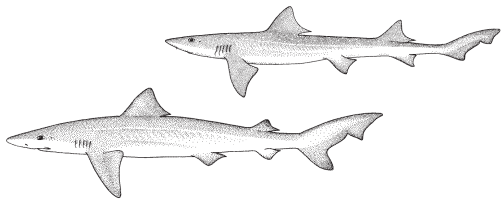
Shark gillnet and hook sectors



Main features

STATUS

- School shark: overfished but overfishing status uncertain.
- Gummy shark: not overfished and not subject to overfishing.
- Sawshark and elephant fish: uncertain.

RELIABILITY OF THE ASSESSMENT

- Tier 1 assessment for gummy and school shark, but school shark assessment uncertain, given recent data.
- Tier 4 assessment for sawshark and elephant fish.

CURRENT CATCH (2007)

Total shark gillnet and hook sectors shark catch:
2031 t carcass weight; value about $15 million (2006–07).

QUOTA SPECIES	AGREED GLOBAL TAC	ACTUAL COMMONWEALTH TAC	CATCH: SHARK SECTOR	CATCH: TRAWL SECTORS
Elephant fish (t)	94	94	39	29
Gummy shark (t)	1800	1701	1555	122
Sawshark (t)	312	312	115	122
School shark (t)	240	213	194	12

TAC = total allowable catch

LONG–TERM POTENTIAL YIELD

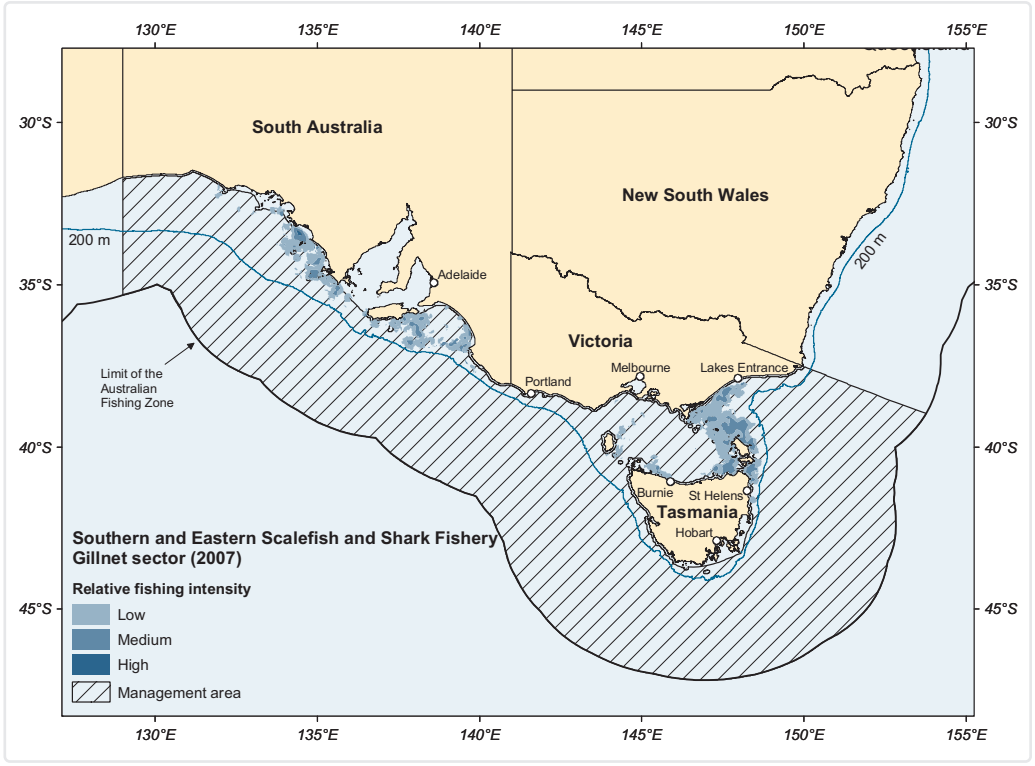
- School shark: 950 t per year.
- Gummy shark: 1800 t per year.

MAIN MANAGEMENT OBJECTIVES

- Achieve, with 80% probability, a biomass of mature school shark that is larger in 2024 than in 1996, in line with overall Southern and Eastern Scalefish and Shark Fishery (SESSF) harvest strategy for other species.

MANAGEMENT METHODS

- Individual transferable quotas (ITQs) for the four main species.
- Legal minimum lengths, gear restrictions and closed areas.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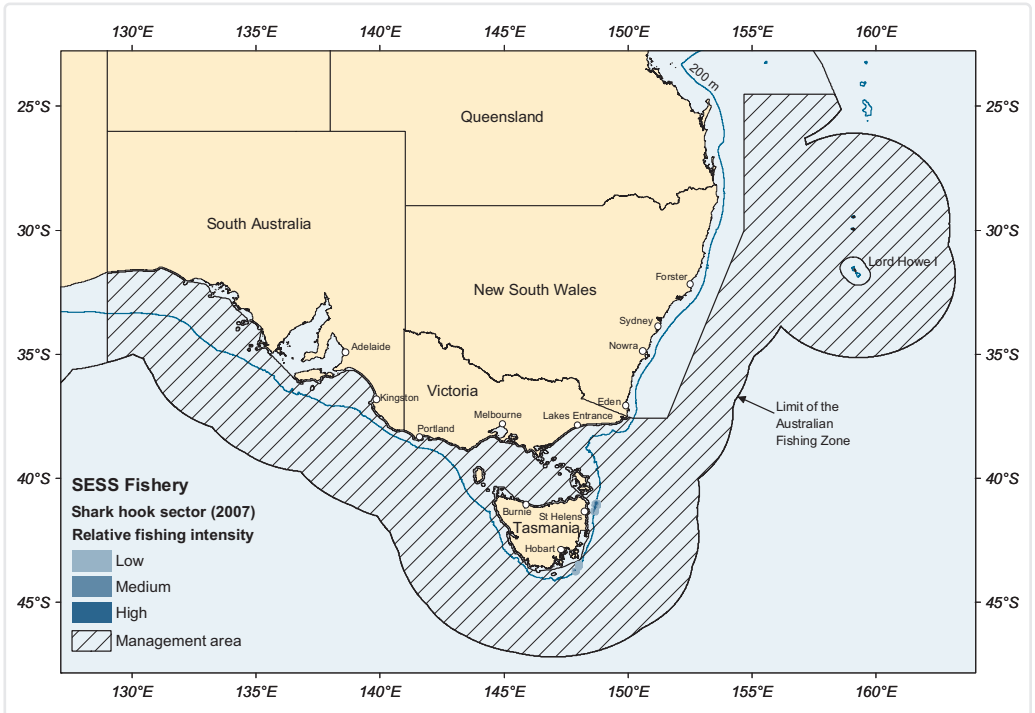
Victoria
Tasmania
200 m
Adelaide
Melbourne
Lakes Entrance
Portland
Burnie
St Helens
Hobart
Limit of the Australian Fishing Zone
Southern and Eastern Scalefish and Shark Fishery
Gillnet sector (2007)
Relative fishing intensity
Low
Medium
High
Management area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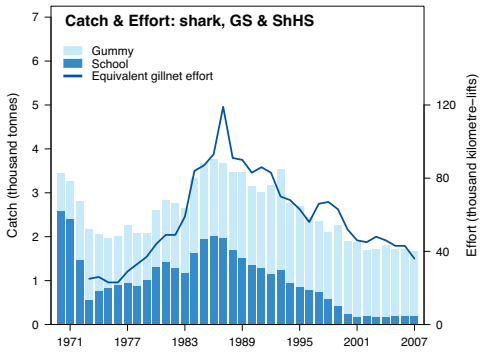
Nowra
Eden
Adelaide
Kingston
Melbourne
Lakes Entrance
Portland
Burnie
St Helens
Hobart
Limit of the Australian Fishing Zone
SESS Fishery
Shark hook sector (2007)
Relative fishing intensity
Low
Medium
High
Management area



Highlights

- The former Southern Shark Fishery now makes up the gillnet sector (which catches mainly shark) and the shark hook sector within the larger SESSF.
- ITQs were introduced for school and gummy shark in the Southern Shark Fishery from 2001 and for sawshark and elephant fish from 2002. Quotas also apply to those species in other sectors of the SESSF. In addition, trigger points have been introduced for other shark species taken by the fishery. Some input controls have been retained.
- Current gummy shark catches are probably sustainable. Recruitment of gummy shark to the fishery in Bass Strait appears to have been stable over the past 20 years. Although the assessment model predicts a decline in pup production, that is not evident in recruitment to the fishery.
- School shark are overfished. Quotas for the species are in accordance with a harvest strategy intended to rebuild the adult biomass by 2024. School shark are now largely a byproduct of the fishery for gummy shark. Information currently available will make it difficult to determine whether the population is recovering.
- Surveys will play an important role in providing a fishery-independent measure of abundance for stocks taken in the fishery, especially school shark. Surveys commenced in 2007 and are continuing in 2008.
- Quota has been allocated via annual permits, but after legal challenges to the quota allocation process are resolved it is expected that statutory fishing rights (SFRs) will be granted from the 2009–10 fishing season.

Background

The gillnet sector (which catches mainly shark) and the shark hook sector, which were formerly managed as the Southern Shark Fishery, are managed by the Australian Fisheries Management Authority (AFMA) on behalf of the Australian Government. The two sectors are part of the larger SESSF. Offshore Constitutional Settlement arrangements with the governments of Victoria, Tasmania and South Australia were finalised in 2001, transferring the management of school and gummy shark in the coastal waters of those states to AFMA (those waters extend to 3 nm offshore, but exclude the internal waters in bays and inlets).

History of the fishery

The fishery has operated for more than 70 years. Initially, fishers targeted school shark (*Galeorhinus galeus*) with longlines. Monofilament gillnets were introduced in the 1960s, and by the early 1970s gillnetting was the main fishing method. In 1972, the discovery of high mercury levels in shark led to a ban on the sale of large school shark in Victoria. That ban and the adoption of gillnets saw gummy shark (*Mustelus antarcticus*) become the principal species in the catch. Southern sawshark (*Pristiophorus nudipinnis*), common sawshark (*P. cirratus*), elephant fish (*Callorhinchus milii*) and several other shark species also became more important.

A maximum mesh size of 16.5 cm was introduced in 1997 to reduce the catch of large shark, particularly adult school shark, and to discourage targeting of school shark in general. Gummy shark has been the main species in Bass Strait catches since the early 1970s. The transition from targeting school shark to targeting gummy shark came later in South Australia than in Bass Strait.

Fishing effort for shark peaked in the late 1980s. It was reduced somewhat in the early 1990s by the amalgamation of entitlements and reductions in net length. A management plan introduced in April 1988 created a limited-entry gillnet fishery that reduced nominal gillnet-fishing capacity and led to a restructuring of the fishing fleet. In April 1991, the length of nets in the fishery was further reduced by 30%. Controls on the longline fishery were introduced in 1994 through hook permits.

Following the introduction of ITQs as the major management control for school and gummy shark in 2001, input controls for the fishery were amended to remove previous hook restrictions and allow all permit holders to use up to 4200 m of gillnet. These changes have the potential to increase effort, but monitoring since 2001 has not shown a marked increase in gillnet effort—the reported levels of fishing effort since 2000 and 2001 are the lowest for the fishery in almost 20 years, with gillnet effort less than half the 1987 peak level of 99 000 km gillnet lifts. ITQs were introduced for sawshark and elephant fish in 2002. Quota can be traded across methods in the SESSF.

The total shark catch peaked at 4226 t (carcass weight) in 1987. Between 1970 and 2004, gummy shark comprised 50% of the catch from the fishery and school shark 36%; the remaining 14% comprised sawshark (7%), elephant fish (2%) and other species. From 1979 until the late 1980s, catches of school and gummy shark were similar. However, since that time school shark catches have contributed a decreasing proportion of the total catch, with management measures limiting their take in recent years.

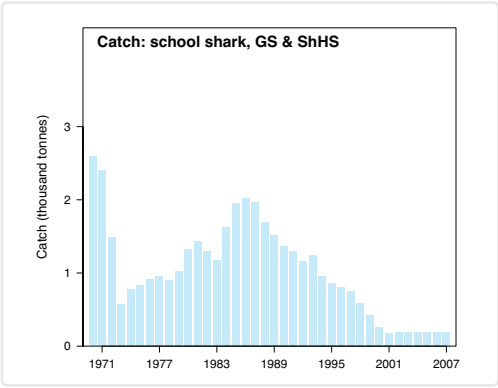
The catch of school shark by gillnet and hook exceeded 2500 t in 1970 and 2000 t in 1986, but declined to 419 t in 1999 and 253 t in 2000. The peak gummy shark catch of 2300 t was taken in 1993; catches have since varied between about 1500 t and 1800 t. Recorded catches of other species increased from an average of 235 t in the 1970s to 572 t in the 1990s, and totalled 344 t in 2004. Sawshark catches peaked in 1995 at 359 t; in 2004 the catch was 187 t. Reported elephant fish catches peaked at 118 t in 1985 but have been around 40–70 t since then (the 2004 catch was 35 t).

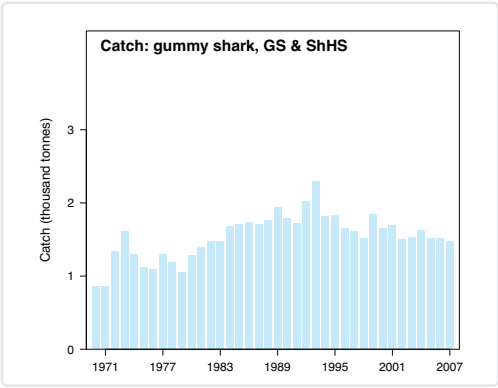
The total reported shark catch in the shark gillnet and hook sectors was 2099 t in 2003 and 2013 t in 2004, with over 90% taken by gillnet. The 2005 shark catch declined to 1937 t. Gillnet effort in 2003 and 2004 was 45 000 km lifts and declined to 41 000 km lifts in 2005. Hook effort was 409 000 hook lifts in 2003 but has subsequently declined to around 300 000 hook lifts per year.

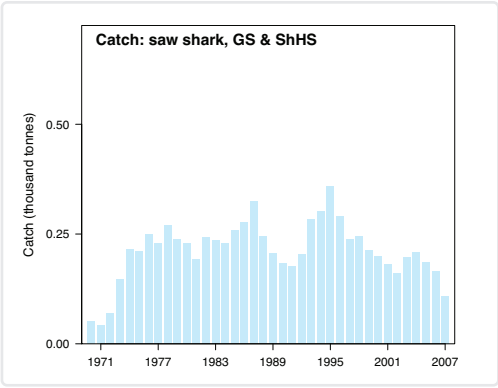
Biology

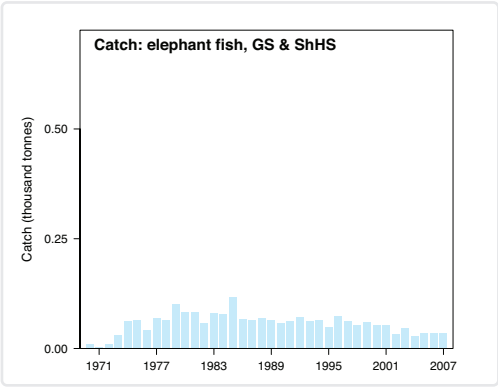
Sharks typically give birth to small numbers of well-developed young, unlike bony fish and invertebrates, which produce large numbers of eggs, relatively few of which survive. Because of the close relationship between the number of young produced and the number of adults, sharks are unlikely to have very large annual variations in recruitment levels. Sharks also tend to be more susceptible to overfishing than scalefish and invertebrates because they are commonly long-lived and often mature at a later age.

School shark move extensively throughout the waters of southern Australia, probably forming a single genetic stock within the fishery and Western Australian waters. The same species is found on the continental shelves around New Zealand and off western Europe, the east coast of South America, the west coast of North America and southern Africa. A total of 26 school sharks tagged in New Zealand have been recaptured off southern Australia, and 10 tagged off southern Australia have been recaptured









in New Zealand. However, statistically significant genetic differences have been found between school shark from Australia and New Zealand. School shark can live for more than 50 years. The females first pup at about 10–12 years and bear between 15 and 43 young. Archival tags placed on school sharks have revealed important information about behaviour, including regular daily movements (individuals remain at depths of over 500 m during the day and move to depths of less than 100 m at night).

Gummy shark are endemic to the temperate waters of the continental shelf and slope off southern Australia. They move less than school shark between regions across the fishery, and no well-defined movement patterns have been detected. Gummy shark live for around 16 years; females mature at about 5 years and, depending on size, may carry from 1 to 38 young at a time.

The fishery takes two species of sawshark: the common sawshark and southern sawshark. Both species occur in Bass Strait and around Tasmania, but the full extent of their distribution is not known. Common sawshark have been found from southern New South Wales around the southern Australian coastline to south-western Western Australia. They grow to at least 134 cm, and males mature at around 97 cm. Southern sawshark have been found from eastern Victoria to the western Great Australian Bight. They grow to at least 99 cm, and males are mature by 90 cm. Both species produce live young from eggs that mature internally. Common sawshark is more common in the catches from Bass Strait, whereas southern sawshark predominates in the Great Australian Bight.

Elephant fish are distributed on the continental shelf in depths to at least 200 m in southern waters from Sydney in New South Wales to Esperance in southern Western Australia. Elephant fish grow to about 120 cm, and males mature at about 65 cm. They lay eggs that take up to 8 months to hatch.

The 2007 fishery

AFMA sets 'global' total allowable catches (TACs) for gummy shark, school shark, sawshark and elephant fish that apply across all sectors of the SESSF. Total shark catch in the shark hook and gillnet sectors of the SESSF was 1918 t in 2006 and 2031 t in 2007. Some catches of school and gummy shark are also taken in fisheries off New South Wales and Western Australia. Those catches are accounted for in assessments: the gummy shark catches are not included in the global TAC, whereas school shark catches in Western Australia are included.

In 2007, the global TAC for school shark was 240 t, of which Commonwealth fishers were allocated 213 t. Reported 2007 Commonwealth catch was 206 t, of which about 194 t was taken by shark hook and gillnet, and 12 t by the trawl fisheries. The global school shark TAC for 2008 was again set at 240 t, in line with the agreed harvest strategy.

The global TAC for gummy shark has been set at 1800 t for several years and remained at that level for 2007 and 2008. Commonwealth fishers were allocated 1708 t in 2007, of which 1677 t was caught (about 1555 t by shark hook and gillnet and 122 t by the trawl fisheries).

Catches of sawshark and elephant fish have been relatively stable for several years. The 2007 global quota for sawshark was 312 t, with 237 t caught. The 2007 global quota for elephant fish was 94 t, with 68 t caught. Significant quantities were taken in the trawl sectors as well as the shark hook and gillnet sectors.

Quota has been allocated via annual permits; however, after the resolution of legal challenges to the quota allocation formula, it is expected that SFRs will be granted from the 2008–09 fishing season. The buyout of fishing effort resulting from the government's *Securing our Fishing Future* package has removed 26 gillnet boat SFRs from the fishery (leaving 62) and 17 shark hook boat SFRs (leaving 13).

Current monitoring and research

Catches have been recorded in logbooks virtually since the fishery began in the mid-1920s, but data on fishing effort were not collected systematically until the 1960s. Those data have been collected by the fisheries agencies of Victoria, Tasmania and South Australia, and have been maintained in a central database by Primary Industries Research, Victoria. From 1 July 1997, a single Australian Government logbook was used in the Southern Shark Fishery, with data maintained in a central database by AFMA. Since 1970, details of species, sex-frequency and length-frequency composition have been obtained from the Southern Shark Fishery, and length-at-age data have been collected intermittently. In addition, the SESSF Integrated Scientific Monitoring Program (ISMP), which has been extended to the gillnet sector, provides valuable information.

Research for the fishery is coordinated by the Shark Resource Assessment Group (SharkRAG), which provides updated models of population dynamics and assessment advice, including information on which to base recommendations for ITQ controls. The group has recently updated school and gummy shark assessments and undertaken research on the status of sawshark and elephant fish. Bycatch action plans and strategic assessments have been developed for the fishery.

A current high priority for research is the development of an index of abundance for school shark using survey methods. Before output controls were introduced, SharkRAG advised that the introduction would affect the reliability of catch rates recorded in logbooks, and therefore the reliability of indices of abundance, leading to increased uncertainty in assessments. An industry-based gillnetting survey with fixed-station sampling was initiated to help overcome the problem. Pilot surveys off South Australia and in Bass Strait in late 1998 indicated that abundance indices with similar precision to those from marine

research surveys could be obtained. Since then, several other attempts have been made to establish a program of industry-based surveys, but there has been no success in developing a time series of information on relative abundance from such surveys. A program to supply information for use in assessment to supplement the catch-and-effort information from the fishery continues to be a high priority.

A new survey program, begun in 2007, involves industry vessels operating under scientific permits and using a range of mesh sizes. The data from previous surveys has been used for determining the location of fishing sites, and the survey program is continuing in 2008. The focus is on fishing known school shark areas to improve understanding of current status, but information on other species is also being collected (for example, biological information such as length-frequency data and vertebrae samples for the purpose of ageing).

Status of stocks

Previous assessments

Concerns over declines in catch per unit effort for this fishery were expressed as early as 1959. In the mid-1980s, the fishery was assessed as overfished and the managers agreed that fishing effort should be reduced to the 1982 level (when total catch was around 2800 t). Failure to cap fishing effort in subsequent years led to further depletion of the school shark stocks. Assessments made in 1991 and 1993 indicated that substantial reductions in catch were needed for both school shark and gummy shark.

Assessment of the status of school shark was the highest research priority in the 1990s. An assessment in 1991 indicated that the sustainable yield was 550 t and that the total biomass had been reduced to 10–25% of the initial level. Previous assessments had difficulties representing the differences among regions across the fishery. Detailed examination of catch-and-effort data to account for spatial variation across the fishery has been an important part of recent research.

An April 1996 assessment of school shark used a spatially aggregated population model that accounted for the peculiarities of school shark biology and gillnet selectivity, but did not account for shark movement. It was based on catch data up to and including 1994. An international review supported the general conclusions, but suggested improvements that were incorporated in a November 1996 revision. The biomass of mature school shark was estimated to be between 15% and 46% of the unfished level; the range reflected uncertainty about biological parameter values and the data used in their estimation.

After the April 1996 assessment, AFMA adopted a management objective for school shark: that, with an 80% probability, the biomass of mature shark would be greater in 2011 than in 1996. The November 1996 assessment indicated that this would require substantial reductions in catch. A schedule of TACs was devised to be phased in over several years to achieve the objective.

Since 1996, assessment models have been developed to consider explicitly the spatial structure of the fishery and account for movement patterns, including the movement of sharks between New Zealand and Australia. The approach allows for multiple stocks and movement patterns to better reflect the tagging data. It considers hypotheses related to stock structure, the validity of different data sources and the values adopted for the parameters of the model. A 1999 update estimated that the biomass of mature school shark in 1997 was between 12% and 18% of the 1927 level. A further update in 2001 was more pessimistic and indicated that rebuilding the stock to the 1996 level by 2011 would not be achievable with the planned quota levels. The biomass of mature shark was estimated to be between 9% and 14% of original levels. The TAC schedule was subsequently revised, and the target date changed to 2024. Global school shark TAC was 309.6 t in 2003 and 292.2 t in 2004.

The status of gummy shark, especially in Bass Strait, has been of less concern than that of school shark. A 1994 assessment concluded that the biomass of gummy shark in the strait was between 40% and 55% of the level before fishing began, and that recent catches had been sustainable. The assessment also indicated that recruitment of juveniles to the fishery in Bass Strait had been relatively stable for the previous 20 years, despite large changes in fishing effort over that period. The status of gummy shark in South Australia and Tasmania was less clear, but catches were considered to be sustainable.

An updated assessment of gummy shark in 2000 supported previous conclusions about the relative stability of recruitment, and suggested that catches were unlikely to be much larger than the historical average even if TACs were larger. Based on then current understanding of stock structure, the 2000 assessment treated gummy shark in Bass Strait, South Australia and Tasmania as separate populations; however, it did not suggest that they should be managed separately. Stock assessment using base-case parameters—considered to be most realistic—estimated that the production of gummy shark pups in Bass Strait in 1999 was 74% of the virgin level. In South Australia, pup production was estimated to be 76% of the virgin level. The stock status off Tasmania was less certain because of a lack of data, but it appeared comparable with that in Bass Strait and South Australia. No formal performance reference point has been adopted for gummy shark, although stabilising pup production above 40% of initial levels has been suggested.

2007 update

School shark

The global school shark TAC was set at 240 t for 2007, in line with the agreed harvest strategy. The strategy requires a constant TAC of 240 t from 2007 intended to bring about rebuilding by 2024. School shark continue to be assessed as overfished. The assessment is based on a sophisticated Tier 1 modelling approach; however, there is much uncertainty over the interpretation of logbook catch-and-effort data since 1997. It is likely that those data do not fully account for the reduction of targeting that has occurred since the regulation of mesh size in 1997 and the introduction and reduction of TACs since 2001.

Current data are insufficient to determine whether school shark are subject to overfishing or are rebuilding. A 2006 update of the 2001 assessment (incorporating 2000–2005 data) provided no evidence of an increase in the abundance of school shark since 2000, but there is some evidence that the biomass and pup production have stabilised. The level of pup production relative to pre-fishery (1927) levels is used as the major reference point of stock status. Pup production is estimated to be below 20% of the 1927 level; thus, the recommended biological catch (RBC) for the species is zero. Continuation of surveys begun in 2007 will be crucial to enable monitoring of recovery of the stock.

Gummy shark

Gummy shark catches from the gillnet sector have been relatively stable since 1972. A 2004 Tier 1 assessment including data to the end of 2003 gave lower estimates of pup production than those from the 2000 assessment, and indicated a slow decline since the 1980s. However, the 2004 estimates of pup levels remained above 40% of initial levels, and recruitment to the fishery remains stable over the long term. The assessment was updated in 2006 (using data to 2005). The base-case assessment (using assumptions that are seen to most likely represent the stock dynamics) indicated that pup production in 2005 was well above 48% of the 1927 level in Tasmania, between 40% and 48% in Bass Strait, and below 40% in South Australia.

The RBC from the assessment is calculated using simulations of future catch levels, assuming that the split among gear types will be the same as in 2006. The results

depend on the target biomass level and the biomass level at which the exploitation rate is reduced—that is, on a range of harvest strategies. The most optimistic of these is an RBC of 1632 t with a target pup production of 40% of the 1927 level, and with the exploitation rate being reduced when pup production falls below 40% of the 1927 level. This RBC does not include an allowance for trawl catches taken in waters off Western Australia and New South Wales by Commonwealth fishers (historically around 50 t per year).

Sawshark

Catch information for the two species of sawshark caught is not reported by individual species, complicating any assessment. There is also a lack of data on the length- and age-composition of historical catches. An initial assessment of sawshark conducted in 2004 suggested that pup production was around 30% of the 1950 level; however, SharkRAG considers the level of uncertainty in that assessment too high to be used in recommending a biological catch, and has instead used the Tier 4 approach adopted elsewhere in the SESSF (see the *Commonwealth trawl and scalefish-hook sectors* chapter). Based on catch information from 2002 to 2006, the RBC is 312 t. Stock status is rated as uncertain.

Elephant fish

There is also a lack of data on the length- and age-composition of historical catches for elephant fish. Reported catches are likely to be underestimated because of large catches by recreational fishers and discarding of elephant fish because of its low price. An initial assessment conducted in 2004 suggested that pup production was around 20% of the 1950 level. As for sawshark, SharkRAG considers the level of uncertainty in this assessment too high to provide RBC advice and has instead used the Tier 4 approach adopted elsewhere in the SESSF. Based on catch information from 2002 to 2006, the RBC is 94 t. Stock status is rated as uncertain.

Reliability of the assessment

The accuracy of reported catch-and-effort data for the fishery has been an ongoing issue. Catches of school shark were under-reported during the mid-1970s because of the ban due to mercury levels, and the fishing industry may later have over-reported catches in the belief that individual catch histories could influence allocations if TACs were introduced. The influence of changes in gear and fishing technology on effective fishing effort is not known. The level of detail in reporting of catch and effort has varied from state to state. Collation of the data requires the use of a correction factor for regions where the fins are removed from the carcasses, and for missing data on fishing effort and species composition of the catch. Also, data on catches by recreational anglers or as bycatch by other fisheries are either poor or not available.

There are significant uncertainties about the spatial structure of school shark and gummy shark populations. The gummy shark assessment model treats stocks in Bass Strait, South Australia and Tasmania separately; however, there is almost certainly a finer-scale population structure that cannot be examined because of the lack of fine-scale data. The assessment is very sensitive to assumptions about density-dependence and the effect of gear saturation, which is used to model the functional response between effort and catch. The updated school shark assessment, now accounting as far as possible for spatial structure, has resolved many of the deficiencies of previous assessments. Several deficiencies remain, including uncertainty arising from the complexity of modelling school shark movement, and potential problems in the use of catch-rate data (since the late 1990s, management has been designed to minimise targeting). As indicated above, there are questions about the interpretation of catch-and-effort data, especially for school shark, following the introduction of quotas. Fishery-independent data will be important in resolving this issue.

The assessment models are used to develop projections, which are used to predict whether various catch options could meet the management objective. The projections are much less certain than are the estimates of current biomass or current depletion.

Future assessment needs

Available biological information on sawshark and elephant fish has been collated, and there has been additional sampling at sea on commercial vessels. That work is essential for improving the assessments for those species. Several other projects have been identified as high priorities for research, some as a consequence of the introduction of ITQs. AFMA implemented a program of fixed-station surveys in 2002, but their cost resulted in fewer surveys being conducted than were planned. The initial design of the program was based on the minimum number of stations needed to provide reliable information. There are plans to begin a program of increased sampling in 2007, with industry involvement. Survey information is important to improving assessments across all species in the fishery, and in particular is essential when monitoring the effectiveness of strategies to rebuild the school shark stock.

After ITQs had been introduced, AFMA revised the input controls for the fishery. Monitoring fishing effort levels in the fishery and assessing the impact of that effort will continue to be an important research area.

Environmental issues

Catches are dominated by gummy and school shark. However, southern sawshark, common sawshark, elephant fish and other shark species constitute about 12% of the total catch. Most shark and scalefish species are marketed, and most discards—notably draughtboard shark (*Cephaloscyllium laticeps*) and Port Jackson shark (*Heterodontus portusjacksoni*)—are released live. Demersal gillnets also take small numbers of protected species, including seals, sea lions and great white shark (*Carcharodon carcharias*). Trigger limits have been implemented for non-quota shark species with the intention that, if the catch reaches the trigger level, there will be a detailed assessment of catch and other available data.

There is particular concern over interactions with Australian sea lions, which are listed as vulnerable under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The sea lion's high site fidelity and low dispersal means that animals lost from a colony are unlikely to be replaced by immigrants. The small colony sizes mean that the loss of just a few breeding females from a population can significantly reduce the long-term prospects of that population. An independent observer program was established in 2006 to provide information on sea lion interactions with this sector and review the adequacy of reporting in logbooks. In addition, a research project placed observers on vessels to monitor and develop risk assessments of the interaction of sea lions with the gillnet sector in South Australian waters. As a precautionary measure, closures were introduced in 2003 around the Pages Islands (the largest sea lion colony) and for school shark at the Head of Bight, but their value in protecting sea lion populations is unknown.

Research surveys of school shark nursery areas in eastern Tasmania and central Victoria in the early 1990s indicated a much lower abundance of pups than when the same areas were studied in the 1950s. Urbanisation near those areas and subsequent pollution and environmental degradation are likely to have affected pup abundance; therefore, the relative importance of the effects of fishing is not known.

Victoria has maintained a closure to targeted school and gummy shark fishing in its coastal waters (to 3 nm offshore) for more than 10 years, and Tasmania maintains closures in known nursery areas. AFMA held a workshop in May 2003 to identify additional areas that would afford protection

to school shark if closed. Several additional closures have since been adopted.

The Department of the Environment, Water, Heritage and the Arts is considering a nomination under the EPBC Act to list school shark as a vulnerable species, with a decision expected in late 2008. In March 2003, the then Minister for the Environment accredited the SESSF under the EPBC Act, and in December 2006 the SESSF was approved as a Wildlife Trade Operation for a further 3 years, subject to a number of conditions and recommendations that were intended to improve ecological sustainability.

A composite bycatch action plan for the SESSF was released in June 2007.

Further reading

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Management performance

The global gummy shark TAC has been set at 1800 t for several years. The Commonwealth-managed fisheries allowance for 2008 is 1717 t. This TAC is higher than the RBC derived from the 2006 assessment; however, SharkRAG advised that it considered future catches of around 1800 t to be sustainable, given overall knowledge of the species and the apparent stability of recruitment for more than 20 years. The RBC is lower still if the target reference level for pup production is set at 48% of the pre-fishing level, rather than the current 40%. While gummy shark are currently not overfished, recent assessments provide some indication of a slow decline in pup abundance since the 1980s. Monitoring pup abundance will be a high priority in coming years; proposed surveys using a range of gillnet mesh sizes should provide valuable information for monitoring abundance over time.

School shark are overfished, and quotas are intended to rebuild the mature biomass to above the 1996 level by 2024 (with an 80% probability). Closures have been introduced in some areas to protect mature females and juveniles. The target date for rebuilding was originally 2011, but an updated assessment suggested that the resource was more depleted and less productive than previously found and that rebuilding would take longer. The introduction of quotas has reduced targeted fishing of school sharks and thus has an impact on the interpretation of catch-rate data collected from the fishery. As an index of abundance, those data have been essential to school shark assessments. The low catch and catch rates of school shark in recent years will continue to produce pessimistic results from the current assessment model. Some level of school shark bycatch is inevitable when fishers are targeting gummy shark. The RBC for school shark is zero based on current assessment; however, AFMA has set a TAC of 240 t for 2008 as a bycatch quota, in line with the previously agreed harvest strategy. The extent to which recent declines in catch rate are a consequence of further stock decline—rather than of management initiatives that have changed industry practices away from targeting school shark—cannot be resolved at this stage, highlighting the importance of survey information to the future monitoring of status. There is likely to be some ongoing targeting of school shark. If stocks are recovering, there will also be increased interaction. It is possible that a sustainable and economically viable gummy shark fishery might thwart school shark from rebuilding to target levels recommended by the Harvest Strategy policy; however, it is important that adequate information is obtained to assess whether or not recovery to at least the limit reference level is occurring.