4 The fish processing activity

4.1 Introduction

The fish processing activity (FPA) described in the second declaration involves a processing vessel that does not fish but receives fish from vessels fishing in the Small Pelagic Fishery (SPF). The panel conducted a comprehensive assessment of the potential impacts of a large-scale mid-water trawl freezer vessel on protected species and localised depletion in its assessment of the declared commercial fishing activity in the first declaration (DCFA1) (Expert Panel on a Declared Commercial Fishing Activity 2014). However, there are five main points of differentiation between the DCFA1 and FPA fishing scenarios. Under the FPA:

- the processing vessel would not fish
- the processing vessel would have reduced storage capacity
- there would be potential for the processing vessel to provide 'mothershipping' services to the catching fleet in addition to receiving fish
- catch could be taken by a fleet of vessels using both purse seine and mid-water trawl rather than a single freezer trawler using mid-water trawl
- the catching fleet would tranship catch to the processing vessel.

The second declaration makes no mention of:

- the configuration of the catching fleet
- whether the processing vessel provides other services to the catching fleet
- the method by which the catch is transhipped from the catching vessels to the processing vessel.

The panel's consideration of these issues and the basis for its assumptions made in developing the FPA fishing scenario (see Box 2.2) is provided below. This underpins the panel's assessment of the likely interactions of the FPA with protected species (Chapter 5) and the potential for any adverse environmental impacts to arise from localised depletion caused by the FPA (Chapter 6).

4.2 The processing vessel

Since the processing vessel in the FPA does not fish, the processing vessel itself has limited capacity to interact with protected species. The panel considered that such interactions would largely be restricted to vessel strike with cetaceans while the vessel was transiting between the fishing grounds and ports to unload/refuel. The storage capacity (and fuel capacity) of the processing vessel will influence how long it can remain at sea before returning to port to unload and/or refuel. The fuel carrying capacity of the processing vessel is unlikely to vary from the large-scale mid-water trawl vessel assessed in DCFA1. In the FPA, the minimum storage capacity of the processing vessel is reduced (400 tonnes (t) less than DCFA1), however, the maximum storage capacity of the FPA and DCFA1 scenarios remains the same at 4500 t. As a result the panel did not consider that there was any significant difference between the number of transit trips made by the processing vessel under the FPA and that of the vessel in DCFA1. The potential for vessel strike is therefore not considered to be any higher under the FPA than under DCFA1. However, it may be higher than under SPF fleet operations to date. This is considered in more detail in Section 5.3.

The panel considered that the processing vessel would have no direct impact on localised depletion and that any direct impact would be incurred through the catching fleet (see Chapter 6).

4.3 Mothershipping

The panel was aware that mothershipping operations that include re-supply of the catching fleet are common in the South Pacific fishery for small pelagic species and that such operations might have significant impacts on the length of time that catching vessels can remain at sea and the extent of the fishery that they can access. In addition, the panel noted that there was potential for fuel spills during refuelling that could have impacts on protected species.

The panel noted that the definition of the FPA referred to receiving or processing fish but did not refer to mothershipping activities. Advice from Seafish Tasmania Pty Ltd (Mr G. Geen, Director, Seafish Tasmania *in litt*. 17 October 2014), the proponents of the proposal to use a processing vessel in the SPF, confirmed that its proposal did not include the re-supply of the catching fleet with fuel, provisions or crew but did include assistance with finding fish.

The panel's research failed to find any relevant information that would allow it to assess the impact of refuelling and reprovisioning in a meaningful way and discussions with the Australian Fisheries Management Authority (AFMA) indicated that it did not regard mothershipping as posing any specific management issues (Dr J. Findlay, Chief Executive Officer, AFMA pers. comm. 5 December 2014). After consideration of the information available, the panel agreed that re-supply, refuelling and re-crewing would not be included in its assessment.

The panel considered the possibility that the processing vessel would assist the catching fleet in finding fish. It concluded that the assistance in finding fish provided to the catching fleet by the processing vessel would increase the fishing efficiency of the fleet. However, research conducted for the panel did not provide any conclusive advice as to whether this was likely to affect the extent of localised depletion. The panel could not quantify the likely impact of any assistance provided by the processing vessel to find fish. For the purposes of its assessment the panel assumed that this assistance was unlikely to be a significant determinant of interactions with protected species or of the extent of localised depletion under the FPA.

4.4 The catching fleet and target species

4.4.1 Fleet configuration

The panel relied on data on previous fishing activity by wet boats in the SPF to inform its consideration of the likely configuration of the FPA catching fleet. Data on active vessels by gear type in the SPF were available to the panel for the period 2007–08 to 2012–13 (see Table 2.2). Very little fishing and no mid-water trawl fishing has been conducted in the SPF since 2010–11, so the panel relied on data for 2007–08 to 2010–11 to identify a typical configuration of the SPF wet boat fleet. During that period an average of four purse seine vessels and one mid-water trawl vessel operated. The panel considered that under the FPA there was likely to be increased mid-water trawl effort and lower purse seine effort and assumed that the wet boat fleet under the FPA comprised three purse seine vessels and two mid-water trawl vessels. The assumption of increased use of mid-water trawl gear under the FPA reflects:

- the exclusion of Australian sardine *Sardinops sagax*, which is taken by purse seines, from the assessment of the FPA
- the shift from surface to subsurface schooling behaviour by jack mackerel *Trachurus declivis* making them less susceptible to purse seines and more susceptible to mid-water trawls
- the greater propensity to take targeted catch of redbait *Emmelichthys nitidus* using mid-water trawls
- that more than 70 per cent of the total allowable catches (TACs) for the fishery in 2014–15 is comprised of jack mackerel and redbait.

4.4.2 Fishing effort

Between 2000 and 2013 the highest number of shots recorded in the SPF in any year was 298 mid-water trawls in 2006 and 204 purse seine shots in 2009 (Table 19.4 in Tuck *et al.* 2013). Since 2009 the number of mid-water trawl shots was less than 100 and since 2011 it has been zero. Purse seine effort also decreased markedly from 517 search hours in the 2009–10 fishing year to less than 65 hours in the 2012–13 fishing year (see Table 2.2). Effort in the mid-water trawl fishery was mostly distributed off the east, south-east and south-west coasts of Tasmania with some effort spread throughout the Great Australian Bight (GAB). Purse seine effort was located closer to shore in the eastern GAB and off southern NSW (see Figure 4.1).

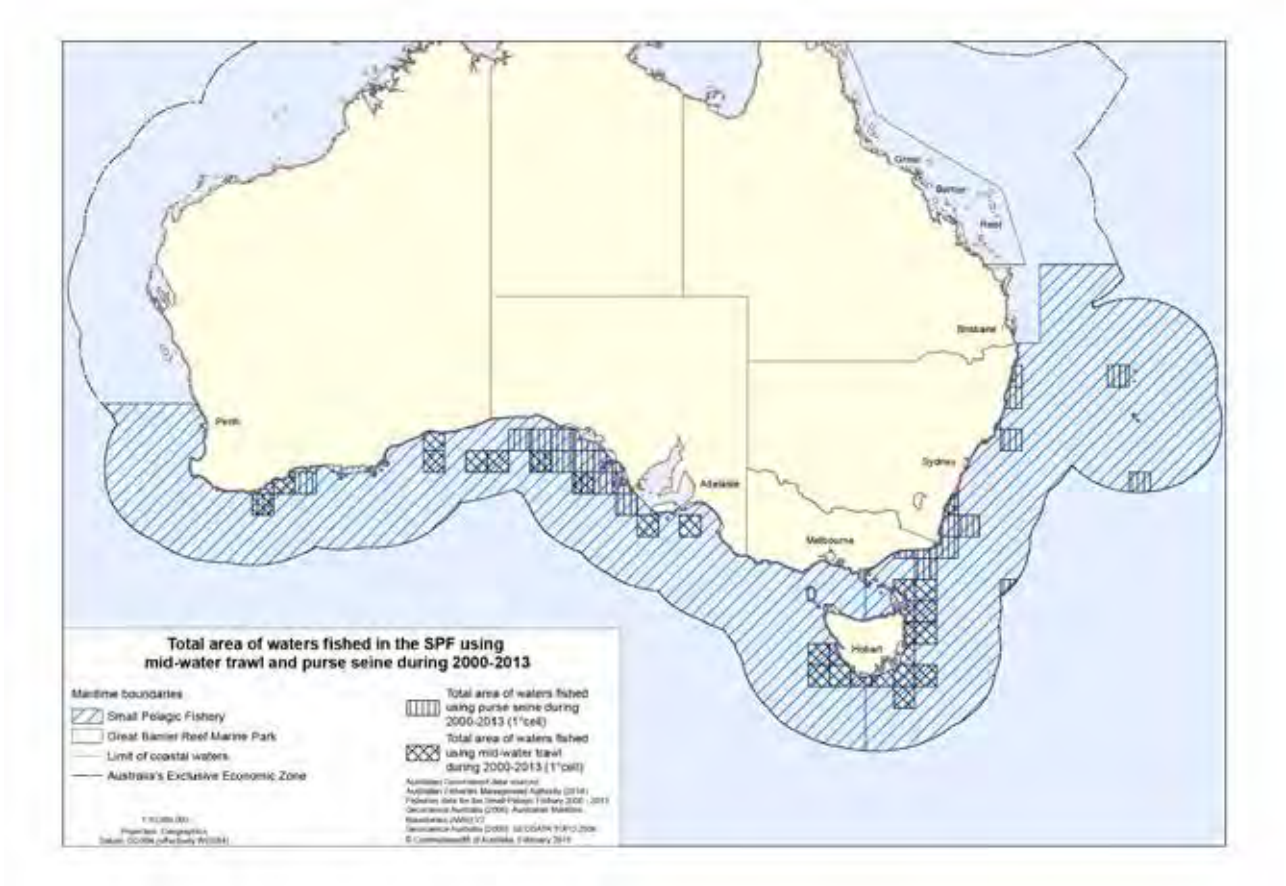

Figure 4.1 Total area of waters fished in the SPF using mid-water trawl and purse seine during 2000–2013.

Source: Map produced by the Environmental Resources Information Network, Department of the Environment using unpublished AFMA data.

The highest annual catch by fishing year of the three main target species (blue mackerel *Scomber australasicus*, jack mackerel and redbait but not Australian sardine) taken by mid-water trawling since 2000 was more than 8000 t in 2003 (AFMA unpublished data). Catches were between 6500 t and 8000 t for the next few years and then declined rapidly to around 1200 t in 2010. Since then, there has been no mid-water trawl catch in the fishery. The purse seine fishery targets blue mackerel mostly and catches varied from 150–200 t to a maximum of more than 2000 t in 2008 but declined rapidly to less than 100 t in 2014 (AFMA unpublished data). Total catch of the three main target species over the past 15 years was less than 9000 t for the purse seine sector and about 52,000 t for the mid-water trawl sector.

The introduction of a processing vessel would reduce the need of the catching fleet to return to port to unload fresh catch, therefore enabling the fleet to stay at sea for longer periods. This could: increase the capacity of the catching fleet to fish areas of the fishery that have not been previously accessible due to their distance from ports; provide an opportunity for increased returns by delivering catch for human consumption; increase the capacity of the catching vessels to fish to the TACs; and thus provide an economic incentive to increase fishing effort.

The panel concluded that compared to the typical and, particularly the recent, SPF fleet, the FPA 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. The impact of any increased effort on interactions with protected species and on localised depletion is examined in Chapters 5 and 6 respectively.

4.4.3 Spatial and temporal pattern of fishing

The panel believed that the spatial pattern of fishing under the FPA would be likely to differ from that of previous fishing activities in the SPF. In the first declaration report the panel concluded that "the limited range of the wet-boat fleet of vessels that has fished in the SPF to date has restricted the fishery's ability to catch the available TACs in an economically efficient way" (Expert Panel on a Declared Commercial Fishing Activity 2014, p. 163). A panel-commissioned project to investigate the fleet dynamics of a range of FPA scenarios supported the view that a fleet supported by a processing vessel would be less operationally constrained than the typical SPF wet boat fleet (Hamer 2015). The panel accepted

that, in theory, the processing vessels could allow the catching fleet to fish further from ports than previous SPF fishing operations. The panel noted that the seasonal pattern of fishing would be influenced largely by the distribution of the target species across the fishery during the fishing year. A less-constrained FPA catching fleet may have more capacity to follow the seasonal movement of fish than the typical SPF fleet. As a result, both the temporal and spatial distribution of effort of the SPF catching fleet might be extended under the FPA. However, in reality, the skippers of the catching fleet would be more likely to use their prior knowledge on where yields are likely to be greatest and balance the trade-offs between catch rate and length of stay in a patch to determine when and where they fish (Dorn 2001, Wise *et al.* 2012). In addition, the natural inter-annual variability of the distribution of SPF target species means that spatial distribution of effort will necessarily vary as found in the fishery for Peruvian anchovy *Engraulis ringens* (Bertrand *et al.* 2007, Joo *et al.* 2014) across years. The panel also noted that the catching fleet would remain constrained by its fuel-carrying capacity and would be required to make regular trips to port to refuel and reprovision the vessels. As a result, transhipping catch is likely to extend the time that the wet boat fleet could remain at sea but only by a few days (Mr G. Geen, Director, Seafish Tasmania *in litt.* 8 April 2013). In the panel's view this constraint would reduce the potential offered by the processing vessel for the catching fleet to fish more broadly in the SPF.

Overall, the panel considered that it was not possible to predict whether the FPA would result in a broader distribution of fishing 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. Nevertheless, the panel noted that any change in the spatial and temporal distribution of effort may have implications for interactions with and/or indirect impacts on protected species. The potential implications for interactions with protected species and localised depletion are discussed in Chapters 5 and 6 respectively.

4.5 Transhipment

The method by which the processing vessel 'receives' the fish from the catching fleet is not specified in the second declaration. The panel was advised by Seafish Tasmania (Mr. G. Geen, Director, Seafish Tasmania *in litt.* 17 October 2014) that fish would be pumped from either the net of the catching vessel or the hold of the catching vessel and these methods were confirmed as being standard practice (Finley *et al.* 2015a). The panel assumed that both methods were likely to be utilised and included each in the fishing scenario of the FPA.

Fish have routinely been pumped from the net to vessel holds in the Jack Mackerel Fishery (JMF) and in the SPF. In the mid-1980s, prior to the creation of the SPF, the JMF comprised a fleet of fishing vessels from 85 to 500 t carrying capacity (Williams *et al.* 1986, 1987). Up to six vessels fished in the 1985–86 season (Williams *et al.* 1986) and seven vessels fished and one vessel of small capacity acted as carrier boat to the fleet in the 1986–87 (Williams *et al.* 1987). The numbers of vessels in following years varied from four to six until the mid-1990s (Pullen 1994). Transhipping between the catching fleet vessels was a common practice in the late 1980s and early 1990s fishery if a vessel was full but still had fish pursed. However, the transfer could only occur during fair weather (Mr G. Pullen, Department of Primary Industries, Parks, Water and the Environment pers. comm. 11 December 2014). The panel assumed that the process of transhipment for purse seine vessels fishing under the FPA, i.e. the pumping of a catch onboard the receiving vessel from another vessel's net, would be similar to that which occurred in the historical JMF fleet.

With regard to the mid-water trawl operations of the first declaration, the panel was informed that pumping has been used in previous mid-water trawl and purse seine operations in the SPF. The panel was advised that, during pumping from mid-water trawl nets, the bag and codend of the net hang vertically beneath the vessel and the net is fully submerged to a depth of 50 to 70 m (Seafish Tasmania *in litt.* 16 October 2012 and Seafish Tasmania pers. comm. 23 April 2013) and that the higher pumping capacity likely in DCFA1, compared to the typical SPF fleet, would reduce the time taken for the codend to be emptied. The panel assumed the pumping operation and capacity of the FPA would be similar (Box 2.2). As in DCFA1, the panel assumed that the pumping capacity of the FPA would be faster and more efficient than those of the early JMF and typical SPF purse seine and mid-water trawl operations.

The panel assumed that in transfers of fish from mid-water trawl vessels to the processing vessel that the net remained fully submerged. However, catches of purse seine vessels fishing under the FPA are at the surface and readily available to predators while the catch is transhipped/pumped to the processing vessel. The panel noted that such pumping had occurred previously in the JMF and SPF without any significant interactions with protected species and that any such species attracted to feed on fish in the purse seine net would be able to escape given that the net is open at the surface. Despite there being no management requirement for purse seine vessels to have vessel management plans (VMPs) to deal with interactions with protected species, the panel formed the view that the transhipment process was unlikely to result in any significant interactions with protected species.

Uncertainty remains about the level of accidental loss of fish during transhipment, which might attract protected predator species to the fishing operations and increase the risk of interaction. Observer reports from the 2002–03 pair trawl trials in the SPF stated that up to 100 kilograms of fish could be lost during these operations (McKinley unpublished (a) and (b)). However, despite an extensive literature review (Finley *et al.* 2015a) no information was identified that would inform an assessment of whether the pumping operation would have any direct effects on protected species. In addition, the panel considered that any risks to protected species arising from pumping operations to a processing vessel would not be different to those posed under a non-transhipment fishing operation where the catch was pumped on-board the catching vessel. In addition, the panel assumed that the mandatory mid-water trawl VMPs would prohibit the discarding of any biological material while gear (including the pump) was in the water, thus avoiding potentially increasing the risk of interaction with and fatality of protected species. The panel assumed that since the processing vessel would not be fishing and AFMA's management arrangements only require VMPs for mid-water trawl vessels, there would be no VMP for the processing vessel.

Summary: panel consideration of the FPA

- *Interactions between the processing vessel and protected species would largely be 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.*
- *The panel considered that the processing vessel would have no direct impact on localised depletion and that any direct impact would be incurred through the catching fleet.*
- *The panel has not considered the potential impacts of resupply, refuelling and re-crewing of the catching fleet by the processing vessel in its assessment.*
- *Fish-finding capability provided to the catching fleet by the processing vessel was considered unlikely to be a significant determinant of interactions with protected species or of the extent of localised depletion under the FPA.*
- *Under the FPA there was likely to be increased mid-water trawl effort and lower purse seine effort compared to typical SPF operations. The panel assumed that the wet boat fleet under the FPA comprised three purse seine vessels and two mid-water trawl vessels.*
- *Compared to the typical and, particularly the recent, SPF fleet, the FPA 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.*
- *It was not possible to 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. Nevertheless, any change in the spatial and temporal distribution of effort may have implications for interactions with and/or indirect impacts on protected species.*
- *Under the FPA, transhipment will occur through pumping fish from the nets or the holds of the catching fleet to the processing vessel.*
- *Experience of pumping fish from the net to, or between, purse seine vessels (in the JMF and SPF), and from the net to mid-water trawl vessels (in the SPF) does not suggest that transhipment poses any specific threat to protected species. The requirement to have a VMP in place on mid-water trawl vessels provides an avenue to further reduce any risk posed by the transfer of fish from these vessels.*
- *The existing management arrangements for the SPF do not require VMPs for the purse seine fleet and the panel has assumed that the processing vessel would not be required to have a VMP since it does not fish.*