Chapter 8
Southern and Eastern Scalefish and Shark Fishery
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FIGURE 8.1 Area of the Southern and Eastern Scalefish and Shark Fishery
8.1 Description of the fishery

The Southern and Eastern Scalefish and Shark Fishery (SESSF) is a multisector, multigear and multispecies fishery, targeting a variety of fish and shark stocks. The SESSF is the largest Commonwealth fishery in terms of volume and accounted for 27 per cent of the gross value of production (GVP) of Commonwealth fisheries in 2011–12. The management area covers almost half the area of the Australian Fishing Zone (Figure 8.1) and spans both Commonwealth waters and waters of several Australian states under Offshore Constitutional Settlement arrangements. A number of the reserves within the Commonwealth marine reserve network established by the Australian Government Department of the Environment fall within the SESSF management area.

The SESSF was established in 2003 through the amalgamation of four fisheries—the South East Trawl, Great Australian Bight Trawl, Southern Shark Non-trawl and South East Non-trawl fisheries—under a common set of management objectives. The Southern and Eastern Scalefish and Shark Fishery management plan 2003 came into operation on 1 January 2005 (amended in 2009).

The primary mechanism for controlling the harvest of stocks in the SESSF is through the allocation of annual total allowable catches (TACs). TACs are determined for all key target species and several byproduct species. The TAC for each stock is distributed among fishers as individual transferable quotas for the fishing season. In addition to TACs, management arrangements in the SESSF include limited entry, gear restrictions (e.g. mesh size, net length, setting depth, hook limits and trap dimensions), spatial closures, prohibited species (e.g. black cod), trip limits for certain species (e.g. pink snapper—*Pagrus auratus*) and size limits for three species, as well as requirements for observer coverage and vessel monitoring systems.

In 2009, the Australian Fisheries Management Authority (AFMA) created the South East Management Advisory Committee (SEMAC) to provide advice to the AFMA Commission on management measures for the SESSF. The Small Pelagic Fishery management advisory committee (MAC) and Squid MAC became part of SEMAC in 2010; the Great Australian Bight Trawl Sector MAC (GABMAC) remains separate. Co-management trials have been undertaken in the Great Australian Bight Trawl Sector (GABTS) with the Great Australian Bight Industry Association (GABIA), and in the Commonwealth Trawl Sector (CTS) with the Lakes Entrance Fishermen’s Co-operative Society. The trials aimed to test approaches for AFMA and industry to work together to reduce regulatory burden and increase the efficiency of fisheries management, without sacrificing sustainability. The trials also focused on ways to streamline and simplify the day-to-day administration of the fishery. The trial in the GABTS has now concluded. However, GABIA continues to work with AFMA under a co-management arrangement for the fishery. The CTS co-management trial has also concluded and a report on the outcomes is expected in 2013.

Annual SESSF landings declined from a peak of almost 37 000 t in 2002 to about 19 000 t in 2012, as a result of reductions in TACs and fishing effort. GVP was $83.8 million in the 2011–12 financial year, down from $85.4 million in 2010–11. The SESSF was one of the target fisheries of the Securing our Fishing Future structural adjustment package (2005–06), which substantially reduced the number of fishing vessels through the purchase of fishing endorsements. Although this package contributed to lower landings and GVP, net economic returns (NER) in the fishery have improved for the remaining participants (Vieira et al. 2010).
8.2 Sectors of the fishery

Current management arrangements are structured around the four primary sectors of the fishery: the CTS; the East Coast Deepwater Trawl Sector (ECDTS); the GABTS; and the Gillnet, Hook and Trap Sector (GHaTS).

The status of stocks taken in these sectors is discussed in Chapters 9, 10, 11 and 12. The GHaTS includes the Scalefish Hook Sector (ScHS), the Shark Gillnet and Shark Hook sectors (SGSHS), and the Trap Sector. In this report, the ScHS is reported with the CTS (Chapter 9) because most of their target species are shared. The SGSHS is reported separately (Chapter 12). The trap sector is not reported in detail because of its low fishing effort and landings.

8.3 Harvest strategy performance

A tiered harvest strategy framework (HSF) has been applied in the SESSF since 2005. The framework has evolved since its introduction, particularly after the release of the Commonwealth Fisheries Harvest Strategy Policy (HSP; DAFF 2007). The current SESSF HSF is described in AFMA (2009) and applies to all sectors and all species under quota. The HSF has three tiers (1, 3 and 4; Tier 2 has been phased out), which have been developed to accommodate different levels of data quality or knowledge about stocks (AFMA 2009). Tier 1 assessments are quantitative, model-based stock assessments that are conducted for stocks with the highest quality of data or information. The Tier 3 assessment methodology primarily involves catch-curve analyses of age (or size) composition data, together with information on size-at-maturity and selectivity, to provide estimates of fishing mortality rates. Tier 4 involves an assessment of trends in catch rates, and is undertaken for stocks for which only catch-and-effort data are available.

The target and limit reference points for each tier reflect those prescribed in the HSP. All tier levels generate a recommended biological catch (RBC) through associated harvest control rules (AFMA 2009), intended to move stock biomass towards the target reference point. These RBCs are translated into TACs through a set of predetermined rules, which include deductions for discarding, recreational catches and state catches. The level of precaution applied in RBCs is intended to increase from Tier 1 to Tier 4, reflecting the increasing level of uncertainty in assessments. The SESSF Resource Assessment Group (RAG) has also produced guidelines on the implementation of the various post-assessment modifiers (recent catch-rate modifiers, minimum and maximum change rules, and discount factors).

Management strategy evaluation (Little et al. 2011; Wayte 2009) has been used to examine the HSF’s performance, and has resulted in several changes to the HSF and its implementation. In 2008, the harvest control rules for Tiers 3 and 4 were altered to ensure that the concepts of target and limit reference points reflected those in the HSP and to address some technical issues. In 2010, a minor change was made to the Tier 4 harvest control rules: the cap on the maximum catch was removed because SESSF RAG considered that it could have unintended consequences and that the 50 per cent change limiting rule was sufficient.
The SESSF contains several stocks that are classified as overfished (i.e. the current biomass is estimated to be below the limit reference point). These overfished stocks are blue warehou, eastern gemfish, school shark, gulper sharks and orange roughy in two zones (southern and western). The reasons why these stocks have not rebuilt are not always clear, but may include that ongoing catches exceed levels that will facilitate rebuilding, that changes in stock productivity may have occurred or that recovery may take a long time due to the biology of the species (Ward et al. 2013). Failure of these stocks to show clear signs of recovery raises concerns over the ability of the SESSF HSF to deal effectively with overfished stocks. For overfished stocks, the harvest control rules, in line with the HSP, recommend a zero RBC. AFMA typically allocates incidental catch allowances to cover unavoidable catches when fishers are targeting other species. Although the SESSF RAG has advised that incidental catch allowances for rebuilding species should be based on estimated bycatch proportions from companion species analysis (Klaer 2010), the SESSF HSF itself does not specify guidelines for setting these catch allowances. In some cases, catch allowances have been set above levels estimated by assessments to allow recovery of the stock within stipulated rebuilding timeframes.

The performance of the SESSF HSF against the economic objective of maximising NER has been encouraging. Indications are that NER increased in the CTS and GHaTS in the years immediately following the implementation of the SESSF HSF (George & New 2013). However, the impacts of the HSF are difficult to separate from other factors, such as the influence of the Securing our Fishing Future structural adjustment package (Ward et al. 2013).

None of the quota species caught in the CTS and GHaTS are currently managed under a B_{MEY} (biomass at maximum economic yield) target estimated using a bioeconomic model. For a multispecies fishery, achieving MEY would also require a multispecies approach to setting MEY targets. For species that have had a maximum sustainable yield (MSY) estimated, a 1.2B_{MSY} proxy for B_{MEY} is used as the target. For other species, a target that is equivalent to the proxy 0.48B_0 (48 per cent of the unfished biomass) is applied. There may be potential to improve economic performance with the development of estimated B_{MEY} targets, rather than the default proxy, for some of the more valuable quota species. Consideration is also being given to alternative approaches to setting targets for secondary species (i.e. those that are not targeted and contribute a small proportion of the NER). Following guidance from the SESSF RAG, SlopeRAG and ShelfRAG have recommended targets below the B_{MEY} proxy for a small number of low-value species. AFMA has yet to decide whether to adopt these alternative targets (AFMA 2012).

Augmenting current stock assessments with available economic survey data to generate bioeconomic assessments may provide one cost-effective means of estimating MEY targets for a broader range of species. The results of work aimed at developing target reference points for data-poor fisheries (Pascoe et al. 2011) may present other options. The multispecies nature of the CTS and GHaTS further complicates the targeting of MEY, given differences in the relative profitability of species that are caught together in the fishery. Current work (under a Fisheries Research and Development Corporation project) on setting harvest reference points in multispecies fisheries may provide guidance on how to better target MEY.

For the GABTS, the development of a bioeconomic model for the sector’s two key target species (Kompas et al. 2012) has allowed TACs to be set in line with achieving estimated B_{MEY} targets.
8.4 Biological status

Of the 37 stocks (34 under quota) assessed across the SESSF in 2012, 29 were not subject to overfishing and 23 were not overfished; 2 were subject to overfishing and 6 were overfished; 6 were uncertain with regard to the level of fishing mortality, and 8 were uncertain with regard to the level of biomass.

The number of stocks assessed for status in the SESSF has increased from 25 in 2004 to 37 in 2012. As a result, the percentage of stocks classified in each status may be more informative than the number. The percentage of stocks classified as not subject to overfishing in the SESSF in 2012 remained at 78 per cent, having increased from 4 per cent in 2004. The percentage of stocks classified as not overfished increased to 62 per cent in 2012, up from 24 per cent in 2004 (Figures 8.2 and 8.3).

The percentage of stocks that were uncertain with regard to the level of fishing mortality and/or biomass has decreased substantially in recent years. In 2004, 72 per cent of stocks in the SESSF were classified as uncertain with regard to the level of fishing mortality, and 56 per cent were classified as uncertain with regard to the level of biomass. These figures declined to 16 per cent of stocks uncertain with regard to the level of fishing mortality in 2012 and 22 per cent uncertain with regard to the level of biomass in 2012.

The percentage of stocks in the SESSF classified as subject to overfishing decreased from 24 per cent in 2004 to 5 per cent in 2012, while the percentage of stocks classified as overfished decreased from 20 per cent in 2004 to 16 per cent in 2012. Two stocks were classified as overfished and subject to overfishing in 2012, down from three in 2011. These stocks were eastern gemfish and school shark. Gulper sharks remained classified as overfished, but were classified as uncertain with regard to the level of fishing mortality as a result of implementation of various measures to reduce targeting and catches. Blue warehou (*Seriolella brama*) remained classified as overfished because there are still no signs of recovery under current catch levels. AFMA continues to work with stakeholders to control the level of fishing mortality for these stocks, to facilitate rebuilding.

**FIGURE 8.2** Fishing mortality status for all stocks in the SESSF, 2004 to 2012

![Graph showing fishing mortality status for all stocks in the SESSF, 2004 to 2012](image)
FIGURE 8.3 Biomass status for all stocks in the SESSF, 2004 to 2012

![Graph showing biomass status for all stocks in the SESSF from 2004 to 2012. The graph indicates the percentage of stocks that are not overfished, overfished, and uncertain if overfished across the years. The percentage of stocks in each category is marked for each year, showing a trend over time.]

Sorting the catch
AFMA
8.5 Economic status

The SESSF HSF provides a framework to assess the economic status of the fishery. Indicators of stock biomass are used to assess the current biomass of species relative to their B_{MEY} target (or its proxy, 0.48B_0). When this information is combined with indicators of profitability and efficiency, the economic status of SESSF sectors can be assessed in terms of whether they are moving towards or away from MEY.

Scalefish catches in the CTS and ScHS accounted for 63 per cent of SESSF GVP in 2011–12 (Figure 8.4). These sectors are therefore key drivers of economic performance in the SESSF. Of these two sectors, only the CTS is surveyed as an individual sector by ABARES as part of its fishery economic surveys program (the ScHS is surveyed as part of the GHaTS). The NER for the CTS has followed a positive trend since 2004–05. Additionally, the estimated biomass of three of the sector’s four most valuable species (blue grenadier, silver warehou and tiger flathead) are close to their B_{MEY} targets (Chapter 9). This further indicates that the economic status of the CTS is positive and has substantially improved since 2004–05. However, it could be further improved if proxy target reference points were replaced with more appropriate, cost-effective estimates of B_{MEY} for some of the more valuable species in the sector.

The rebuilding of orange roughy (Hoplostethus atlanticus) stocks over the longer term should also improve the sector’s economic status, although sustainable harvests of this species are likely to be lower than historical levels.

**FIGURE 8.4** Real GVP in the SESSF by sector, 2001–02 to 2011–12

Notes: GVP for the SGSHS only includes gummy, school and saw sharks, and elephantfish, caught in the gillnet and hook sectors. GVP for other sectors includes non-scalefish product caught in the CTS and ScHS, and non-shark product caught in the SGSHS.
Economic indicators for the GHaTS were used to assess the economic status of the SGSHS. In 2011–12, the SGSHS accounted for 65 per cent of GVP in the GHaTS. For the decade preceding 2009–10, estimates of NER in the GHaTS had been positive. In 2009–10, estimates became negative (–$0.4 million) and remained at similar negative levels in the two financial years that followed. This is despite biomass levels of gummy shark (the sector’s main target species) being close to or above the stock’s target reference point. Recent spatial closures aimed at reducing marine mammal interactions in the sector may have contributed to this change. Another key challenge for the sector is the rebuilding of the school shark stock; this could lead to increases in NER in the future but is likely to be associated with adjustment costs, particularly if it occurs over a short period.

The development of a bioeconomic model for the two key species targeted in the GABTS (deepwater flathead—*Neoplatycephalus conatus* and Bight redfish—*Centroberyx gerrardi*) has improved management’s ability to target $B_{MEY}$ (Kompas et al. 2012). The most recent stock assessments for Bight redfish projected biomass levels at the start of 2013–14 to be above the $B_{MEY}$ target (Klaer 2010, 2011, 2012), potentially allowing increased profits from the species as it is fished down to its MEY target reference point. However, the most recent stock assessment for deepwater flathead suggests that biomass levels need to be rebuilt towards the $B_{MEY}$ target. Nonetheless, fishery profitability is unlikely to be constrained by stock status, with biomass forecast to increase to 0.39SB₀ in 2013–14, just below the MEY target reference point of 0.43SB₀.

In the ECDTS, low levels of fishing effort have prevailed in recent years. Low expected profit in the sector appears to have discouraged activity in the fishery. As a result, the sector has generated minimal NER.

Overall, the current economic status of the entire SESSF is mixed. The negative change in economic performance in the GHaTS has occurred at the same time as continued NER improvements in the CTS, while the GABTS now pursues estimated $B_{MEY}$ targets for its key species. The deterioration in economic performance in the GHaTS demonstrates that management of bycatch issues can have significant implications for a fishery’s economic performance, and such factors should be taken into account when attempting to meet bycatch management objectives. The SESSF HSF will continue to make an important contribution to the fishery’s economic performance by guiding management decisions that explicitly aim to maximise NER.
8.6 Environmental status

Tuck et al. (2013) concluded that trawling in the South-East Trawl and GABT and Danish-seining account for the greatest volume of bycatch. This largely reflects the level of fishing activity in these sectors and fisheries. Discards largely comprise small fish species with little or no commercial value. Over 20 years of monitoring by Integrated Scientific Monitoring Program (ISMP) observers indicates a reduction in the volume of trawl discards since the mid-2000s. Trawling effort in the SESSF declined by about one-third over this time and probably explains much of the reduction in discards.

The SESSF sectors interact with a number of species listed as protected or conservation dependent under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). Five previous target species in the SESSF are listed as conservation dependent: orange roughy, eastern gemfish, Harrisson's dogfish (Centrophorus harrissoni), southern dogfish (C. zeehaani) and school shark. Blue warehou has been nominated for listing under the EPBC Act. These species, discussed in Chapters 9 and 12, are under rebuilding or recovery strategies. They are currently managed under incidental catch allowances, closed areas and trip limits, to allow for incidental catch while targeting other species.

8.6.1 Protected species bycatch

Fishers are required to take all reasonable steps to avoid interactions with protected species (except those listed as ‘conservation dependent’) and report all interactions in their logbooks. AFMA reports all interactions with protected species recorded in logbooks to the Australian Government Department of the Environment on a quarterly basis. These reports (which are also published on the AFMA website) provide the basis for reports of the number of interactions with protected species within the SESSF in 2012. Interactions are known to occur with species groups protected under the EPBC Act, including marine mammals (cetaceans and pinnipeds), seabirds, sharks (white shark—Carcharodon carcharias, grey nurse shark—Carcharias taurus, shortfin mako shark—Isurus oxyrinchus, porbeagle shark—Lamna nasus) and syngnathids (seahorses and pipefish). Although these interactions are generally rare, they can be significant for some species. It can be difficult to obtain robust estimates of interaction rates, particularly at lower levels of observer coverage or monitoring.

Pinnipeds (seals and sea lions)

The areas fished by the SESSF overlap with the distributions of the Australian fur seal (Arctocephalus pusillus doriferus), New Zealand fur seal (A. forsteri) and Australian sea lion (Neophoca cinerea). Fur seal populations have recovered substantially following heavy harvesting in the 18th and 19th centuries, but sea lions are currently listed under the EPBC Act as vulnerable. The CTS and Shark Gillnet Sector, in particular, are known to interact with these species, whereas interactions with the hook sectors are much rarer. Between 1993 and 2000, data collected by the ISMP and its precursor (the Scientific Monitoring Program) indicated that an average of 720 fur seals might be caught incidentally by small trawlers operating in the CTS each year (NSSG & Stewardson 2007). Because of their smaller vessels and net sizes, wet-boat trawlers have reduced ability to apply mitigation methods such as seal excluder devices (SEDs), which are designed for larger nets. Trials of a flexible SED design suitable for use in smaller nets have been reasonably successful (Knuckey 2009), but reliably estimating and reducing the level of interactions between seals and wet-boats remain difficult.
Minimising seal interactions has been a focus for the winter trawl fishery for blue grenadier off western Tasmania. SEDs have been compulsory in this component of the SESSF since 2005, and modifications to fishing practices appear to have substantially reduced the incidence of seal bycatch in the midwater nets of factory vessels. Observers have been deployed on factory trawlers to verify interaction rates. In 2007, the South East Trawl Fishing Industry Association (SETFIA) released an updated trawl industry code of conduct for responsible fishing. It also released an industry code of practice that aims to minimise interactions with fur seals, as well as addressing the environmental impacts of the fishery generally.

Concern has been increasing about the mortality of Australian sea lions caught as bycatch in shark gillnets. The Australian sea lion is endemic and listed as vulnerable under the EPBC Act. Sea lion populations were reduced substantially by sealing between the 18th and early 20th centuries, and recovery has been slow (DEWHA 2010). Australian sea lions show high genetic differentiation due to high fidelity of female sea lions to their natal sites, indicating that animals lost from a colony are unlikely to be replaced by immigrants from other colonies (DEWHA 2010). The small size of some colonies means that the loss of a few breeding females from a population can significantly reduce the long-term prospects for recovery of that population (Goldsworthy et al. 2010). Research projects (Goldsworthy et al. 2007, 2010) have placed observers on vessels to monitor Australian sea lion interactions off South Australia, where most of the Australian sea lion colonies occur. Goldsworthy et al. (2010) used Australian sea lion foraging data and fine-scale fishing effort data to identify areas at risk of interactions. Based on the observer data (12 Australian sea lion mortalities were observed in 145 sea-days on 10 trips, amounting to 234 sets), Goldsworthy et al. (2010) estimated that more than 300 Australian sea lions could be caught during each breeding cycle (17.5 months).

Closures were introduced in 2003 around the Pages Islands (the largest sea lion colony) and around Kangaroo Island. In December 2009, interim voluntary closures of 4 nautical miles around all colonies were introduced. The current declaration of the SESSF as an approved Wildlife Trade Operation under the EPBC Act includes a requirement to implement long-term management measures, including formal fisheries closures, which should significantly reduce the impact of fishing on Australian sea lions and facilitate the recovery of subpopulations. AFMA implemented an Australian sea lion management strategy in July 2010, including spatial closures around colonies, increased observer coverage and trigger limits, with observed levels of bycatch above the trigger limits resulting in the closure of larger areas (AFMA 2010). Several state-managed fisheries also interact with Australian sea lions.

Increased onboard observer coverage or camera monitoring is important for obtaining reliable data on interaction rates. In the first six months of the sea lion management strategy, the prescribed level of observer coverage was not achieved. The Australian Government funded a trial of onboard cameras to monitor Australian sea lion bycatch in 2010–11. In 2011, in light of an expert review of the management strategy, AFMA introduced a temporary order (six months, effective 1 May) that increased the size of closed areas around 31 colonies and required 100 per cent observer coverage on gillnet vessels off South Australia in the Australian sea lion management area. This area consists of several zones, each with an interaction trigger limit, which triggers closure if the limit is reached. Onboard cameras could be used instead of a scientific observer to achieve the required coverage levels. The temporary order was replaced by a Closure Direction, which extended protection to 48 known Australian sea lion colonies. The Closure Direction expired on 1 May 2013, but after consultation with stakeholders has been extended to 1 May 2015, with the
addition of two newly identified Australian sea lion colonies. Observer requirements in the Australian sea lion management area, including 100 per cent onboard observers or electronic monitoring, have been continued under conditions attached to permits and statutory fishing rights. AFMA lowered the trigger limit for sea lion mortalities in December 2011, following advice from marine mammal experts regarding risks to some sea lion subcolonies. The trigger limit was reduced from 52 animals to 15 animals across seven management zones in the Australian sea lion management area (AFMA 2011a).

In 2012, 203 pinniped interactions were reported in CTS and GHaTS logbooks: 8 with sea lions, 9 with New Zealand fur seals, 97 with Australian fur seals and 89 with seals of unknown species. This is a reduction from the 255 interactions reported in 2011. Increases in the number of reported Australian and New Zealand fur seal interactions were primarily a result of improved identification—the total number of reported seal interactions actually declined from 253 in 2011 to 195 in 2012, and the number of unspecified seal interactions decreased from 226 to 89. Of the 203 pinniped interactions, 6 of the 8 sea lions, 83 of the 97 Australian fur seals, 8 of the 9 New Zealand fur seals and 71 of the 89 unspecified seals were reported to be dead.

Eighty-four per cent of all pinniped interactions in 2012 were reported from bottom trawling in the CTS, and 7 per cent (15 interactions) were reported from midwater trawl or Danish-seine operations. Gillnetting reported 8 per cent of interactions. Two sea lions were reported hooked on longline gear but broke free at the surface.
Dolphins

Increased observer coverage in the SGHS in 2011 highlighted interactions with dolphins and potential under-reporting in logbooks (AFMA 2011a). All cetaceans are protected species under the EPBC Act. Two dolphin mortalities were reported in logbooks between January and September 2010 (AFMA 2011b), and 52 interactions with dolphins were reported from September 2010 to September 2011 (AFMA 2011b). In response, AFMA introduced an additional temporary order (AFMA 2011b) that included the Dolphin Gillnet Closure, an area of about 27 239 km² south-west of Kangaroo Island, where most of the interactions were reported. This measure has been extended to 23 September 2014. Observer coverage was increased to 100 per cent (onboard observer or camera) in the area adjacent to the gillnet closure. The lack of historical independent monitoring in the fishery means that the significance of the interactions with dolphins, and how they might have changed over time, cannot be assessed. The increase to 10 per cent observer coverage across the broader area of the SGHS is providing more information on interactions. In 2012, 19 dolphin interactions were reported: 18 in the GHaTS fishery, 17 of which were dead, and 1 in the CTS, which was released alive.

Seabirds

In 1998, in accordance with EPBC Act requirements, the Australian Government developed a threat abatement plan for the incidental bycatch of seabirds during oceanic longline fishing operations. The plan, which was revised in 2006 (DEWR 2006), applies to longline operations in the SESSF (and longline operations in other Commonwealth fisheries), and is the main guide to mitigating seabird bycatch in this sector. The levels of seabird bycatch recorded by auto-longline, demersal longline, dropline and trotline operators in the SESSF are low, compared with those in other pelagic longline fisheries that target tuna and billfish (Brothers 1991; Brothers et al. 2010; CCAMLR 2002).

Seabirds also interact with trawling activities, being vulnerable to injury as a result of striking the trawl warps during fishing operations, predominantly when catches are being processed. Analysis of observer data suggests that there may be significant levels of interaction, but further work is needed to understand the scale and significance of interactions (Phillips et al. 2010). Given the difficulty of documenting these interactions (birds suffering warp strike are not landed), obtaining reliable estimates of seabird mortalities is difficult, even with onboard observers. The issue was investigated by a research project between AFMA and the Tasmanian Department of Primary Industries, Parks, Water and Environment. Mitigation measures, such as offal management and bird-scaring devices, have been effective in reducing seabird bycatch elsewhere. During 2011, AFMA worked with SETFIA to develop tailored seabird management plans to address this issue, including seabird management plans for individual vessels. Vessels are required to use effective seabird mitigation devices, and AFMA is currently conducting a trial using observers to test the effect of these devices on seabird interactions with otter trawlers.

During 2012, 199 seabird interactions were reported in logbooks: 182 in the GHaTS fishery, 16 in the CTS and 1 in the GABTS. Most of the interactions in the GHaTS (160) occurred during a scientific trial investigating the use of auto-longlines to target gummy shark. Seabird mitigation measures were strengthened after high numbers of interactions with seabirds were recorded in December 2012. The auto-longline trial ended on 31 March 2013. The majority of interactions during the scientific trial were with shearwater species.
Most interactions during normal fishing operations (91) were with various species of petrels, prions and shearwaters, 88 of which were reported to be dead. Twenty-four interactions with various albatross species were reported, including three shy and three Buller’s albatross, of which 16 died. One cormorant was reported dead in a gillnet.

**Sharks**

In 2012, 268 non-target sharks were reported in GHaTS logbooks (263 of which were dead) and 19 in the CTS (17 of which were dead). The most prevalent bycatch shark was shortfin mako, 262 of which were reported, all dead. Sixteen porbeagle sharks and one longfin mako were also reported; all were dead. Eight white sharks were reported—five in the GHaTS and three in the CTS; seven of these were released alive. The EPBC Act requires all white sharks and grey nurse sharks to be released alive, if possible.

During 2012, in view of their overfished status, a proposal was made for the listing of Harrisson’s dogfish and southern dogfish as threatened species under the EPBC Act. On 30 May 2013, the then Minister for Sustainability, Environment, Water, Population and Communities decided to list Harrisson’s dogfish and southern dogfish in the conservation dependent category, noting that both of these species have experienced severe historic declines following overfishing, and are subject to recovery plans that provide for management actions to stop the decline and support recovery of these species.

**Syngnathids (seahorses and pipefish)**

Syngnathids are taken as bycatch in the CTS in otter-trawl and Danish-seine nets. In contrast with 2011, when the greatest number of syngnathids were reported in Danish-seine logbooks, the largest number of syngnathids in 2012 was reported in trawl logbooks; 335 syngnathids were reported in trawl logbooks, of which 236 were dead. Danish-seiners reported two syngnathids in 2012, one of which was dead.
8.7 Literature cited


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