8 Southern and Eastern Scalefish and Shark Fishery overview

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Figure 8.1 Area of the Southern and Eastern Scalefish and Shark Fishery (SESSF)

Note: Sector-specific areas are provided in following chapters

8.1 BACKGROUND

The Southern and Eastern Scalefish and Shark Fishery (SESSF) was created in 2003 through the amalgamation of four fisheries previously under separate management arrangements. The SESSF is a complex, multisector, multigear and multispecies fishery targeting scalefish and shark stocks of various size, distribution and composition. It extends from waters off southern Queensland, south around Tasmania and then west to Cape Leeuwin in Western Australia (Fig. 8.1). The fishery’s management area encompasses almost half the waters of the Australian Fishing Zone. The fishery operates in both Commonwealth and state waters under complex jurisdictional arrangements resulting from a number of Offshore Constitutional Settlement arrangements with state governments.
The SESSF is one of the largest Commonwealth-managed fisheries, but landings have declined from a peak of almost 37,000 t in 2002 to 21,943 t in 2008. The gross value of production (GVP) was $86.7 million in 2007–08, accounting for 30% of the GVP of Commonwealth fisheries in that year.

The SESSF Management Plan 2003 came into operation on 1 January 2005, and management arrangements are revised annually. Total allowable catches (TACs) for individual quota species are also set annually by the Australian Fisheries Management Authority (AFMA).

### 8.2 SECTORS OF THE FISHERY

The principal sectors of the SESSF managed under the SESSF Management Plan are discussed in subsequent chapters:

- Commonwealth Trawl Sector (CTS) and Scalefish Hook Sector (ScHS)
- East Coast Deepwater Trawl Sector (ECDTS)
- Great Australian Bight Trawl Sector (GABTS)
- Shark Gillnet and Shark Hook Sectors.

In addition, comparatively minor sectors include the South Australian, Tasmanian and Victorian coastal waters sectors. The Tasmanian rock lobster sector, created to allow for a traditional small catch, is a very minor sector in terms of total fish catch. The CTS contributes about 75% of the landed catch and 60% of the value of the SESSF.

Management of the SESSF is mainly through output controls in the form of TACs allocated as individual transferable quotas (ITQs); quota species comprise around 80% of the total commercial landed catch. Input controls used include limited entry, gear restrictions (e.g. mesh size, net length, setting depth, hook limits and trap dimensions) and extensive spatial and depth closures. Other controls used include the declaration of prohibited species and trip, bycatch and size limits for certain species.

### 8.3 HARVEST STRATEGY FRAMEWORK

In the SESSF, a four-tier harvest strategy framework (HSF) was developed and has been applied each year since 2005. The framework is consistent with the Commonwealth Fisheries Harvest Strategy Policy (HSP) and is designed to cater for different levels of certainty (or knowledge) about a stock. It adopts increased levels of precaution that correspond to increasing levels of uncertainty about stock status, such that the level of risk is approximately constant across the tiers. In this approach, each stock is assigned to one of the tier levels depending on the amount and type of information available to assess stock status. Tier 1 represents the highest quality of information available (e.g. a robust, quantitative, model-based stock assessment) and Tier 4 the lowest (e.g. an assessment of catch per unit effort). Target exploitation rates are intended to decrease from Tier 1 to Tier 4.

Each tier has its own harvest control rule that is used to determine a recommended biological catch (RBC). Five resource assessment groups (RAGs) cover groups of species, advise on which species and stocks belong at each tier and determine the RBCs. Coordination and review of this process is provided by an overarching SESSF RAG. The RBCs provide the best scientific advice on what the total mortality should be for each species or stock. The expected mortality from discards and landings in other jurisdictions is subtracted from these RBCs before advice on TACs is provided.

The harvest control rules for Tier 3 and Tier 4 were changed in 2008 to address some problems that had been identified. For both tiers, the previous rules did not encompass the concepts of target and limit reference points as articulated in the HSP and as used in Tier 1 assessments. In addition, for Tier 3 there was a mismatch between the period used to calculate the current level of fishing mortality (the number of fully selected age classes) and the reference period for current catches (the previous four years). Also, the method used in Tier 3 to estimate current fishing mortality did...
not correctly adjust for annual variations in recruitment and catch levels. For Tier 3, this combination of problems caused a slow response in the adjustment to RBCs and overcompensation for recent trends. For Tier 4, the lack of targets and limits in the control rule tended to stabilise catch rates around the levels observed when the rule was first applied. As a result, there was no ability to rebuild stocks, if that was necessary or desirable, to higher levels with higher catch rates. The new harvest control rules described below were used in 2008 to determine RBCs for the 2009–10 fishing year.

- **Tier 1:** uses a robust, quantitative and model-based assessment. The target level of fishing mortality is the level that would, on average, maintain the biomass at the target level. The target biomass is prescribed in the HSP as the biomass producing maximum economic yield ($B_{MEY}$) or, if this is not known, 1.2 times the biomass producing maximum sustainable yield ($B_{MSY}$). The proxy for $B_{MSY}$ is 40% of the unfished biomass; for $B_{MEY}$ it is 48% of the unfished biomass. If the biomass is below a threshold level, the level of fishing mortality is decreased, reaching zero when the biomass is at or below the limit reference point (initially set at 20% of unfished levels or $0.5B_{MSY}$). The threshold level for biomass, below which fishing mortality is decreased, was set at 35% of unfished levels in 2008. The RBC is the catch obtained by applying the target level of fishing mortality to the current biomass.

- **Tier 2:** uses a preliminary quantitative, model-based assessment, as for Tier 1, except that the target biomass was originally set at 50% of unfished levels. The same limit reference point applies.

- **Tier 3:** uses estimates of average recent fishing mortality from the age structure of the catch, data on the biology of the species, total catch weight and selectivity of the fishing gear. The target and limit reference points are set at the level of fishing mortality that would lead, in the long term, to a spawning biomass equal to $B_{MEY}$ and $0.5B_{MSY}$, respectively, or their proxies. The RBC is set as a proportion of average recent catch, where the proportion depends on the relationship between the estimate of current fishing mortality and these reference points.

- **Tier 4:** uses trends in (statistically standardised) catch rates and assumes (as does Tier 1) that there is a relationship between catch rates and the biomass of a species. The target and limit reference points are set at catch rates determined by a RAG to correspond to a biomass of $B_{MEY}$ and $0.5B_{MSY}$, respectively, or their proxies. The target catch rate is selected as the average for a period of years (the reference period) when the species was considered to be fully fished, catch rates were relatively stable and the fishery was considered to be both profitable and sustainable. Alternatively, for species that do not have a long history of exploitation, the average catch rate for a reference period early in the fishery is considered to represent a relatively unfished state, and the target catch rate is set at half this level (approximating the proxy for $B_{MEY}$ of 48% of unfished levels). In both cases, the limit reference point is set at 40% of the target. The RBC is set as a proportion of the average catch in the reference period (or half this value for relatively unfished species), where the proportion depends on the relationship between the current standardised catch rate and the reference points. A maximum level of catch is also set at 1.2 times the average catch in the reference period.
Post-assessment modifiers

In addition to the above harvest control rules, several additional rules have been developed to account for various issues in the application of the rules:

- **Minimum and maximum changes:** Changes to TACs are limited to between 10% and 50% to avoid both trivial adjustments and large changes that are very difficult for industry to adjust to.

- **Transition to new rules:** A limit of 25% was placed on changes to TACs that are due solely to the application of the new Tier 3 and Tier 4 harvest control rules. This rule was applied for one year, in 2008.

Two additional modifying rules are being developed but are not yet fully tested or applied:

- **Incorporating recent industry data:** In recognition of the lags inherent in the process and to make it more responsive to current conditions, TACs are adjusted up or down according to whether the standardised catch rates for the most recent year are higher or lower than the previous year. This has been applied to the 2009–10 TACs for three species and is being further tested.

- **Discount factor:** The new harvest control rules do not apply any inherent level of increasing precaution with the lower tier levels. It is expected that this will be introduced through a discount factor that reduces the TACs slightly for Tier 3 species and more for Tier 4 species. The appropriate level for these discounts is yet to be determined.

### 8.4 CURRENT MONITORING AND ASSESSMENT

From 1994 to 2005 detailed information on the composition of both the retained and the discarded catch of trawl and non-trawl vessels was collected by the Integrated Scientific Monitoring Program (ISMP). This program aimed to place independent scientific observers on a statistically robust sample of fishing trips to gather data on species composition, size and age composition and fishing practices. The ISMP also took length samples of the catch at the main landing ports and the Melbourne and Sydney fish markets. The program was combined with the AFMA observer program in 2006. Since then, the level of sampling has been reduced and the program’s ability to provide robust estimates of discarding and representative sampling of the catch is being examined. The ISMP sampling design review that is currently being undertaken will establish a new sampling regime appropriate to the fishery after the structural adjustment component of the Securing our Fishing Future package.

The Central Ageing Facility at Queenscliff, Victoria, has determined the age composition of selected species since 1991, but the future source of these essential data is also uncertain. Up to the early 1980s most research was carried out by state agencies. Since then, monitoring and assessments have progressively improved through the establishment of coordinating groups and assessment groups focused on individual species.

The most significant recent initiative in monitoring and assessment for the SESSF has been the initiation of the design and development of fishery-independent surveys. The intention is to develop a suite of cost-efficient fishery-independent surveys that will provide indices of abundance for most major species in the SESSF. Eventually, this will circumvent the current reliance on catch per unit effort (CPUE) data from the fishery as the main indicator of relative abundance for most quota species.
8.5 STATUS OF STOCKS

The formation of multispecies assessment groups for shelf, slope and deepwater species has increased the number of species assessed in a given year. However, species of lesser economic value (such as John dory, mirror dory, ocean perch and royal red prawn) have still not had quantitative model-based assessments since ITQ management began in 1992. Determination and application of appropriate discount factors for such Tier 3 and Tier 4 species is needed to ensure that these stocks are not at increased risk as a result of a lack of the more sophisticated assessments.

The revised HSF described above now incorporates explicit target and limit reference points for each tier level. The indicators used in these assessments therefore allow, and have been used to provide, an assessment of stock status. Tier 1 assessments provide a direct estimate of current biomass levels relative to agreed targets and limits and therefore an indication of whether a stock is overfished. Recent catch levels relative to RBCs provide an indication of whether overfishing is occurring for both Tier 1 and Tier 4 stocks. Tier 3 assessments give an estimate of recent average levels of fishing mortality, which provides an objective basis for assessing whether overfishing has been occurring. Tier 4 assessments have been used to assess whether both Tier 3 and Tier 4 stocks are overfished. Where there was an inconsistency between the results from these assessments (e.g. redfish), the assessment from the more robust Tier 3 level has been used.

Carryover and change to fishing year

AFMA revised the quota ‘carryover’ provision in 2002. For most species, fishers had been given up to 20% credit because of undercaught quota (‘undercatch’) or incurred a 20% debit because of overcaught quota (‘overcatch’). In 2003 and 2004 no carryover of undercatch or overcatch was permitted for blue grenadier, blue warehou, eastern gemfish, orange roughy (southern and western zones), redfish and silver trevally. In 2005 a 10% overcatch carryover debit was permitted for all quota species except sharks, elephant fish, oreodories, dory and ribaldo. There was also no undercatch carryover credit provision in 2005 for these species or for blue grenadier, flathead, eastern gemfish, pink ling or orange roughy. From 2006 the undercatch and overcatch carryover percentages were set at 10% for all quota species except for school shark, gummy shark, sawshark and elephant fish, for which no overcatch carryover was permitted.

In addition to these carryover arrangements, AFMA sets what is called a ‘determined amount’. This is a maximum amount, in addition to the percentage of overcatch, that an operator may take under certain conditions without committing an offence. However, twice the quantity of any catch above the quota but below the determined amount that applies for a species is deducted from the operator’s ITQ for the following seasons.

For a number of overfished stocks, TACs are now set at low levels to prevent targeted fishing. This is meant to allow retention, rather than discarding, of any incidental catch that is taken during fishing for other species. However, when a TAC has been heavily reduced to such a level, the carryover amounts can become a large proportion of the actual TAC. Allowing carryover provisions appears to be contrary to the concept of such a non-target TAC, especially when the carryover increases the TAC by a significant amount.
Starting in 2008 the fishing year for the SESSF has changed from a calendar year to a fishing year, spanning 1 May to 30 April. The TAC values given at the beginning of each SESSF chapter indicate the TAC for the 2008 fishing year. However, because it was not possible to acquire and process the catch data for the 2008 fishing year by the required deadline for the Fishery status reports 2008, the catch is reported for the 2008 calendar year. Therefore, the final reported catch for the 2008 fishing year will vary from what is reported here. However, in most cases this will not be an issue as the catch is not approaching the TAC. For the few species where it appears that the catch has exceeded the TAC and that overfishing may have occurred (e.g. flathead), an explanation is provided.