

2011 Stock Assessment Report for School Shark (*Galeorhinus galeus*)

Prepared by the Shark Resource Assessment Group (SharkRAG)

Stock Structure

School Shark is distributed around southern Australia mainly on the continental shelf and upper slope where they have been recorded from Moreton Bay (southern Queensland) to Perth (Western Australia), including Tasmania. They have been taken from the near shore zone to 550 m depth, mainly near the bottom, but at times occur in the pelagic zone and well offshore. Genetic studies suggest there are six genetically isolated populations of school shark around the world. Tag studies provide evidence of some mixing between southern Australia and New Zealand, but genetic studies suggest these populations are not inter-breeding. The behaviour of SharkRAG's assessment models supports the existence of some regional stock structure. SharkRAG's agreed assessment model assumes two stocks because insufficient data exist to support more complex stock structures.

Biological indicators

Biological productivity:	Low
Trophic level:	4 (Scale: planktivorous whale shark 1, top predator white shark 5)
Associated species:	School shark is taken as an incidental bycatch when targeting Gummy Shark with gillnets, and of trawling and longline fishing.
Percentage of gillnet catch targeted:	Low
Percentage of otter trawl catch targeted:	Negligible
Suggested environmental drivers:	Not examined. Moon phase & water temp. affect catch rates.

Recent catch history

	2004	2005	2006	2007	2008	2009	2010	2011
Agreed TAC (Global) (t)	292.2	274.8	228	352	240	240	216	176
Calculated RBC (t)				0	0	0	0	0
Actual C'wealth TAC (t)	327	243	228	360	263	255	233	176
Actual State TAC (t)	na	na	29.4	27.7				
GHATF catch (t)	174	199	209	196	234	239	178	173
Trawl catch (SETF & GABTF) (t)	14	10	27	12	13	19	19	18
Estimated GHATF discards (t)	na	na	na					
Estimated trawl discards (t)	0	1	2					
% trawl discards	1	17	4					
State catch (t)	13	15	na	?				
Total catch (t)	188	211	238	208 +	247+	258+	197	191*

* 2011 figures still incomplete

The above catches are those reported on catch disposal records and are from calendar year periods. Additional catch was taken off Western Australia outside the SESSF; these were 11, 18, 17, 15, 4, 9 and 13 t during 2002-2008, respectively. GHATF discard rates have not been monitored, but as the stock increases these are also likely to increase.

In contrast to Gummy Shark (*Mustelus antarcticus*), if fisheries management were to permit, School Sharks can be targeted throughout their life-cycle with hooks and gillnets. From the mid-1920s to the early 1970s,

School Shark was targeted by demersal longline in southern Australia, and Gummy Shark was taken mostly as byproduct. Catches from the SESSF are thought to have peaked around 2500 t per annum during the 1960s before declining and then rising to another peak of around 2000 t per annum in the late 1980s. Monofilament gillnets, which are more effective than the shark longlines at catching gummy sharks, were introduced first in 1964, but it was not until the early 1970s that gillnets replaced longlines as the preferred fishing method. This change was in part caused by a ban on the sale of large school shark during 1972–85 in Victoria because the mercury content of the meat exceeded the former health standard (subsequently revised upwards). With the adoption of gillnets the core of the GHATF through Bass Strait effectively became a small mesh (6-6.5 inch) fishery for Gummy Shark which only opportunistically targeted school shark. At the margins of the GHATF in western SA and southwestern Tasmania where local stocks were less depleted the targeting of school shark persisted with larger mesh sizes (7-8 inch) until smaller mesh sizes (6-6.5 inch) were regulated throughout the fishery in 1997, and the ITQ system was implemented in 2001 with a 350t TAC. School shark have also been taken as byproduct in the CTS and GABTS sectors, although this catch has been covered by the SESSF quota since 2001.

SharkRAG's assessments (since 1991) have consistently estimated that the School Shark population is below 20% of pristine levels (the SESSF HSF limit reference point). SharkRAG's recommendation in 2001 was to step the initial 350t TAC down to the level estimated to be the unavoidable incidental catch of the gummy shark fishery (240t) over 5 years. The management measures implemented by AFMA since the mid-1990s has aimed to stop all targeting of school shark and has reduced school shark catches from around 800t per annum in the mid-1990s to the current level of around 200t, within a 240t TAC. School shark is now mostly taken as incidental bycatch when targeting gummy shark. In the 2011 season AFMA implemented a 20% rule that limited school shark catches by individual operators to 20% of their Gummy Shark catch. This rule was implemented after extensive analysis of the catch data and was designed to ensure there was no targeting of school sharks.

Extensive closures to gillnetting have also been implemented since 2000 closing areas in Spencer Gulf, St Vincents Gulf, the head of the Great Australian Bight and west coast of Tasmania which were historically used to target adult School Sharks. Those areas complemented pre-existing closures to shark fishing within 3 miles off Victoria and inside all Victorian bays and inlets, and the inshore nursery areas of Tasmania which have been in place since the 1980s. Further closures were implemented in 2007 outside 183 m to shark gillnets and shark longlines and inside 183 m to auto-longliners were also aimed at reducing the bycatch of long lived mature age classes of school shark. In 2009 further closures around 150+ SA islands aimed primarily at reducing interactions with Australian sea-lions also closed >100 sq. nm of shallow water where adult school sharks were formerly targeted seasonally. In 2010 these sea lion closures were expanded, and an area off the Coorong closed because of dolphin interactions. The recent closure of the small mesh scalefish fishery in Corner Inlet in Victoria will also provide further protection to a formerly important school shark pupping area.

2011 assessment

School shark has a long history of assessment that has been documented in previous species summaries. In summary, the results of the most recent assessment (2009) were consistent with SharkRAG's previous assessments. The current biomass was estimated to be between 8-17% of pristine levels, well below the limit reference point of 20%. However for the first time the assessment clearly suggested that adult biomass levels have been stabilized by management measures implemented since the 1990s. Most sensitivity tests suggested that the School Shark resource is recovering at present catch levels, but some indicated that it is still in decline. However, given the long-lived nature of the species and the low levels of data now being gathered it is not yet possible to determine whether a rebuild has commenced.

The 2009 assessment's estimate of the stock's intrinsic productivity (MSYR) remains highly uncertain and very low. The default rate of rebuild suggested in the Commonwealth Fisheries Harvest Strategy Policy is that the rebuild back to the limit reference point (20% of pristine), and from the limit reference point to the target reference point (48%), should each occur within one generation and 10 years, which SharkRAG estimates to be 32 years for School Shark. Current projections suggest that to rebuild the stock back to 20%

of pristine pup production within 32 years catches of 26t or less are required. However, as noted the intrinsic productivity of the stock remains highly uncertain.

The stock assessment was not updated in 2010 or 2011, but the majority of SharkRAG members considers that the stock remains below the limit reference point of 20% of unfished levels.

Recommended Tier Level

School shark is assessed against the Tier 1 harvest control rule (HCR1).

RBC calculation

The stock remains well below the Limit Reference Point of 20% of pristine levels so the RBC is zero. SharkRAG recommended that the unavoidable bycatch level be set at 176 t, the same as last year. SharkRAG recommended no carryover of overcatch or undercatch.

Additional comments from the RAG

- SharkRAG does not believe that the current TAC (176 t) is going to move the stock to its target reference point in the required time-frame; and considers the rebuilding time-frame for school shark under the Commonwealth Fisheries Harvest Strategy Policy is unrealistic given the biology of this species and its longevity.
- SharkRAG reiterated its previous advice that it considers further TAC reductions alone are likely to start driving discarding, which while giving the appearance of a successful outcome in terms of landed catch this will not do enough to reduce fishing mortality.
- A number of SharkRAG members continue to consider that the current model is overly pessimistic.
- SharkRAG continues to recommend the need to develop an independent index of abundance for this species to enable a more accurate determination of the trend in stock abundance.