and advice on direct interactions with protected species

The MTA differs from the declared commercial fishing activity (DCFA1) under the first declaration [*Final (Small Pelagic Fishery*] *Declaration 2012*] only in that its minimum storage capacity is reduced by 400 tonnes (t). The panel found that the uncertainties around the pattern of fishing likely to be undertaken by DCFA1 applied equally to the MTA. The panel considered that its assessment was not sufficiently sensitive to detect any differential impacts on the nature and extent of direct interactions with protected species arising from a 400 t reduction in storage capacity. The panel's assessment and advice on the DCFA1's direct interactions with protected species therefore applies to the MTA. A full summary of that advice can be found in Section 7.2 of the first declaration report (Expert Panel on a Declared Commercial Fishing Activity 2014). Some key points are summarised below.

- The MTA is a mid-water freezer trawler with a minimum storage capacity of 1600 t, operating in the SPF.
- The MTA would be able to stay at sea for longer periods and to fish more extensively in the SPF area than previous midwater trawlers in the SPF. It would be likely to focus its fishing effort on the shelf and slope areas of the SPF where the target species are predominantly distributed but would likely fish these areas more extensively than previous fishing operations in the SPF.
- If the MTA operated in areas or at times of the year that have not been fished previously by mid-water trawl vessels, it is reasonable to expect that rates of interaction with protected species, the species involved and the risk profile of those species may differ from those of the past. However, it is not possible to predict with certainty the species involved, the spatial/temporal pattern of fishing or the intensity of fishing by the MTA because the fishing plan will be dictated by the prevailing environmental and economic conditions.
- While it is inevitable that the MTA would interact with protected species of pinnipeds, cetaceans and seabirds, there remains considerable uncertainty about the likely extent of these interactions and the level of direct interactions resulting in injury or mortality of protected species that could occur without causing an adverse environmental impact.
- Most fisheries, including the SPF, are managed in similarly uncertain environments.
- There are actions that could be taken to avoid, reduce and mitigate the risks of adverse environmental impacts occurring, and research and monitoring could be undertaken to reduce the uncertainties (see Section 3.2).

## 7.2.2 Assessment and advice on localised depletion

In relation to localised depletion, the panel considered that the reduced storage capacity of the MTA may reduce the extent of localised depletion and the risks associated with adverse impacts arising from such depletion. Conversely, the reduced capacity to stay at sea may provide an incentive to stay in a localised area for more extended periods compared to the more wide-ranging activity possible under DCFA1. Given the uncertainties associated with the fishing pattern of the MTA, the panel considered that it was unlikely that it could detect any meaningful distinction between the likely impact of localised depletion caused by the MTA and that caused by the DCFA1. The panel's assessment and advice on the impacts of localised depletion under DCFA1 therefore applies to the MTA. A full summary of that advice can be found in Section 7.3 of the first declaration report (Expert Panel on a Declared Commercial Fishing Activity 2014). Some key points are summarised below.

- The panel defined localised depletion as a spatial and temporal reduction in the abundance of a targeted fish species that results from fishing.
- Localised depletion is an inevitable consequence of any fishing activity including the MTA.
- The panel found no conclusive evidence of historical localised depletion that caused adverse environmental impacts in the SPF, noting that there were no monitoring programs in place specifically designed to detect localised depletion.
- Exploitation rates in the SPF are considered to be conservative against international benchmarks for small pelagic fisheries and concerns about the basis for spawning stock biomass estimates and the SPF Harvest Strategy Policy are being addressed. It is unlikely that any localised depletion of SPF target species arising from the MTA would affect the overall status of those species.
- The MTA has the potential to have adverse impacts on central place forager (CPF) species through localised depletion. Whether that potential is realised depends on where, when and how intensively the MTA fishes. However, it is not possible to predict with certainty the species composition, the spatial/temporal pattern of fishing or the intensity of fishing by the MTA because the fishing plan will be dictated by the prevailing environmental and economic conditions.
- There remains uncertainty about the nature and extent of adverse impacts on CPFs from localised depletion arising from the MTA.
- There are actions that could be taken to avoid, reduce and mitigate the risks of adverse environmental impacts occurring, and research and monitoring could be undertaken to reduce these uncertainties (see Section 3.3).

## 7.3 The fish processing activity

The FPA operates in the SPF using a vessel with minimum storage capacity of 1600 t that receives or processes SPF quota species from a fishing fleet. The panel assumed that the fishing fleet comprised wet boats, three of which used purse seine and two that used mid-water trawl. To underpin its assessment of the FPA, the panel considered the likely operation of the FPA and the factors that would affect its interactions with protected species and, through localised depletion, its impact on those species and the broader marine environment. The key findings are summarised below.

- The panel assumed that the processing vessel did not resupply, refuel or re-crew the catching fleet.
- Under the FPA, transhipment will occur through pumping fish from the nets or the holds of the catching fleet to the processing vessel. The panel did not find any evidence to suggest that the process of transhipment would pose any specific threat to protected species.
- Interactions between the processing vessel and protected species would be largely restricted to vessel strike with cetaceans while the vessel was transiting between the fishing grounds and ports to unload/refuel. The potential for vessel strike is not considered to be any higher under the FPA than under DCFA1. However, it may be higher than under SPF fleet operations to date.
- Fish-finding capability provided to the catching fleet by the processing vessel was unlikely to be a significant determinant of interactions with protected species or of the extent of localised depletion under the FPA.
- The processing vessel would have no direct impact on localised depletion and any direct impact would be incurred through the catching fleet.
- Compared to the typical and particularly the recent SPF fleet, the FPA scenario would most likely result in increased effort in both the purse seine and mid-water trawl sectors. However, the panel could not quantify this increase.

- Any change in the spatial and temporal distribution of effort, compared to typical SPF fleet operations, may have
  implications for interactions with and/or indirect impacts on protected species. The panel could not predict whether the
  FPA would result in a broader distribution of effort or greater effort in areas fished previously by the SPF fleet. This will
  depend on the availability of fish, the fuel-carrying capacity of the catching fleet and skippers' knowledge of the fishing
  grounds, all of which may vary over time.
  - Existing management arrangements in the SPF require vessel management plans (VMPs) for all mid-water trawl vessels but not for purse seine vessels. The panel has assumed that the purse seine component of the FPA catching fleet and the processing vessel would not be required to have a VMP.

## 7.3.1 Assessment and advice on direct interactions with protected species

### Pinnipeds

All of the breeding distribution of the Australian and New Zealand fur seal *Arctocephalus pusillus doriferus* and *A. forsteri* in Australia, and most of the breeding distribution of the Australian sea lion *Neophoca cinerea*, occurs within the area of, or adjacent to, the SPF. Seals are common marine predators in southern Australia and are attracted to any fishing activity that occurs within their foraging range. The greater the level, frequency or predictability of fishing activity, the greater the number of seals that are likely to be attracted to, and interact with, fishing operations. If fishing is persistent over time and fishing activities provide opportunities for seals to gain nutritional benefits, then part of their populations can become habituated to fishery interactions.

Fur seals readily interact with trawl fisheries throughout the area of the SPF, and these interactions can include net feeding, entering the trawl net, and habituation to fishing activities. With these interactions, some level of bycatch mortality is inevitable and in areas of high seal abundance and/or high fishing activity, likely to be common, even with best-practice management. Mid-water trawls in the SPF with seal excluder devices (SEDs) that were monitored by underwater video, during 2006 and 2007, recorded a high incidence of net entry by fur seals during trawls and very high bycatch mortality.

Pinnipeds also readily interact with purse seine fisheries that overlap with their foraging range. Most interactions involve net feeding, with seals taking advantage of the pursed fish which provide an abundant and easy food source that can be gained with little energetic cost compared to normal foraging. The vast majority of interactions are non-lethal, as seals can readily move in and out of the net over the float line and are not usually impeded in accessing the surface to breathe.

It is not possible to predict with any certainty the location, timing or intensity of fishing of the FPA fleet and as a result it is not possible to provide any firm conclusions on the likely rate of interactions between the FPA fleet and pinnipeds. However, the panel recognises that the extent of interactions with fishing activities will largely be determined by the extent to which they are concentrated in key pinniped foraging areas. Historically most trawl fisheries' interactions with pinnipeds have been with Australian fur seals in southeastern Australia. There would be uncertainty about the extent of interactions with pinnipeds if the FPA catching fleet and particularly the mid-water trawl vessels fished off South Australia and Western Australia. In these regions, New Zealand fur seal and Australian sea lion are most common. Neither species has been exposed to the level of bycatch mortality from trawl fisheries experienced by Australian fur seals, so there is uncertainty about the differential impacts of bycatch on their populations. This is especially significant for the threatened Australian sea lion.

Overall, the panel considered that the extent of interactions with the FPA would likely be higher than the DCFA1 and typical SPF fleet, noting that purse seine is likely to have extremely low levels of pinniped mortality.

Compared to the typical SPF fleet, the panel considered that:

- There would be more effort under the FPA and this would likely result in a greater number of interactions.
- The FPA scenario would likely result in an increase in pinniped bycatch mortality given that the FPA fleet configuration includes more mid-water trawl and less purse seine vessels.
- If the presence of the processing vessel allows fishing to extend into areas not previously fished or more intensive fishing of some areas, it is reasonable to expect that the rate of interactions with pinnipeds might change and potentially involve interactions with all three pinnipeds rather than just fur seals.

Compared to DCFA1, the panel considered that:

- The number of interactions with pinnipeds under the FPA may be less, similar or more, depending on the comparative levels of effort and catch under each scenario. For example, if the mid-water trawl wet boat catching fleet of the FPA needs to expend more fishing effort to take the same amount of catch as the DCFA1 fishing vessel, then the number of interactions could be higher. The panel could not predict with any certainty the relative levels of effort in the catching fleets under DCFA1 and the FPA.
- The FPA fleet would be more constrained in terms of the additional area of the fishery that can be fished (wet boats will remain constrained by the need to refuel and return to port regularly). This may mean that they are more likely to fish closer inshore than DCFA1 and potentially have more interactions with protected CPF species such as fur seals and sea lions.

#### Actions to avoid, reduce and mitigate adverse environmental impacts on pinnipeds

#### Mid-water trawl

- VMPs for mid-water trawl vessels should stipulate the use of an upward-opening SED, with hood, with the requirement for underwater monitoring of SED efficacy and cryptic mortality to assess and improve performance.
- VMPs should set daily and per-shot trigger limits on fur seals and provision for move-on rules with a requirement to move to an area where interactions with seals are less likely.
- Introduce a bycatch rate trigger limit for fur seals for the fishery or fishing areas, or a total mortality trigger for a fishing season and/or fishing areas.
- Ensure 100 per cent observer coverage of all mid-water trawl fishing operations and, if daily or per shot trigger limits are used in conjunction with move-on rules or with a requirement to review mitigation measures, provide sufficient observer capacity to ensure that underwater video footage is monitored at the end of each shot to maximise response times to mortalities.
- Require 'stickers' to be removed from trawl nets before shooting.
- Implement spatial closures for mid-water trawl that mitigate bycatch interactions with fur seals, especially in regions adjacent to breeding colonies where there is high transit and foraging activity by central place foraging lactating adult females.
- Implement Australian sea lion closures off south Australia, as specified in Condition 1 (e) for the DCFA1 (see Section 3.1) amended to include waters out to 183 metres depth, consistent with the outer extent of the gillnet component of the Gillnet, Hook and Trap (GHAT) Fishery.
- If such closures off South Australia are not implemented, bycatch trigger limits and management arrangements for Australian sea lion in the mid-water trawl sector of the SPF should be introduced consistent with those in the Australian sea lion Management Zones in the GHAT Fishery.
- Implement mid-water trawl closures and bycatch trigger limits for Australian sea lion colonies occurring within the SPF off Western Australia.

#### Purse seine

• Review the protected species handling manual referred to in the SPF Purse Seine Code of Practice to ensure it provides information on how to safely remove live seals from purse seine nets that have been pursed or 'dried-out', and for removing them from the vessel deck.

#### Research and monitoring to reduce uncertainties

- What are the individual and cumulative fishery-related bycatch impacts on pinniped populations?
- What levels of fishery-related mortality can pinniped populations sustain?
- Where are the regions of critical foraging habitat for pinniped populations where the management of direct interactions with the FPA may be most needed?
- Are there additional modifications to fishing gear and behaviour that can reduce the potential for direct interactions by the FPA with pinnipeds?

#### 112 Cetaceans

Nearly all cetaceans recorded in Australian waters have ranges that overlap to some extent with the SPF area. The risk of interactions increases where prey species are also targeted by fisheries and where fishing grounds overlap with important habitats used by cetaceans for aggregating, feeding, breeding and as migratory routes. The nature and likelihood of interactions between cetaceans and mid-water trawl and purse seine fisheries varies widely among these species. Bottlenose dolphins *Tursiops* spp. and short-beaked common dolphins *Delphinus delphis* are likely to be at higher risk of interaction based on reported interactions with these gear types and bycatch mortality in Australia and internationally. The evidence suggests that in Australian waters most interactions with these species in purse seine nets result in dolphins escaping or being released alive whereas higher mortality rates are incurred as a result of interactions with mid-water trawl gear. Interaction rates with dolphins in international purse seine tuna fisheries that set on dolphins, and in other Australian purse seine fisheries that target Australian sardines *Sardinops sagax* may not be indicative of likely rates of interactions in the FPA.

Direct interactions with fishing operations include net feeding and feeding on discards, and fish escaping from nets. Vessel collisions resulting in injury or death of whales and some other cetaceans are thought to be relatively common in Australian waters but are not well documented. Most severe or fatal injuries to whales from vessel strike are caused by collisions from vessels greater than 80 m, and higher speed increases the risk of serious injury or death. The processing vessel of the FPA may therefore have a higher risk of vessel strike than vessels typically used in the SPF but not significantly different from that of the DCFA1.

It is highly likely that there will be some direct interactions between the FPA and cetaceans. The FPA would enable fishing to occur more extensively in the SPF area, which would increase the range of cetacean species likely to be encountered. The nature and extent of direct interactions by the FPA with cetaceans is uncertain but some cetacean mortality is likely. The panel concluded that species such as bottlenose dolphins and short-beaked common dolphins, that are known to prey on small pelagic fish, and interact extensively with trawl fisheries and purse seine fisheries, are at increased risk of being taken as bycatch by the FPA, whereas some larger whale species may be at slightly higher risk from vessel strike.

The lack of information on the distribution and abundance, population trend, genetic structure, and location and timing of use of important habitats for most cetacean species, greatly increases the uncertainties about the likelihood of direct interactions occurring and whether such interactions would result in significant environmental impacts for these protected species.

Compared to the typical SPF fleet, the panel considered that:

- There would be more effort under the FPA and this would likely result in a greater number of interactions.
- The FPA scenario would likely result in an increase in cetacean bycatch mortality given that the FPA fleet configuration includes more mid-water trawl and less purse seine vessels.
- If the presence of the processing vessel allows fishing to extend into areas not previously fished or more intensive fishing of some areas, it is reasonable to expect a change in both the rate of interactions and the cetacean species involved.

Compared to DCFA1, the panel considered that:

- The number of interactions with cetaceans under the FPA may be less, similar or more, depending on the comparative levels of effort and catch under each scenario. For example, if the mid-water trawl wet boat catching fleet of the FPA needs to expend more fishing effort to take the same amount of catch as the DCFA1 fishing vessel then the number of interactions could be higher. The panel could not predict with any certainty the relative levels of effort in the catching fleets under DCFA1 and the FPA.
- The FPA fleet would be more constrained in terms of the additional area of the fishery that can be fished (wet boats will remain constrained by the need to refuel and return to port regularly). As a result, there may be less potential for a change in the species composition of cetacean interactions than under the DCFA1. The FPA would be more likely to focus its fishing in areas nearer the coast where short-beaked dolphins happen to be more abundant and interactions with this species may therefore be higher than under DCFA1.
- Both the DCFA1 and FPA fleets would concentrate their fishing in the waters of the shelf and upper slope, where the target species are distributed. As a result, it is unlikely that either fleet would fish extensively in areas of the highest cetacean species richness further offshore.

#### Actions to avoid, reduce and mitigate adverse environmental impacts on cetaceans

#### Mid-water trawl

The following advice is drawn from the panel's assessment of the impact of mid-water trawl on cetaceans in its first declaration report.

- Use an excluder device for cetaceans only after its operation has been optimised for the vessel, fishery and different dolphin species, including both bottlenose and short-beaked common dolphins, under a scientific permit with the required level of performance developed in consultation with experts, noting that excluder designs tested to date have not been consistently effective in reducing cetacean bycatch in trawls, and at present there is no solution to filter or deter cetaceans from entering the net opening.
- Use underwater video to monitor dolphin behaviour within the net and around the excluder device to determine the efficacy of the excluder device and levels of cryptic mortality.
- Management actions applied to dolphin interactions in the SPF should be consistent with the current spatial management zones and actions to mitigate dolphin bycatch in the gillnet sector of the GHAT Fishery off South Australia.

#### Purse seine

- Incorporate the elements of the South Australian Sardine Fishery Code of Practice that relate to mitigation of interactions with dolphins into the SPF Purse Seine Code of Practice.
- Validate the logbook reporting of interactions with dolphins in purse seine operations in the SPF.

#### All fishing operations

- Introduce a bycatch rate trigger limit for dolphin species for the fishery or fishing areas, or a total mortality trigger for a fishing season and/or fishing areas on a precautionary rather than an evidentiary basis.
- In response to a single dolphin mortality, require the vessel to move to an area where interactions with cetaceans are less likely, based on available data on estimated at-sea density distributions.
- Assess the efficacy of acoustic deterrent pingers (during rigorous controlled trials under scientific permit with the required level of performance developed in consultation with experts), and temporal and spatial closures, that have been shown elsewhere to have potential to reduce the risk of interactions for some cetacean species, including dolphins.
- Prohibit the discard of any biological waste (excluding the release of any protected fauna) from all fishing and processing vessels.
- Ensure 100 per cent observer coverage of mid-water trawl fishing operations and, if trigger limits are used in conjunction with move-on rules or requirements to review mitigation measures, provide sufficient observer capacity to ensure that underwater video footage is monitored at the end of each shot to maximise response times to mortalities.
- In addition to the above actions to mitigate impacts on dolphins, ensure that monitoring and agreed management responses are in place to allow a timely management response if other cetacean species interact with the FPA.
- The risk of vessel strike by the processing vessel could be reduced by:
  - reducing the co-occurrence of whales and vessels where possible, in particular by identification and avoidance of key feeding grounds or aggregation areas
  - use of reduced vessel speed zones to reduce the likelihood of fatal vessel strikes in identified high-risk areas
  - using marine mammal observers to alert vessel crew to the presence of cetaceans in the vicinity or path of vessels.

#### Research and monitoring to reduce uncertainties

- What regions in the SPF area are important habitats used by cetaceans that have increased risk of interactions with the FPA?
- What levels of mortality arising from interactions with the FPA could be sustained by cetacean populations in the SPF area?
- What modifications to the proposed fishing gear and operations of the FPA are needed to improve management and reduce the potential for interactions including bycatch of cetaceans?
- At a minimum, maintain the current management arrangements which specify targets of observer coverage for existing vessels of 10 per cent of purse seine coverage and full coverage for either five or 10 trips respectively for new vessels entering the fishery or moving into new areas, and clearly define the terms 'new areas' and 'new vessels'.

• Develop a dedicated observer program for purse seine vessels to validate logbook reporting of interactions with protected cetacean species.

#### Seabirds

The reported rate of interactions with seabirds in the SPF has been low, particularly in the purse seine sector, despite most operations having been in areas of high seabird species richness. This is most likely because of the ability of birds to interact with fish in the open purse seine net without capture and the low level of discharge of biological material in the mid-water trawl sector. However, the panel did not dismiss the issue of under-reporting of seabird interactions.

Based on the information available, the species most commonly involved in interactions with mid-water trawl and purse seine gear in the SPF area are shearwaters, predominantly the flesh-footed shearwater. Proximity of fishing operations to seabird breeding sites and the time of day that fishing occurs may be major determinants of the rate of interactions.

The panel considered that the extent of interactions of the FPA with seabirds will depend on the actual fleet configuration, the fishing practices adopted, the level of fishing effort, the spatial and temporal pattern of fishing and the seabird mitigation measures used. While there remains some uncertainty about the possible loss of fish during transhipment and the potential for such loss to increase seabird interactions, there is no evidence to suggest that the practice of transhipment poses a specific risk to seabirds.

It is not possible to predict with any certainty the location, timing or intensity of fishing of the FPA fleet. As a result, it is not possible to provide any firm conclusions on the likely rate of interactions between the fleet and seabirds. However, the panel expected that the rate of interactions with seabirds would remain low under the FPA.

Compared to the typical SPF fleet, the panel considered that:

- There would be more effort under the FPA and this would likely result in a greater number of interactions.
- The FPA scenario would likely result in an increase in seabird bycatch mortality given that the FPA fleet configuration includes more mid-water trawl and less purse seine vessels.
- If the presence of the processing vessel allows fishing to extend into areas not previously fished or more intensive fishing of some areas, it is reasonable to expect a change in both the rate of interactions and the seabird species involved.
- The panel concluded that there was unlikely to be any discernible differential impact of the FPA on the interaction rate with seabirds and that the rate was likely to be low. Since the processing vessel does not fish, there would be no additional risk posed through entanglement with fishing gear. Risk of collision with the processing vessel is also not considered to be different to that with any other vessel, and is likely to be low since there would be no attractant such as discarded biological material.

Compared to DCFA1, the panel considered that:

- The number of interactions with seabirds under the FPA may be less, similar or more depending on the comparative levels of effort and catch under each scenario. For example, if the mid-water trawl wet boat catching fleet of the FPA needs to expend more fishing effort to take the same amount of catch as the DCFA1 fishing vessel, then the number of interactions could be higher. The panel could not predict with any certainty the relative levels of effort in the catching fleets under DCFA1 and the FPA.
- The FPA fleet would be more constrained in terms of the additional area of the fishery that can be fished (wet boats will remain constrained by the need to refuel and return to port regularly) and this may mean that they are more likely to fish closer inshore than DCFA1 and potentially have more interactions with protected CPF species of seabirds.

The panel considered that there are actions that could be taken to avoid, reduce and mitigate potential impacts of the FPA on seabirds and and monitoring that could be undertaken to reduce the uncertainties.

#### Actions to avoid, reduce and mitigate adverse environmental impacts on seabirds

#### Mid-water trawl

- Any requirements in the VMPs for mid-water trawl vessels regarding discharge of biological material, the removal of stickers and warp maintenance should be consistent with or equivalent to the advice of the Agreement on the Conservation of Albatrosses and Petrels (ACAP).
- The ACAP advice regarding net binding, bird scaring lines and the use of a snatch block should be adopted noting that the use of bird scaring lines and net binding are part of the seabird VMP for Australia's winter blue grenadier *Macruronus novaezelandiae* fishery.

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- If bird bafflers and warp deflectors are to be used, develop and optimise the design under scientific permit and in consultation with experts, noting that seabird captures in the Southern and Eastern Scalefish and Shark Fishery have been reduced by 75 per cent using 'pinkies'.
- Ensure that any seabird VMP meets the requirements of the National recovery plan for threatened albatrosses and giant petrels 2011-2016.
- Direct deck lighting inboard and keep to the minimum level necessary for the safety of the crew.

#### Purse seine

• Update the SPF Purse Seine Code of Practice by replacing the 'Protected Species Handling Manual' with, at a minimum, the bird handling protocol developed for the Western Australian South Coast Purse Seine Managed Fishery, and ideally, develop a protocol for handling protected species specifically for the SPF and all relevant gear types.

#### All fishing operations

- Develop advice on the correct interpretation of 'interactions' with seabirds in consultation with the Department of
  the Environment to ensure that it is consistent with the intent of the memorandum of understanding between the
  Department and the Australian Fisheries Management Authority and ensure that FPA operators and crew are familiar
  with this advice.
- Validate logbook reports on interactions with seabirds through increased and spatially representative observer coverage.
- If unacceptable levels of interactions with protected seabird species occur, suspend fishing immediately and adopt one of the following options:
  - time and area closures, noting that these will rely on knowledge of spatial and temporal uses of bird habitats that overlap with the fishery
  - trigger limits and move-on rules
  - review of transhipment procedures if the interactions occur during transhipment.

#### **Research and monitoring to reduce uncertainties**

- Maintain the current management arrangements which specify targets of observer coverage for existing vessels of 10
  per cent of purse seine coverage and 20 per cent of mid-water trawl coverage and full coverage for either five or 10
  trips respectively for new vessels entering the fishery or moving into new areas and clearly define the terms 'new areas'
  and 'new vessels'.
- Identify ecologically sensitive seabird species, areas and times where spatial management strategies may be appropriate to mitigate direct interactions if required.
- Use electronic monitoring via video camera(s) to assist in quantifying warp strikes.
- If warp strike is occurring, consider installing corpse catchers on warps to assist in understanding whether there is a level of cryptic mortality from warp strike that has been undetected.
- Develop a dedicated observer program for all SPF fishing operations to validate logbook reporting of interactions with protected seabird species. In the mid-water trawl sector this should focus on observing and validating warp interactions and trawl entanglements.

### 7.3.2 Assessment and advice on localised depletion

As in its assessment of DCFA1, the panel interpreted localised depletion as a spatial and temporal reduction in the abundance of a targeted fish species that results from fishing. Localised depletion, as distinct from range contraction or overall stock depletion, is therefore an inevitable consequence of fishing under the FPA. The central issue for the panel's assessment was whether the fishing activity of the FPA could be concentrated enough, both spatially and temporally, to cause a localised depletion of the target species sufficient to cause adverse environmental impacts to the Commonwealth marine environment.

The panel assessed the potential impact of localised depletion arising from the FPA on the target species and on protected species of CPFs. A summary of those assessments is presented below.

### 116 SPF target species

In relation to the specific characteristics of the FPA, the panel found that:

- Localised depletion, as defined by the panel, will occur under the FPA.
- Given that no impacts on target species were discernible during periods of the fishery when catches have been high, the panel concluded that the FPA is unlikely to cause localised depletion to such an extent as to cause adverse environmental impacts on the target species.
- The storage capacity of the processing vessel is not relevant to the assessment of the potential for the FPA to cause localised depletion that has adverse environmental impacts.
- The ability to tranship at sea would potentially allow for the catching fleet to increase its effort and hence increase the extent of localised depletion compared to operations in the past but this would be constrained by the need for the catching fleet to regularly return to port to refuel.
- The relative impacts of localised depletion on the target stocks caused by the FPA, DCFA1 and the typical SPF fleet will be influenced by the fishing method used, the concentration and intensity of fishing effort and the quantum of catch.

The panel concluded that:

- compared to the typical SPF fleet, the FPA is likely to
  - increase the quantum of catch because of the improved efficiency of fishing offered by the presence of the processing vessel
  - increase the distribution of effort by allowing wet boats greater range and therefore reduce the intensity of fishing in a given area
  - reduce the proportion of catch taken by purse seine with potentially less impacts on individual schools of fish.
- compared to DCFA1 (and the MTA), the FPA is likely to
  - result in a similar quantum of catch
  - reduce the distribution of effort since wet boats are more constrained by the need to return to port to refuel, and therefore increase the intensity of fishing in a given area
  - increase the proportion of catch taken by purse seine with potentially more impacts on individual schools of fish.

The panel could not predict how these competing factors would balance out. However, as in its assessment of DCFA1 and the MTA, the panel considered that any localised depletion of SPF target species that might arise from the FPA was unlikely to affect the overall status of stocks of those species in the SPF, assuming that the total allowable catches (TACs) are set in accordance with the current SPF Harvest Strategy and with the best possible stock estimates. The panel noted that current and ongoing research is designed to ensure that this is the case. However, the panel remains of the view that further research into stock structure would be needed to improve certainty about the appropriate spatial scale at which to manage effort and catch of SPF stocks.

#### Research and monitoring to reduce uncertainties

Uncertainties associated with stock structure and hence with the adverse impacts of localised depletion arising from the FPA on target species could be reduced by research and monitoring in the following areas:

- clarification of the extent of sub-structuring of SPF target species within the Eastern and Western Zones specifically, and the SPF more broadly
- ongoing monitoring of the length frequency of catch taken by the whole fleet, including the FPA, at a statistically appropriate sampling intensity.

#### Central place foragers

Concentrated fishing activity at locations and times when CPFs are most susceptible to the impacts of prey depletion may result in longer foraging trips and/or reduced rates of provisioning to offspring. Persistent depletion can result in reduced offspring growth rates, fledging/weaning mass and reduced survival, and reduced adult breeding success. Longer-term impacts can affect major demographic factors such as survival, recruitment and reproductive rates that drive population age structure, growth rates and, ultimately, population size.

Although CPF species have been shown to be highly responsive to changes in prey availability within their key foraging areas, very few studies have linked reduced foraging and reproductive performance to the impacts of fishing, and even fewer to localised depletion. Only the case study on Peruvian boobies *Sula variegata* found compelling evidence for localised depletion (see Box 6.1). In three other case studies in the North Sea, Benguela and Alaska where declines in population size and reproductive success in CPF predators have been identified (see Section 6.3), spatial closures have been introduced as a precautionary measure to mitigate potential adverse impacts of localised depletion even though the causes of the declines are uncertain.

There is very limited information currently available that enables the panel to assess the potential for adverse impacts on CPF species from localised depletion in the SPF. The CPF species most susceptible to localised depletion of SPF target species, taking into account both their dietary reliance on SPF target species (more than 10 per cent) and their reliance on near-colony prey resources while raising offspring, are the Australian fur seal, New Zealand fur seal, Australasian gannet *Morus serrator*, short-tailed shearwater *Ardenna tenuirostris*, little penguin *Eudyptula minor*, crested tern *Thalasseus bergii* and shy albatross *Thalassarche cauta cauta*. The key areas of importance to these species include south-eastern Australia, especially Bass Strait, Tasmania and South Australia. Few studies have examined the potential impact of localised depletion on these species. This list of susceptible CPF species is unlikely to be comprehensive since there are significant gaps in the dietary data available for CPFs in the SPF.

The panel noted that the overall level of exploitation permitted in the SPF is consistent with the best available advice on management of small pelagic species and that this has been found to be adequate from an ecosystem perspective. However, the panel considered that the SPF Harvest Strategy settings are unlikely to make a significant contribution to avoiding adverse environmental impacts of localised depletion on CPF species, since while separate TACs are allocated to the Eastern and Western Zones, there is no finer spatial allocation of catch or effort. Further, the panel noted that while the SPF Harvest Strategy outlines responses to localised depletion once it has been detected, there are no measures in place in the SPF that would detect the spatial and temporal extent of localised depletion or adverse environmental effects that arise from it and there are no spatial and temporal closures in place, or proposed, that address potential trophic impacts to CPF species in the SPF.

The panel concluded that the FPA has the potential to have adverse impacts on CPF species through localised depletion and that the nature and extent of those impacts would depend on the spatial and temporal scale of the depletion. Since it is not possible to predict the location, time or intensity of fishing or the quantum of catch in any area under the FPA, there remain uncertainties about the impact of the FPA on protected CPF species.

The panel concluded that, compared to the typical SPF fleet, the FPA is likely to:

- increase the quantum of catch because of the improved efficiency of fishing offered by the presence of the processing vessel
- allow wet boats to remain at sea for longer and therefore
  - broaden the distribution of effort and reduce the intensity of fishing in a given area, or
  - increase the fishing effort in a given area
  - slightly increase the potential for localised depletion and the risk of adverse impacts on CPFs if fishing is concentrated in critical foraging areas of the CPFs
  - slightly decrease the potential for localised depletion and the risk of adverse impacts on CPFs if fishing is more broadly distributed.

The panel concluded that, compared to DCFA1 and MTA, the FPA is likely to:

- result in similar or higher levels of catch
- reduce the distribution of effort since wet boats are much more constrained by the need to return to port to refuel, and therefore increase the intensity of fishing in a given area.

The panel could not predict how these factors would balance out. However, overall, the panel concluded that there was slightly more potential for the FPA fishing fleet to have adverse impacts on protected CPF species than the typical SPF fleet but slightly less potential than under DCFA1 or the MTA.

#### Actions to avoid, reduce and mitigate adverse environmental impacts

Spatial closures are the most common form of precautionary management used to mitigate the potential adverse impacts of localised depletion on CPF predators; however, the effectiveness of spatial closures for this purpose has not been clearly demonstrated. Their value depends heavily on the ability to determine the size of spatial closures that would be appropriate for particular species at particular locations and at particular times.

The panel concluded that the risks to the key CPF species identified above from localised depletion caused by the FPA could be addressed proactively by separating the fishing activity from their key foraging areas. Determining the appropriate temporal or spatial scale of the closures will be challenging but reasonable datasets exist for at least some CPF species in some areas of the SPF. It may be necessary to extrapolate from this information in order to define appropriate spatial closures elsewhere in the SPF. Closures would need to be modified adaptively to reflect new information from fishing or targeted research.

#### Research and monitoring to reduce uncertainties

- Dietary studies to determine which key CPFs or other commercially or ecologically important predators are most reliant on SPF species.
- Studies to better understand the critical foraging areas, habitats and times for key CPFs.
- Examination of the biological response of CPFs to changes in prey availability. •
- Development and implementation of potential ecological performance indicators for the fishery.

## 7.4 Interpretation and context

The panel's guidance on interpretation and context of its assessment provided in the panel's first declaration report remains relevant to this assessment. This guidance can be found in full in Section 7.4 of the panel's first declaration report (Expert Panel on a Declared Commercial Fishing Activity 2014). The key points relevant to the assessment of the MTA and the FPA are as follows.

- The SPF target species are not as influential in the southern Australian ecosystem compared to small pelagic species in other more productive upwelling systems around the world that support much larger biomasses of similar species.
- After consideration of the available information, including the results of a recent management strategy evaluation of the SPF Harvest Strategy, and with regard to international advice on appropriate management settings for small pelagic species, the panel assumed that the total allowable catches for SPF target species are sustainable and enforceable.
- The panel's assessment is based on specific MTA and FPA fishing scenarios (see Boxes 2.1 and 2.2) and a number of assumptions (see Chapter 4). Any significant changes to those scenarios and assumptions would necessarily affect the panel's assessment and advice. In particular, further consideration of the impact of the FPA on the spatial and temporal pattern of fishing and the implications for adverse environmental impacts would be required if:
  - the FPA included the re-supply, refuelling and re-crewing of the catching fleet by a processing vessel
  - the configuration of the FPA catching fleet differed significantly, in terms of the number of vessels and/or the fishing methods used, from the fleet configuration scenario used in this report.
- The optimal combination of individual actions identified by the panel to avoid, reduce and mitigate adverse environmental impacts of the MTA and the FPA would need to be determined in relation to the specific characteristics of the proposed vessel gear and fishing plan.
- The panel's advice on research and monitoring that could be implemented to reduce uncertainties about the environmental impacts of the MTA and the FPA should be considered in the context of the trade-offs between precaution and the time and cost involved in acquiring new information.
- The potential environmental impacts of the MTA and the FPA need to be considered in the context of the cumulative impacts of all fisheries operating in the area of the SPF.

## 7.5 Concluding comments

The panel has been able to identify with some confidence the likely nature of the interactions of the MTA and the FPA with protected species in the SPF. The form of direct interactions, and the species most likely to be affected by both direct interactions and localised depletion have been identified and the panel has provided specific advice on measures that could be taken to avoid, reduce and mitigate these impacts. However, even if these measures were adopted, the panel considers that direct interactions with protected species and localised depletion, as defined by the panel, will occur under the MTA and the FPA. The panel's assessment has confirmed that there are considerable uncertainties relating to the extent of the impacts that would arise from these activities and the level of impact that would create adverse environmental outcomes.

The panel reiterates the points made in the first declaration report:

- The uncertainties relating to the MTA and the FPA are not dissimilar to those in many other fisheries in Australia and elsewhere.
- A precautionary and adaptive, risk-based approach to management of the potential impacts of the MTA and FPA would be required.
- The panel's assessment of the MTA and the FPA should be considered in the context of the role that SPF target species play in the southern Australian ecosystem, the management regime that controls the catch of those species, and of the cumulative impacts of fishing in the area of the SPF on protected species.