

Smooth Hammerhead, *Sphyrna zygaena*

Report Card assessment	Sustainable		
IUCN Red List Australian Assessment	Near Threatened	IUCN Red List Global Assessment	Vulnerable
Assessors	Simpfendorfer, C., Gaibor, N., Soldo, A., Heupel, M.R., Smith, W.D., Stevens, J.D. & Vooren, C.M.		
Report Card Remarks	In Australia, severe declines in NSW but stable in the remainder of Australian range		

Summary

The Smooth Hammerhead is one of the larger hammerhead sharks and is distributed worldwide. The fins are highly valued and the species is caught with a wide variety of gears in both coastal and oceanic fisheries, as bycatch and a target. There is limited data on the species' life history, though it is presumably at least as biologically sensitive as the Scalloped Hammerhead. Species-specific data are often not available to assess population trends as hammerhead species are mostly grouped but hammerheads show dramatic population declines of >99% in some areas. On the basis of these estimated reductions in several locations and suspected declines in other areas, the species is assessed as globally Endangered (IUCN). In Australia, there are conflicting trends in the population between the east (declining) and west coasts (stable or increasing). Data from the New South Wales shark control program shows an approximate 85% decline in general hammerhead catch rates, while the species-specific catch data from the southwest coast gillnet fishery suggests the population is stable or increasing. When the population trend is weighted according to the relative size of NSW and the remainder of the Australian distribution, the total population decline in Australia over three generations is estimated to be 20%. Therefore, the Australian subpopulation is assessed as Near Threatened (IUCN) and Sustainable (SAFS).



Distribution

The Smooth Hammerhead occurs across the Atlantic, Indian and Pacific Oceans in temperate and tropical waters (Compagno 1984). In Australia, it is found from the Coral Sea (Queensland) south through New South Wales, Victoria, South Australia, Tasmania and Western Australia, as far north as the Monte Bello Islands (Last and Stevens 2009).

Stock structure and status

In Australia, data from the New South Wales shark control program shows an approximate 85% decline in hammerhead catch rate from 1973 to 2008. While this estimate was for all hammerhead species combined, Smooth Hammerhead is thought to make up the majority of the catch (Reid et al. 2011). The catch rates from gillnet fishing in southwestern Australia have shown stable or increasing levels over a 20-year period to 2010 suggesting a stable population in that region (Simpfendorfer 2014). Recent research indicates that there is significant stock structuring between the Atlantic and Indo-Pacific Oceans, and evidence for genetic structure within ocean basins (Testerman 2014).

Fisheries

The fins are highly valued and the species is caught with a variety of gears, including longlines, gillnets, purse seines and trawls (Bonfil 1994). In Australia, the New South Wales beach protection program catch of hammerheads (mostly Smooth Hammerhead) accounted for nearly 50% of the catch of 4,715 sharks in the period from 1972-1973 to 1989-1990 (Reid and Krough 1992). The large mesh nets used by shark control programs appear to be very efficient at catching hammerhead sharks, including Smooth Hammerhead, while catches are very low on the large baited lines used in some programs (Simpfendorfer 1993). The Smooth Hammerhead is also taken by the commercial line fishery and recreational game fishery off New South Wales (NSW) where combined hammerhead commercial catches have averaged ~3 t in the last five years. The Smooth Hammerhead is a minor byproduct of the West Australian gillnet fishery with 3-10 t taken per year, although the species appears not to be impacted by this low fishing pressure. In the Mediterranean, combined hammerhead catches have declined by 99% with the species virtually disappeared from the Mediterranean Sea since 1986 (Walker et al. 2005, Ferretti et al. 2008). In the northwest Atlantic, the Smooth Hammerhead was likely overfished since mid-1980s (Jiao et al. 2011).

Habitat and biology

The Smooth Hammerhead is coastal-pelagic and semi-oceanic to depths of 200 m (Ebert 2003). Maximum size is 370-400 cm total length (TL) (Compagno 1984). In Australia, males mature at approximately 250-260 cm TL and females at 265 cm TL (Stevens 1984). Litter sizes are between 20 and 49 pups (Stevens 1975). Age at maturity is estimated to be approximately 11 years for animals from Taiwan (Liu and Tsai 2011), and in the Atlantic Ocean, 15 years for females and 22 years for males (Clarke et al 2015). Maximum age is estimated as at least 24 years for males and 25 years for females (Rosa et al. 2015).

Longevity and maximum size	Longevity: at least 25 years Max size: 350-400 cm TL
Age and/or size at maturity (50%)	Males: ~15 years, ~250-260 cm TL Females: ~22 years, 265 cm TL

Link to IUCN Page: <http://www.iucnredlist.org/details/39388/0>

Link to page at Shark References: <http://www.shark-references.com/species/view/Sphyrna-zygaena>

References

- Bonfil, R. 1994. Overview of world elasmobranch fisheries. FAO Fisheries Technical Paper. FAO, Rome.
- Coelho, R., Fernandez-Carvalho, J., Amorim, S. and Santos, M.N. 2011. Age and growth of the smooth hammerhead shark, *Sphyrna zygaena*, in the Eastern Equatorial Atlantic Ocean, using vertebral sections. *Aquatic Living Resources* 24: 351-357.

- Clarke, S., Coelho, R., Francis, M., Kai, M., Kohin, S., Liu, K., Simpfendorfer, C., Tovar-Avila, J., Rigby, C., and Smart, J. 2015. Report of the Pacific shark life history expert panel workshop, 28-30 April 2015. Scientific Committee Eleventh Regular Session, WCPFC-SC11-2015/EB-IP-13.
- Compagno, L.J.V. 1984. Sharks of the World. An annotated and illustrated catalogue of shark species to date. Part II (Carcharhiniformes). Ebert, D.A. 2003. The sharks, rays and chimaeras of California. University of California Press.
- Ferretti, F., Myers, R.A., Serena, F. and Lotze, H.K. 2008. Loss of Large Predatory Sharks from the Mediterranean Sea. *Conservation Biology* 22: 952-964
- Jiao Y, Cortes E, Andrews K, Guo F. 2011. 2011. Poor-data and data-poor species stock assessment using a Bayesian hierarchical approach. *Ecological Applications* 21: 2691-2708.
- Last, P.R. and Stevens, J.D. 2009. Sharks and Rays of Australia, 2nd edition. CSIRO, Melbourne, Australia.
- Liu, K., and Tsai, W. 2011. Catch and life history parameters of pelagic sharks in the Northwestern Pacific. ISC Shark Working Group Workshop, 19-21 July 2011. ISC/11/SHARKWG-1/06.
- Reid, D.D. and Krough, M. 1992. Assessment of catches from protective shark meshing off New South Wales beaches between 1950 and 1990. *Australian Journal of Marine and Freshwater Research* 43: 283-296.
- Reid, D.D., Robbins, W.D., Peddemors, V.M. 2011. Decadal trends in shark catches and effort from the New South Wales, Australia, Shark Meshing Program 1950-2010. *Marine and Freshwater Research* 62: 676-693.
- Román-Verdesoto, M. and Orozco-Zöller, M. 2005. Inter-American Tropical Tuna Commission: Bycatches of Sharks in the tuna purse-seine fishery of the Eastern Pacific Ocean reported by observers of the IATTC, 1993-2004. Data Report 11. IATTC, La Jolla, California, USA.
- Rosa, D., Coelho, R., Fernandez de Carvalho, J., Ferreira, A., and Neves dos Santos, M. 2015. Age and growth of the smooth hammerhead shark, *Sphyrna zygaena*, in the Atlantic Ocean. ICCAT SCRS/2015/038.
- Simpfendorfer, C. 1993. The Queensland shark meshing program: analysis of the results from Townsville, North Queensland. In: J. Pepperell, J. West and P. Wood (eds), Shark Conservation. Proceedings of an International Workshop on the Conservation of Elasmobranchs held at Taronga Zoo, pp. 71-85. Sydney, Australia, February 24, 1991.
- Simpfendorfer, C.A. 2014. Information for the development of Non Detriment Findings for CITES listed sharks. A report to the Australian Department of the Environment. James Cook University.
- Stevens, J.D. 1975. Vertebral rings as a means of age determination in the blue shark (*Prionace glauca* L.). *Journal of the Marine Biological Association of the United Kingdom* 55: 657-665.
- Stevens, J.D. 1984. Biological observations on sharks caught by sports fishermen off New South Wales. *Australian Journal of Marine and Freshwater Research* 35: 573-590.
- Testerman, C.M. 2014. Molecular ecology of globally distributed sharks. Nova Southeastern University.
- Walker, P., Cavanagh, R.D., Ducrocq, M. and Fowler, S.L. 2005. Regional Overview. Northeast Atlantic (Including Mediterranean and Black Sea). In: S.L. Fowler, R.D. Cavanagh, M. Camhi, G.H. Burgess, G.M. Cailliet, S.V. Fordham, C.A. Simpfendorfer and J.A. Musick (eds), Sharks, Rays and Chimaeras: The Status of the Chondrichthyan Fishes, pp. 71-94. IUCN SSC Shark Specialist Group. IUCN, Gland, Switzerland and Cambridge, UK.