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James Woodhams and Cher Harte

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Department of Agriculture and Water Resources
GPO Box 858 Canberra ACT 2601
Telephone 1800 900 090
Web agriculture.gov.au

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Introduction

Background

In 1994, the ninth conference of parties to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) adopted a resolution on the status of international trade in shark species. The resolution called for a review of information on the global status of shark stocks and the impact of trade on those stocks. In 1999 the Food and Agriculture Organization (FAO) of the United Nations released the International Plan of Action for Conservation and Management of Sharks (IPOA–Sharks).

The IPOA–Sharks is a voluntary instrument that directs FAO member states to 'adopt a national plan of action for the conservation and management of shark stocks (NPOA–Sharks) if their vessels conduct directed fisheries for sharks or if their vessels regularly catch sharks in non-directed fisheries'. The IPOA–Sharks directs those states that implement an NPOA–Sharks to assess it regularly (at least every four years) to identify cost-effective strategies for increasing its effectiveness.

Australia developed its first NPOA–Sharks in 2004 (DAFF 2004). This drew on information in the first shark assessment report (DAFF 2001). The second shark assessment report incorporated catch and effort data to 2005–06 and management information up 2009 (Bensley et al. 2010). The second shark assessment report supported the development of the second NPOA–Sharks (DAFF 2012).

The Department of Agriculture and Water Resources commissioned this (the third) shark assessment report to inform the development of the next NPOA–Sharks. The 2018 shark assessment report builds on information provided in the 2001 and 2009 reports and provides updated information on:

- resource information, including shark catch, trade and stock status
- fisheries management and regulatory frameworks
- conservation and management arrangements.

Data and information

This shark assessment report has been prepared with the assistance of Australian, state and Northern Territory fisheries agencies and members of the Shark-Plan Representative Group (SRG). The SRG was established to oversee and report on implementation of the NPOA operational strategy. This shark assessment report incorporates publicly available information and data from each jurisdiction on shark catch and management. This report also includes trade data produced by the FAO and Australian Bureau of Statistics (ABS).

The 2018 shark assessment report focuses on data between 2006–07 and 2014–15. Every attempt has been made to ensure that these data are accurate at the time of publication.

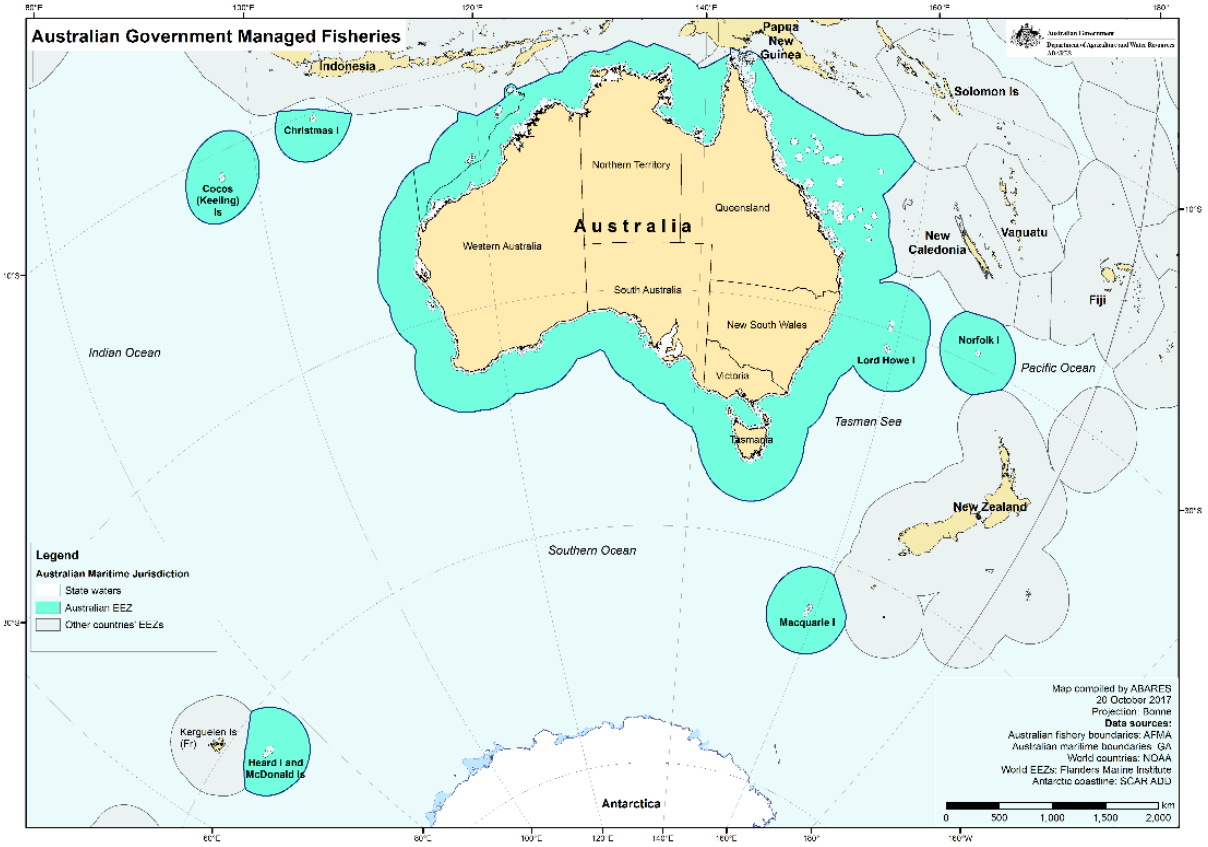
Much of the information presented in the 2001 and 2009 shark assessment reports remains unchanged and is not replicated in this report. This report uses standard Australian fish names.

Australian Fishing Zone

State and territory fisheries agencies generally manage fisheries out to 3 nautical miles, while the Australian Government manages fisheries in waters from 3 nautical miles out to 200 nautical miles. There are several exceptions to this general rule, with a number of Offshore Constitutional Settlement (OCS) arrangements established to manage fish stocks that occur in more than one marine jurisdiction. Under these OCS arrangements, fishing for a particular fish stock may be managed either through joint authority arrangements made between two or more jurisdictions or by transferring management of a straddling stock to a single jurisdiction. For example, under OCS arrangements, the Commonwealth manages commercial fishing for school shark (*Galeorhinus galeus*) and gummy shark (*Mustelus antarcticus*) stocks in coastal waters off south-eastern Australia on behalf of Victoria, South Australia and Tasmania.

This report principally considers data and information for fisheries operating within the Australian Fishing Zone (Map 1). Some information is also presented for straddling and/or high seas stocks.

Map 1 Australian Fishing Zone



1 Australian shark catch

Australia's waters contain at least 322 species of chondrichthyan fishes, including sharks (182 species), rays (125 species) and chimaeras (15 species) (Simpfendorfer et al. forthcoming).

Sharks are caught in fisheries in Commonwealth fisheries, all states and the Northern Territory. Commercial and non-commercial operations target a relatively small number of species. The majority (by number) of shark species caught in Australian fisheries are taken as either byproduct (some quantity is retained) or bycatch (not retained).

Fishing methods used to target sharks in Australia include line (demersal longline, setline, dropline, trotline, handline and rod and reel), net (demersal and pelagic gillnet), hand collection and drumline (set as part of bather protection programs). Some demersal trawl fisheries historically targeted deepwater sharks, but these operations are understood to have largely ceased. Sharks may also be taken by other fishing methods used to target other species, including mid-water trawl, haul seine net, purse seine net, mesh net and trap (both fish and crustacean trap).

Commercial fishing

Between 2006–07 and 2014–15 total commercial shark catch in Australia declined substantially (Table 1). In 2006–07 total commercial shark catch was around 9,057 tonnes, compared with around 5,750 tonnes in 2014–15. Catch in 2014–15 was also lower than levels reported in the 2009 shark assessment report (Bensley et al. 2010).

Ideally, catch trends would be considered in conjunction with effort data. However, a standardised unit of fishing effort cannot be practically applied at the national scale due to the range of fishing methods used and the broad spectrum of data collection protocols.

The processed state of catch recorded in logbooks and catch documentation schemes varies between fisheries. Common states include whole weight, trunked weight and gutted weight. Where possible, whole weight is presented in this report, but this is not always possible. Therefore, catch should be interpreted as trends rather than absolute values.

Table 1 Reported commercial shark catch, by jurisdiction, 2006–07 to 2014–15

Jurisdiction	2006–07 (tonnes)	2007–08 (tonnes)	2008–09 (tonnes)	2009–10 (tonnes)	2010–11 (tonnes)	2011–12 (tonnes)	2012–13 (tonnes)	2013–14 (tonnes)	2014–15 (tonnes)
Commonwealth **a**	3,969	4,316	3,959	3,714	3,692	3,344	3,555	3,446	3,597
New South Wales	747	602	314	356	330	321	273	247	205
Victoria	63	56	42	38	49	49	46	43	42
Queensland	1,672	1,417	1,289	899	702	582	551	585	592
South Australia	159	197	236	342	258	273	210	206	136
Western Australia	1,574	1,899	1,608	1,226	1,013	912	946	995	1,044
Tasmania	35	24	21	16	17	16	13	10	12
Northern Territory	838	822	885	665	853	795	442	127	123
Total b	**9,057**	**9,333**	**8,354**	**7,257**	**6,914**	**6,291**	**6,035**	**5,659**	**5,750**

a Commonwealth catch includes discards where data were available. **b** Reporting of catch by jurisdiction varies according to the state of processing. Some jurisdictions report whole weight; others report processed weight. This information should only be used to make indicative comparisons between years and jurisdictions.
Source: Data supplied by jurisdictions.

Species mix

The key species that make up catch vary for each jurisdiction. Total catch often comprises several species, but a relatively small number of species or species groups usually make up most of that catch. Table 2 presents the 10 species or species groups (including percentage of catch) which contribute most to the total reported catch by jurisdiction for 2006–07 to 2014–15. The contribution to total catch of a species or species group may vary slightly between years at the jurisdictional level.

Table 2 Top 10 shark species caught by jurisdiction, 2006–07 to 2014–15

Jurisdiction	Top 10 species by catch volume	Proportion of total catch (%)
Commonwealth	Gummy, school, sawshark (*Pristiophorus spp.*), ornate angelshark (*Squatina tergocellata*), common sawshark (*Ristiophorus cirratus*), elephantfish (*Callorhinchus milii*), shortfin mako (*Isurus oxyrinchus*), Australian angelshark (*Squatina australis*), platypus (mixed species) and broadnose shark (*Notorynchus cepedianus*).	85
New South Wales	Shovelnose rays (family Rhinobatidae), unspecified shark, gummy, fiddler rays (Trygonorrhina), angel shark (*Squatina spp)*, blacktip (Carcharhinus spp), sandbar (*C. plumbeus*), sawshark (*Pristiophorus spp.*), wobbegong (Orectolobidae) and bronze whaler (*C. brachyurus*).	78
Victoria	Gummy, skate, southern eagle ray (*Myliobatis australis*), elephantfish, angelshark, blue (*Prionace glauca*), school, bronze, seven gilled and unspecified shark.	97
Queensland	Unspecified whaler (Carcharhinus spp), Australian blacktip, hammerhead, blacktip, unspecified shark, spot-tail, scalloped hammerhead (*Sphyrna lewini*), pigeye and bullshark (grouped) and spinner shark (*Carcharhinus brevipinna*).	91
South Australia	Gummy, school, bronze and dusky whaler, wobbegong, port jackson (*Heterodontus portusjacksoni*), elephantfish, saw shark and other.	100
Western Australia	Gummy, bronze, whiskery (*Furgaleus macki*), sandbar, hammerhead, copper whaler, spinner, wobbegong, blacktip and pigeye.	94
Tasmania	Gummy, elephantfish, draughtboard (*Cephaloscyllium laticeps*), school, seven gilled (Hexanchidae), sawshark, thresher (Alopias spp.), mako (Isurus spp.), unspecified shark and wobbegong.	99
Northern Territory	Australian blacktip (*C. tilstoni*), hammerhead (Sphyrna spp.), spottail (*C. sorrah*), pigeye (*C. amboinensis),* bull (*C. leucas*), lemon (*Negaprion acutidens*), tiger (*Galeocerdo cuvier*), winghead (*Eusphyra blochii*), dusky and milk shark (*Rhizoprionodon acutus*).	99

Source: Data supplied by jurisdictions

Recreational fishing

Recreational shark catch is generally not well understood. This is largely the result of the inherent challenges associated with monitoring recreational fishers and recreational catch, the typically non-target nature of sharks within the broader recreational catch. There are also challenges associated with the identification of sharks.

Most jurisdictions conduct some form of survey of recreational anglers to capture a snapshot of activity. A survey methodology is typically selected based on the specific information needs of the jurisdiction. Most surveys collect at least some data on catch (for example, species or species

group, number or weight of fish and whether catch is retained or discarded) and effort (for example, time spent fishing, boat use in hours/days and distance travelled to fish).

Table 3 shows the most recent estimates of catch and release rates from jurisdictional surveys of recreational fishers. Recreational anglers operating only in Commonwealth waters are not specifically or separately surveyed. Therefore, any recreational angling activity in Commonwealth waters are likely to be reflected in the survey of the neighbouring state or territory survey.

Release rates for sharks in recreational fisheries are typically quite high. Relatively few species (as a proportion of the total number of species interacted with) are targeted and/or retained. Species commonly targeted and retained include elephant fish and gummy shark.

Table 3 Catch and release rates for sharks and rays taken by recreational fishers, by state/territory, 2000–01, 2009–10, 2012–13 and 2013–14

Jurisdiction	Number	Standard error	Release rate (%)	Survey year
New South Wales/Australian Capital Territory	108,938	19,326	95	2013–14
Victoria	89,423	20,585	82 **a**	2000–01
Queensland	193,000	28,000	96	2013–14
South Australia	37,694	na	57	2013–14
Western Australia	30,671	na	91	2013–14
Tasmania	38,614	5,033	76	2012–13
Northern Territory	27,738	3454	95 **b**	2009–10

a National release rate from survey - not specific to Victoria. **b** More recent estimates are available, but these are restricted to the broader Darwin area and are not territory wide. **na** Not available.
Sources: Giri & Hall (2015), Henry & Lyle (2003), Lyle, Stark & Tracy (2014), QDAF 2013–14, Ryan et al. (2015), West et al. (2012), West et al. (2015).

Indigenous shark fishing

Sharks and rays are an important resource for Indigenous Australians (Saunders & Carne 2010). Estimates of shark and ray catch by Indigenous Australians have not been updated since the 2009 shark assessment report.

Other shark catch

NSW Shark Meshing (Bather Protection) Program

Under the NSW Shark Meshing (Bather Protection) Program, nets are set at 51 beaches between Wollongong and Newcastle from September to April (inclusive) each year. Nets are set in 10 to 12 metres of water, typically within 500 metres of the shore. They are fitted with acoustic devices to deter dolphins and whales.

The NSW Government publishes an annual report on the program. In the 2015–16 meshing season, 748 entanglements with marine life were recorded—comprising 133 with target sharks and 615 with non-target marine life; 384 animals (51 per cent) were released alive (NSW Department of Primary Industries 2017).

Queensland Shark Control Program

The Queensland Government has had a shark control program in place since 1962. Under the program, nets and drumlines are used to minimise the threat of shark attacks on humans. Between 2001 and 2015 an average of 629 sharks per year were caught under the program (Queensland Government Department of Agriculture and Fisheries 2016). The main species/species groups are blacktip reef shark (*Carcharhinus melanopterus*), bull shark, spinner shark and tiger shark.

Western Australia

From January to April 2014 the WA Government trialled a shark drum lining program in metropolitan and Geographe Bay waters. Under the program, 199 sharks (mainly tiger sharks) were captured. Tiger sharks longer than 3 metres were euthanised. A single north-west blowfish was also caught during the trial (WA Department of Primary Industries 2014).

Post release mortality of sharks

A wide variety of shark species interact with commercial and recreational fishing gear with certain species and life history strategies being more susceptible to certain gear types. For example, relatively large, pelagic or highly migratory shark species are relatively more susceptible to pelagic longline gear, while relatively small demersal sharks, skates and rays are relatively more susceptible to demersal trawl gear. Fishers may land and sell some of these species, but few of these sharks are the primary target species of operations. Because these sharks are often discarded, it is important to understand post release mortality.

Some fishing methods, gear types and vessel types are more easily configured to study post release mortality (PRM). Further, the biology, behaviour and/or preferred habitats of some sharks make them relatively easier to study with regard to PRM than others. As a starting point, fishing methods that more frequently land live sharks are better candidates for studying how many of those sharks survive after release.

Some key elements of PRM are described below. A list of additional sources of further reading can be found on page 34.

Methods

Pop-up archival tags are one of the better methods available to directly estimate post release survival. These are typically attached to the shark on, or alongside the vessel and programmed to detach and transmit data after the death of the animal or when a specified amount of time is reached (for example, 30 days). If a tag detaches before the specified time, the shark is assumed to have died as a result of its interaction with the fishing gear. Tag detachment after the specified time is typically interpreted as the animal having survived its interaction with the fishing gear.

There are relatively few quantitative studies that measure the survival of sharks after release from commercial or recreational fishing using these methods. This is principally because this type of research is resource intensive (in costs, skills and time) and logistically difficult (in getting researchers and gear onto boats and deployed on target animals). The resource intensive nature of the research means that often few archival tags are deployed, influencing statistical power of the data from the tags recovered. As a result, non-tag methods are increasing in popularity. These principally use aspects of blood chemistry to detect stress levels of the shark and through this infer the likelihood of survival post release.

Indications from recent research-line gears

Research indicates that hook type (for example, j-hook or circle hook) and hooking location (mouth/jaw/gut/tail) are important determinants of PRM (Curruthers, Schnieider & Neilson 2009). Sharks hooked in the mouth or jaw (typically by circle hooks) have a better chance of survival, provided minimal damage is done during removal of the hook and/or releasing the animal from the gear. Conversely, sharks hooked in the gills, gut or tail (typically by j-hooks) have a relatively poorer chance of survival. Time on the line may also be an important indicator of likelihood of survival post release. For some species (but not all), the longer the time on line, the poorer the chance of survival post release (Barnes et al. 2016; Butcher et al. 2015; WCPFC 2017d).

Leader material may also contribute to post capture mortality. Sharks are often able to bite through monofilament lines. As a result, they spend less time on the line and are not subject to extended periods of restricted movement or any additional damage resulting from handling by fishers. Where a shark is cut free from the gear, with a length of leader material trailing from the hook, the length of leader material trailing from the animal may also influence long-term survival. Long leaders trailing from the hook can reduce chances of survival due to the drag caused by the trailing leader (WCPFC 2017d).

Indications from recent research—net gears

Sharks taken using demersal trawl gears generally exhibit lower survival rates than those taken with other gears (Eddy, Brill & Bernal 2016; Ellis, McCully-Phillips & Francois 2017). The Longer the trawl time and the larger the amount or weight of fish in the net, the poorer the chances are that sharks will survive.

The size of the shark relative to the rest of the fish (or crustaceans) in the net may also affect survival rates because crushing and restricted movement (and reduced ventilation) are primary causes of stress. Where the shark is substantially larger than the other animals in the net, it may experience less crushing (instead crushing the other contents of the net). Reduced ventilation remains an issue and one of the primary stressors on sharks taken by net gears is restricted movement. These phenomena are worse for sharks that rely on ram ventilation (they need to swim and have water passing over their gills to effectively respire).

Purse seine nets confine large quantities of fish in a restricted area. This is another key stressor for net-caught sharks because the concentration of fish reduces water oxygen levels—impairing effective respiration.

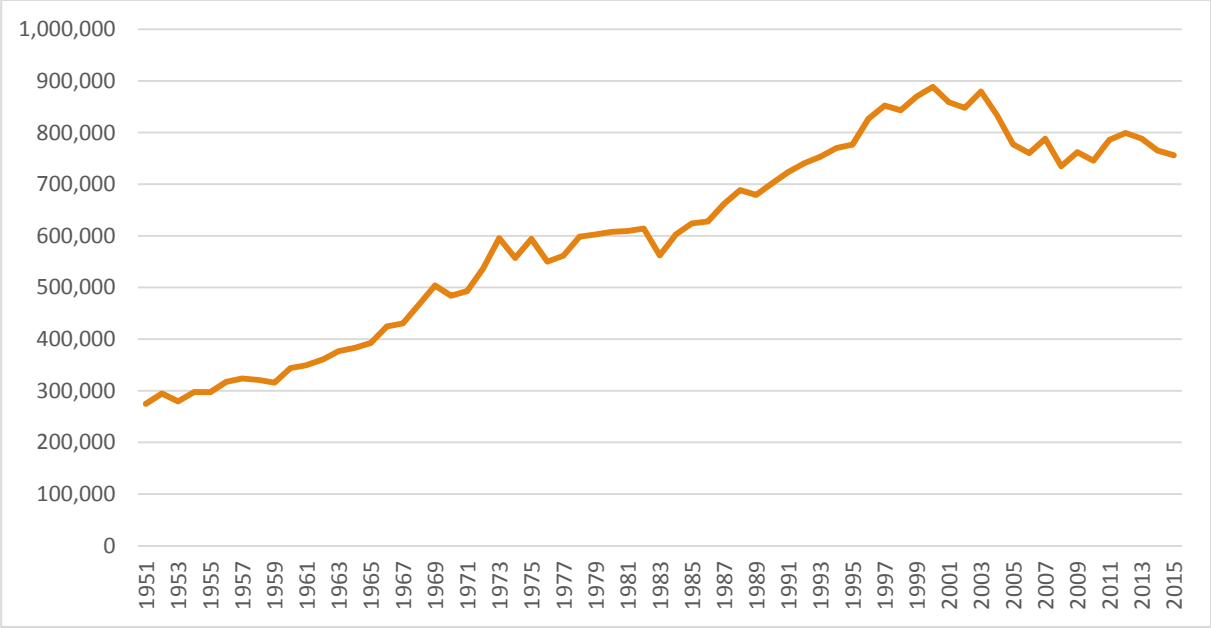
2 Shark production and trade

Global shark production

The Food and Agriculture Organization (FAO) of the United Nations publishes global shark capture data covering all species of chondrichthyans (FAO 2017). These data show a steady increase in reported shark capture since the 1950s (Figure 1). Catch appears to peak in the early 2000s, then follows a declining trend in more recent years, levelling out at around 750,000 tonnes per year.

Dent and Clarke (2015) report that the retention of shark meat for sale and subsequent consumption is gradually increasing and that the global trade in shark fin, a previous driver of increasing landings, has stabilised in recent years. These data may comprise mixed states of product (resulting from some level of processing), as well as some double counting of re-exported product.

Figure 1 Global shark catch, 1951 to 2015



Source: FAO 2017

Shark trade

This report draws on ABS fisheries trade data for 2005–06 to 2015–16 (supplied to ABARES on an annual basis to assist with various projects and analyses). These data contain quantity and value of shark products imported into, and exported from Australia. They also contain some information on product type, but are of limited value in terms of understanding the species that comprise this trade activity (Table 4). Further, interpretation of location within these statistics should be approached with some caution because re-exporting (where a product is imported, possibly processed and then re-exported) is common. The data show that Australia imports a significantly larger quantity of shark product than it exports.

Table 4 Trade codes for shark products

Code type	Trade code	Product description
Import	0302650024	Dogfish and other sharks, fresh or chilled (excluding fish fillets and other fish meat of 0304, livers and roes)
	0302810040	Fresh or chilled dogfish and other sharks (excluding fillets and other meat of HS 0304 and livers and roes)
	0303750019	Dogfish and other sharks, frozen (excluding fish fillets and other fish meat of 0304, livers and roes)
	0303810070	Frozen dogfish and other sharks (excluding fillets and other meat of HS 0304 and livers and roes)
	0305590025	Dried shark fins (excluding smoked)
	0305710091	Shark fins, dried, salted, in brine or smoked, whether or not cooked before or during the smoking process
Export	03026500	Dogfish and other sharks, fresh or chilled (excluding fish fillets, other fish meat, livers and roes)
	03037500	Dogfish, and other sharks, frozen (excluding fish fillets, other fish meat, livers and roes)
	03038100	Frozen dogfish and other sharks (excluding fillets and other meat of HS 0304 and livers and roes)
	03057100	Shark fins, dried, salted, in brine or smoked, whether or not cooked before or during the smoking process
Import and export	0304	Fish fillets and other fish meat (whether or not minced), fresh, chilled or frozen

Source: ABS

Exported shark product

From 2005–06 to 2015–16, Australia exported just over 268 tonnes of shark product (value approximately $1.1 million) (Table 5). The most important destination in terms of value was Hong Kong, while Taiwan was most important in terms of volume. Japan was the most important destination in terms of unit price, closely followed by Singapore.

Table 5 Export destination, value and volume

Country	Value ($)	Volume (kg)
Hong Kong	728,270	50,912
Singapore	103,296	2,000
Taiwan	91,574	109,569
Philippines	86,884	33,254
Malaysia	48,796	4,500
China	22,906	65,896
New Zealand	22,376	1,857
Japan	2,640	49
United States	496	50
Thailand	316	48
Total	**1,107,554**	**268,135**

Imported shark product

From 2005–06 to 2015–16, Australia imported a little over 5600 tonnes of shark product (value nearly $50 million) (Table 6). The majority, in value and volume, of imported shark product came from New Zealand.

Table 6 Import origin, value and quantity

Country	Value ($)	Volume (kg)
New Zealand	37,475,859	5,379,628
China	5,167,004	94,141
Hong Kong	2,733,326	21,845
Indonesia	1,300,299	16,790
Philippines	1,028,993	10,319
Singapore	963,189	5,690
Taiwan	307,344	43,662
Greece	280,543	46,469
Japan	169,313	667
Papua New Guinea	123,480	1,170
United States	51,375	270
Brazil	45,208	261
Fiji	37,549	3,170
Spain	31,189	290
Malaysia	13,119	1,400
Oman	11,684	32
Republic of Korea	11,254	2,352
Thailand	8,802	138
New Caledonia	6,153	48
Argentina	6,050	2,506
Uruguay	5,012	2,000
Vietnam	4,617	296
Pakistan	4,225	4
United Kingdom	3,800	111
Kyrgyzstan	1,520	214
Tonga	1,300	11
South Africa	1,027	320
Total	**49,793,234**	**5,633,804**

3 Stock status

Status determination

The Status of Australian Fish Stocks Reports provide the most comprehensive information on national status of sharks. The first report was published in 2012 (Flood et al. 2013) and reported status for around 70 per cent of total catch and 80 per cent of total value of wild capture fisheries in Australia in 2009–10. The second report covered around 85 per cent of total catch and 90 per cent of total value of wild capture fisheries in Australia in 2012–13 (Finn et al. 2015). The third and most recent edition of the report covered around 90 per cent of total catch and 90 per cent of total value of wild capture fisheries in Australia in 2015 (Stewardson et al. 2016).

The third edition reports on the status of 10 shark stocks across five species. Status for these stocks is provided in Table 7. Definitions for status are provided in Appendix. When published, Simpfendorfer et al. (forthcoming) is expected to provide a comprehensive assessment of the status of all sharks (excluding rays) in Australia using a similar approach.

Table 7 Shark stock status, 2016

Species	Stock	Jurisdiction	Status
Blacktip shark	East coast	Queensland, New South Wales	Sustainable
	Gulf of Carpentaria	Northern Territory, Queensland	Undefined
	North and west coast	Northern Territory, Western Australia	Sustainable
Dusky whaler	Western Australian	Commonwealth, South Australia, Western Australia	Transitional–recovering
	Eastern Australian	Commonwealth, New South Wales	Undefined
Gummy shark	Southern Australian	Commonwealth, New South Wales, Tasmania, Victoria, South Australia, Western Australia	Sustainable
	Eastern Australian	New South Wales	Undefined
Sandbar shark	Western Australian	Northern Territory, Western Australia	Transitional–recovering
	Eastern Australian	Queensland, New South Wales	Undefined
School shark	Southern Australian	Commonwealth, New South Wales, Tasmania, Victoria, South Australia, Western Australia	Overfished

Source: Stewardson et al. 2016

Straddling and/or highly migratory stocks

Several pelagic shark stocks are caught in association with Commonwealth managed tuna fisheries operating in Australian waters and on the high seas. This section summarises the latest assessment information for these stocks.

Pacific Ocean oceanic whitetip shark

In 2012, the Western & Central Pacific Fisheries Commission (WCPFC 2012) developed a new assessment for oceanic whitetip sharks (*Carcharhinus longimanus*) in the Pacific Ocean. This new modelling indicated that the stock was overfished and that overfishing was occurring—based on reference points associated with maximum sustainable yield (MSY). Management measures to reduce fishing mortality have been agreed under the Conservation and

Management Measure for Oceanic Whitetip Sharks (CMM 2011–04) and the WCPFC Scientific Committee (SC) has recommended avoiding capture as the best way to improve the status of the stock.

Pacific Ocean silky shark

In 2012, the WCPFC (2013) developed a new assessment for silky shark (*Carcharhinus falciformis*) in the Pacific Ocean. It found that silky sharks were overfished and that overfishing was occurring. The SC advised that the greatest impact on the stock is attributed to bycatch from the longline fishery, with significant impacts also from the purse seine fishery. The SC recommended the Commission consider measures directed at bycatch mitigation, as well as measures directed at targeted catch, such as from shark lines to improve the status of the silky shark population.

North Pacific shortfin mako

In 2015, the WCPFC (2015) conducted a new assessment for shortfin mako in the North Pacific. It found that the stock is data poor and that stock status could not be determined.

North Pacific blue shark

In 2017, the WCPFC completed a new assessment of blue shark in the North Pacific (WCPFC 2017a). It concluded that biomass was above MSY levels and that overfishing was not occurring.

Indian Ocean blue shark

The relationship between abundance, catch per unit effort and total catches over the past decade is uncertain. Three stock assessment models were applied to the blue shark resource in 2015. Two models produced similar results, suggesting that overfishing was occurring but that it was not yet overfished. The third suggested the stock was close to MSY levels and that overfishing was not occurring. A 'best case' model could not be selected by the SC so the results represented the range of plausible model runs (WCPFC 2016). The SC recommended that the Commission consider a precautionary approach to blue shark management by ensuring that future catches do not exceed current catches, that the stock should be closely monitored and that mechanisms need to be developed by the Commission to improve current statistics. Encouraging cooperating parties to comply with their recording and reporting requirements for sharks, so as to better inform scientific advice is seen as a priority.

Southern hemisphere porbeagle shark

In 2017, a new assessment was developed for porbeagle shark (*Lamna nasus*) in the Southern Hemisphere. The stock assessed covered the range of the species in the Southern Hemisphere and its occurrence in the areas of competence of the WCPFC, the Inter-American Tropical Tuna Commission (IATTC), the International Commission for the Conservation of Atlantic Tunas, the Indian Ocean Tuna Commission and the Commission for the Conservation of Southern Bluefin Tuna (WCPFC 2017b). This assessment used a risk-based approach and does not provide direct estimates of stock depletion. Fishing mortality for porbeagle is considered to be relatively low overall and the probability of it being under the three reference points defined in the assessment high or very high. The SC advised the Commission that the risk of porbeagle being subject to overfishing anywhere in the southern hemisphere was very low.

Pacific Ocean bigeye thresher shark

A new assessment was developed in 2017 which spans the entire Pacific Ocean (that is the WCPFC and IATTC areas of competence; WCPFC 2017c). This assessment uses a 'risk assessment' approach and does not provide direct estimates of stock depletion. Under this model bigeye thresher shark (*Alopias superciliosus*) mortality is estimated to be high overall, but total impacts from pelagic longlines are low. The SC recommended that the Commission take this assessment into consideration when developing management measures.

Risk assessment

Risk assessments are increasingly being used in Australia to identify shark species at risk from fishing activities (for example Hobday et al. 2007; Salini et al. 2007; Stobutzki et al. 2003; Walker et al. 2008). The risk assessment methodologies used across Australia vary in design, but all attempt to measure the likelihood and consequence of adverse impacts on shark stocks from fishing. In Queensland, key risk assessment publications include Pears et al. (2012), Tobin et al. (2010) and Zeller and Snape (2006). The Department of Primary Industries and Regions, South Australia, published a risk assessment for the Commercial Marine Scalefish Fishery (PIRSA 2011). All Commonwealth fisheries are assessed through a common methodology (described in Hobday et al. 2007).

4 Data collection, storage and analysis

Collection

All Australian commercial fisheries that catch shark employ some form of mandatory logbook system to record commercial catch and effort information. The level of information required varies between fisheries and jurisdictions. For target shark fisheries, logbooks usually provide for recording of catch at a species or species group level and effort according to a unit of gear deployed (for example, gillnet length, gillnet hours or hook hours). Verification of catch may also be undertaken upon landing to monitor catch against quota and support stock assessments. Generally speaking, the prevalence of non-species specific reporting (for example, use of family names) or generic reporting (for example, 'shark-unspecified') increases when the sharks caught are not primary the target species or are largely discarded.

Paper-based logbook returns completed by fishers are the principal data recording method used in most fisheries. Some jurisdictions are implementing electronic reporting procedures. Electronic submission of data enables almost real time collection, while at the same time potentially reducing data acquisition and processing costs.

Observer programs provide valuable information but are rarely designed specifically to capture data on shark catch or interactions. Several jurisdictions use observer programs (human or electronic) and other scientific research processes to validate logbook information and gather additional data. The Commonwealth has an observer program in operation in most of its fisheries, partly to validate logbook data, but also to collect information on bycatch, including interactions with threatened, endangered or protected (TEP) species. A number of other jurisdictions have observer or scientific programs in place to collect or validate some aspect of fishery data. The NT Government runs a collaborative shark tagging program with commercial fishers and the Queensland Government uses 'species of conservation interest logbooks'.

The use of vessel monitoring systems is mandated in all Commonwealth fisheries, as well as for some fisheries in Victoria, Queensland, South Australia, Western Australia and the Northern Territory. There is increasing use of electronic monitoring systems in Australian fisheries as the technologies used in these systems becomes more reliable and more able to collect necessary information.

The degree to which shark catch data are recorded and validated is dependent on the fishery and objectives of the monitoring programs in place. It is often not possible for observer programs to monitor all interactions.

Improved catch data in recent years has improved understanding of the total Australian shark catch. However, there remains scope for continued improvement in the resolution of reporting of sharks. This is evidenced by the use of generic or group codes detailed in Table 2.

Storage and accessibility

All jurisdictions store commercial catch data in databases that enable efficient access by the management agency and maintain the security and privacy of commercial information. However, data collected, data management and storage facilities differ—as do methods for data entry, quality control and analysis. These differences make consistent national reporting difficult. Most jurisdictions publish reports that summarise catch and effort data by fishery or gear type. These reports may or may not include shark catch to species level.

Analysis

Fishery or stock assessment advice is typically provided by expert-based and fishery-specific assessment groups. All jurisdictions have implemented consultative forums to provide government with management advice. Commonwealth-managed fisheries use advisory groups such as the Southern and Eastern Scalefish Resource Assessment Group (SESSFRAG) and Shark Resource Assessment Group (SharkRAG). Resource assessment groups are typically made up of scientific experts, fishery managers and fishing industry and other non-government representatives—including recreational fishing representatives and environmental non-governmental organisations. State and territory jurisdictions typically use a similar model for their advisory groups with similar membership. These groups are usually structured to allow for formal assessments (of stocks, species or management issues) to be undertaken out of session by the relevant experts and then brought into the stakeholder forum for discussion and the formulation of management advice. This advice is usually presented according to fishery level objectives and any agreed reference points.

5 Legislation and policy

Overarching domestic legislation, policy and processes

Environment Protection and Biodiversity Conservation Act 1999

The Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) is important for fisheries of all jurisdictions. It covers:

- listing and regulation of threatened, endangered or protected species
- preparation of recovery plans
- identification of key threatening processes and, where appropriate, development of threat abatement plans
- direction of assessment and export approval processes for all fisheries with an export component.

All Commonwealth fisheries are subject to independent assessment under the EPBC Act regardless of export assessment requirements. These assessments help to ensure the ecological sustainability of fisheries.

Australia's NPOA–Sharks

The *National Plan of Action for the Conservation and Management of Sharks 2012—Shark plan 2* (NPOA–Sharks) contains 38 actions to achieve the broader objectives of the plan. Not all actions apply equally to all jurisdictions, so the SRG developed an Operational Strategy to identify the actions each jurisdiction would pursue over the life of the plan. Each jurisdiction reports progress against the actions to the SRG. These reports are published on the Sharks page of the Department of Agriculture and Water Resources website.

National Shark Recovery Group

The National Shark Recovery Group (NSRG) advises the Australian Government Department of the Environment and Energy on the design and implementation of recovery plans for EPBC Act–listed shark species. NSRG membership comprises the Commonwealth, state and territory government agencies; Indigenous representatives; commercial fishing industry, conservation and recreational sector representatives; and scientific experts.

Australia's Oceans Policy

The Australian Government is guided by *Australia's Oceans Policy* (Environment Australia 1998) in its marine environment programs. The policy provides national coordination and consistency for marine planning and management, and allows for regional diversity. The Minister for the Environment and Energy is responsible for the policy.

Commercial fishing

All jurisdictions have fisheries management and conservation legislation that directs fisheries management arrangements for sharks (Table 8).

Table 8 Principal fisheries legislation and policy, Commonwealth, states and Northern Territory

Jurisdiction	Legislation	Policies, policy instruments and management processes
Commonwealth	*Fisheries Management Act 1991* *Fisheries Administration Act 1991* *Torres Strait Fisheries Act 1984* *Environment Protection and Biodiversity Conservation Act 1999* *Great Barrier Reef Marine Park Act 1975* *Maritime Powers Act 2013*	*Commonwealth Fisheries Harvest Strategy Policy and Guidelines* (2007) *Commonwealth Policy on Fisheries Bycatch* (2000) Ecosystem Based Fisheries Management Ministerial Direction 2005 Management advisory committees Resource assessment groups Other advisory groups (for example, on gulper sharks)
New South Wales	*Fisheries Management Act 1994* *Environmental Planning and Assessment Act 1979* *Threatened Species Conservation Act 1995*	Management advisory committees Fishery-specific management strategies Risk assessments
Victoria	*Fisheries Act 1995* *Flora and Fauna Guarantee Act 1988*	Fishery management plans
Queensland	*Fisheries Act 1994* Fisheries Regulation 2008 *Nature Conservation Act 1992* *Marine Parks Act 2004* *Great Barrier Reef Marine Park Act 1975*	Queensland Sustainable Fisheries Strategy 2017–2027 Established working groups
South Australia	*Fisheries Management Act 2007* Fisheries (General) Regulations 2000 *National Parks and Wildlife Conservation Act 1975* *Marine Parks Act 2007*	Fisheries Council Commercial Blue Crab Fishery draft management plan Commercial Giant Crab Fishery draft management plan GSV Prawn Fishery Management Plan
Western Australia	*Fish Resources Management Act 1994* Fish Resources Management Regulations 1995 *Wildlife Conservation Act 1950*	Management advisory committees
Tasmania	Fisheries (Scalefish) Rules 2015 Fisheries (General and Fees) Regulations 2016 *Living Marine Resources Management Act 1995*	Fishery advisory committees Scalefish Fishery Management Plan
Northern Territory	Northern Territory Fisheries Act 1988 Northern Territory Fisheries Regulations 1993 Territory Parks and Wildlife and Conservation Act 2006	Offshore Net and Line Fishery Management Advisory Committee Northern ONLF Licensee Committee Northern Territory Seafood Council Barramundi Fishery Management Plan Mud Crab Fishery Management Plan Spanish Mackerel Fishery Management Plan

Recreational fishing

All jurisdictions have controls in place to manage the recreational take of sharks. A summary of these controls can be found in Table 9.

Some form of recreational fishing licence is required in all jurisdictions except the Northern Territory. However, in some jurisdictions these licences are only required for specific activities (for example, Western Australia's recreational fishing from boat licence) and some licences may have little bearing on the management of sharks (for example, the Queensland Stocked Impoundment Permit Scheme).

Fish (including shark) caught recreationally cannot be sold or traded in any Australian jurisdiction.

Table 9 Shark controls for recreational anglers

Jurisdiction	Species or species group	Controls	Additional information
New South Wales	Wobbegong	Must be released	–
	All sharks	Possession limit of 5	–
	Tiger, mako, smooth hammerhead, whaler, blue shark	Possession limit of 1 of any of these species	–
	Great (*Sphyrna mokarran*) and scalloped hammerhead, grey nurse (*Carcharias taurus*), Herbsts nurse (*Odontaspis ferox*), whale (*Rhincodon typus*) and white shark (*Carcharodon carcharias*)	Protected by legislation; no take	Also applies to commercial fishing
	School shark	Min size 91 cm	–
Victoria	White and grey nurse sharks	Protected by legislation; no take	Also applies to commercial fishing
	Elephant fish	Possession limit of 1	–
	Gummy and/or school shark	Possession limit of 1; minimum size of 45 cm	–
	All other sharks	Possession limit of 1 per species; max 5 sharks per person	–
	Rays, skates and guitarfish	Possession limit of 1; max size of 1.5 m (wide); no take within 400 m of pier, jetty, wharf or breakwater; all to be landed whole	–
Queensland	Narrow (*Anoxypristis cuspidata*), dwarf (*P. clavata*), freshwater (*P. microdon*) and green sawfish (*P. zijsron*); white, grey nurse, speartooth sharks; manta ray (*Manta birostris* and *M. birostris*)	Protected by legislation; no take	Also applies to commercial fishing; shark identification guide available
	Grey nurse shark	Designated protected areas	Also applies to commercial fishing
	All sharks	Max size of 1.5 m; Possession limit of 1	–

Jurisdiction	Species or species group	Controls	Additional information
South Australia	White shark	Protected by legislation; no take	Also applies to commercial fishing
	School and gummy shark (combined)	Possession limit of 2; boat limit of 6 where 3 or more people in boat; minimum size limits also apply	–
	All sharks	Ban on use of wire trace ≥2 mm in conjunction with hook sized ≥12/0	In metropolitan areas ban on use of trace ≥1 mm and hooks with shank >56 mm or gape >23 mm
Western Australia	Whaler sharks (including dusky, bronze whaler, bull and tiger sharks)	Max size limit of 70 cm interdorsal fin length	Mitigates against consumption of heavy metals
	Narrow, dwarf, freshwater and green sawfish; grey nurse, white, speartooth, northern river and whale shark	Protected by legislation; no take	Also applies to commercial fishing
	Total possession limit on finfish	Maximum quantity of finfish limits that include shark	Limit total take of finfish
Tasmania	School and gummy shark	Minimum total length 75 cm (if headed and tailed 45 cm)	Also applies to commercial fishing
	School and gummy (combined)	Bag/possession limit of 2 school or gummy	Using graball net or setline
	Mako and blue shark	Bag limit of 1 of either; Possession limit of 2 of either	–
	Sharks and rays	Bag limit of 2; possession limit of 4; boat limit (all species) of 5	Licence restrictions for set lines, beach seine and graball nets
	White, basking (*Cetorhinus maximus*), grey nurse, whale and megamouth sharks (*Megachasma pelagios*)	Protected by legislation; no take	Also applies to commercial fishing
Northern Territory	All sharks	Possession limit of 3	Shark identification guides available
	Northern river (*Glyphis garricki*) and speartooth shark (*G. glyphis*), sawfish of the genus Pristis (except wide sawfish *Protogygia. pectinata*)	Protected by legislation; no take	Also applies to commercial fishing

Sharks protected by legislation

All jurisdictions have fisheries management and conservation legislation that establishes the authority and management frameworks to protect shark species of conservation or management concern. Legislative requirements may direct a management agency to implement certain measures (such as stock rebuilding strategies, catch limits or no-take restrictions) or to develop recovery plans.

Some species are listed in more than one jurisdiction due to a broad distribution and population status or threats to the species across jurisdictions. For example, the grey nurse shark is protected in six of Australia's eight jurisdictions. Table 10 shows Australian shark species protected under legislation and their conservation status by jurisdiction.

Table 10 Listed shark species by jurisdiction

Species or species group	Commonwealth	New South Wales	Northern Territory	Queensland	South Australia	Tasmania	Victoria	Western Australia
Basking shark	–	–	–	–	–	Protected	–	–
Dwarf sawfish	Vulnerable	–	No take	Protected	–	–	–	Protected
Freshwater sawfish	Vulnerable	–	No take	Protected	–	–	–	Protected
Great hammerhead	–	Vulnerable	–	–	–	–	–	–
Green sawfish	Vulnerable	Presumed extinct	No take	Protected	–	–	–	Protected
Grey nurse shark	East—critically endangered; west—vulnerable	Critically endangered	–	Protected	–	Protected	Threatened; protected aquatic biota	Protected
Maugean skate (*Zearaja maugeana*)	Endangered	–	–	–	–	Endangered	–	–
Megamouth shark	–	–	–	–	–	Protected	–	–
Narrow sawfish	–	–	–	Protected	–	–	–	Protected
Northern river shark	Endangered	–	No take	–	–	–	–	Protected
Sand tiger shark (*Odontaspis ferox*)	–	Protected	–	–	–	–	–	–
School shark	Conservation dependent	–	–	–	–	–	–	–
Scalloped hammerhead	–	Endangered	–	–	–	–	–	–
Speartooth shark	Critically endangered	–	No take	Protected	–	–	–	Protected
Whale shark	Vulnerable	–	–	–	–	Protected	–	Protected
White shark	Vulnerable	Vulnerable	–	Protected	Protected	Vulnerable	Threatened; protected aquatic biota	Protected

Species or species group	Commonwealth	New South Wales	Northern Territory	Queensland	South Australia	Tasmania	Victoria	Western Australia
Whaler shark (Family *Carcharhinidae*)	–	–	–	–	–	–	–	Protected over 70 cm inter-dorsal length
All sharks and rays	–	–	–	–	–	–	–	Commercially protected fish (fishery-specific exceptions)

6 International instruments and agreements

Australia shares responsibility for the management of straddling fish stocks with neighbouring countries in the Asia–Pacific, Indian Ocean and Southern Ocean regions. Australia engages in international fisheries issues bilaterally, regionally and globally—to promote more sustainable fisheries management practices worldwide and to achieve long-term and commercially viable access to regional migratory and straddling stocks for Australian fishers.

The Department of Agriculture and Water Resources develops policies and programs to address Australia's international rights and obligations, and represents Australia's interests in several international forums. These include:

- the Commission for the Conservation of Southern Bluefin Tuna (CCSBT),
- the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES),
- the Convention for the Conservation of Antarctic Living Marine Resources (CCAMLR),
- the Convention on the Conservation of Migratory Species of Wild Animals (CMS),
- the Food and Agriculture Organization of the United Nations (FAO),
- the Indian Ocean Tuna Commission (IOTC),
- the Southern Indian Ocean Fisheries Agreement (SIOFA),
- the South Pacific Regional Fisheries Management Organisation (SPRFMO),
- the Western and Central Pacific Fisheries Commission (WCPFC).

Convention on International Trade in Endangered Species of Wild Fauna and Flora

Australia is one of 183 countries party to the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). The CITES helps to ensure that international trade does not threaten species. It places species into one of three categories (appendixes) based on conservation status and risk from trade. Trade restrictions apply to each category.

CITES Appendix I lists species threatened with extinction that are, or may be, affected by trade. Trade in these species is usually prohibited.

CITES Appendix II lists species that are not currently threatened with extinction but might be if trade is not strictly controlled and monitored. The list may include some non-threatened species—to prevent threatened species from being traded under the guise of non-threatened species that are similar in appearance. Trade in these species must be covered by export and import permits.

CITES Appendix III lists species that any CITES party has identified as being subject to regulation in its jurisdiction to prevent or restrict exploitation and requires the cooperation of other countries to control trade. In Australia, these species are usually treated like a CITES Appendix II species—that is, they must be covered by export and import permits. CITES-listed shark species are provided in Table 11.

Table 11 Shark species covered by the Convention on International Trade in Endangered Species of Wild Fauna and Flora

Appendix I	Appendix II
Sawfishes (*Pristidae* spp. not included in Appendix II)	Basking shark, giant oceanic manta ray (*Manta birostris*), great hammerhead, porbeagle shark, oceanic whitetip shark, reef manta ray, scalloped hammerhead, smooth hammerhead (*S. zygaena*), white shark, whale shark, freshwater sawfish

International trade in listed species taken in Australian fisheries must be underpinned by an assessment of sustainability under national environmental legislation (the EPBC Act 1999). Assessments have been undertaken for the three hammerhead species, oceanic whitetip and porbeagle sharks taken in domestic fisheries. Appropriate harvest levels for the three hammerhead sharks have been determined. However, oceanic white tip and porbeagle sharks cannot be harvested for export in Australia.

Convention on the Conservation of Migratory Species of Wild Animals

The Convention on the Conservation of Migratory Species of Wild Animals (also known as the CMS or the Bonn Convention) is an international treaty conducted under the UN Environment Program. It aims to conserve terrestrial, marine and avian migratory species throughout their range. Under Article I(a):

> 'Migratory species' means the entire population or any geographically separate part of the population of any species or lower taxon of wild animals, a significant proportion of whose members cyclically and predictably cross one or more national jurisdictional boundaries.

Australia is a party to the CMS. Migratory species threatened with extinction are listed in CMS Appendix I. Migratory species that need or would significantly benefit from international cooperation are listed in CMS Appendix II.

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides that all species listed in CMS appendixes are to be listed as migratory species under the Act and therefore considered matters of national environmental significance. It is an offence under section 254 of the EPBC Act to kill, injure, take, trade, keep or move a member of a listed migratory or marine species in a Commonwealth area unless the action is covered by a permit issued by the Minister for the Environment and Energy or is otherwise exempt. Listed species are shown in

Table 12.

Table 12 Shark species covered by the Convention on the Conservation of Migratory Species of Wild Animals

Appendix I, Migratory species threatened with extinction	Appendix II, Migratory species that need or would significantly benefit from international cooperation
Angleshark, Atlantic devil ray (*Mobula hypostoma*), Basking shark (*Cetorhinus maximus*), Bentfin devil ray (*Mobula thurstoni*), Box ray (*Mobula tarapacana*), Common guitarfish (*Rhinobatos rhinobatos*) **a**, , Dwarf Sawfish, Giant devil ray (*Mobula mobular*), Giant oceanic manta ray (*Manta birostris*), Green Sawfish, Japanese devil ray (*Mobula japonica*), Largetooth Sawfish, Lesser Guinean devil ray (*Mobula rochebrunei*), Munks devil ray (*Mobula munkiana*), Narrow Sawfish, Pigmy devil ray (*Mobula eregoodtenkee*), Reef manta ray (*Manta alfredi*), Shortfin devil ray (*Mobula kuhlii*), Smalltooth Sawfish, Whale shark (*Rhincodon typus*), White shark (*Carcharodon carcharias*),	Angleshark, Atlantic devil ray (*Mobula hypostoma*), Basking shark, Bentfin devil ray, Bigeye thresher shark, Blue shark, Box ray, Common guitarfish, Common thresher shark (*A. vulpinus*), Dusky Shark, Dwarf Sawfish, Giant devil ray, Giant oceanic manta ray, Great hammerhead, Green Sawfish, Japanese devil ray, Largetooth Sawfish, Lesser Guinean devil ray, Longfin mako (*Irurus paucus*), Munks devil ray, Narrow Sawfish, Pelagic thresher shark (*A. pelagicus*), Pigmy devil ray, Porbeagle, Reef manta ray, Scalloped hammerhead, Shortfin devil ray, Shortfin mako, Silky shark, Smalltooth Sawfish, Spiny dogfish (*Squalus acanthias*) **b,** Whale shark, White shark, White-spotted wedgefish (*Rhynchobatus australiae*).

a, Listing applies to Mediterranean Sea population **b** Listing applies to northern hemisphere population.

Conclusion

This report addresses the sustainability and management of Australian shark stocks and will inform the development of the next Australian National Plan of Action for the Conservation and Management of Shark Stocks (NPOA–Sharks). The objective of the International Plan of Action for Conservation and Management of Sharks (IPOA–Sharks) is to ensure the conservation and management of sharks and their long-term sustainable use. The Food and Agriculture Organization (FAO) of the United Nations states that the goal of a shark plan is to:

1. ensure that shark catches from directed and non-directed fisheries are sustainable
2. assess threats to shark populations, determine and protect critical habitats and implement harvesting strategies consistent with the principles of biological sustainability and rational long-term economic use
3. identify and provide special attention, in particular to vulnerable or threatened shark stocks
4. improve and develop frameworks for establishing and coordinating effective consultation involving all stakeholders in research, management and educational initiatives within and between States
5. minimize unutilized incidental catches of sharks
6. contribute to the protection of biodiversity and ecosystem structure and function
7. minimize waste and discards from shark catches in accordance with article 7.2.2.(g) of the Code of Conduct for Responsible Fisheries (for example, requiring the retention of sharks from which fins are removed)
8. encourage full use of dead sharks
9. facilitate improved species-specific catch and landings data and monitoring of shark catches
10. facilitate the identification and reporting of species-specific biological and trade data.

These are largely incremental goals that focus on continual improvement. The information presented in this report establishes that these goals are actively being pursued in Australia.

Australia has very few commercial fisheries that target sharks. Most shark catch is the result of non-targeted fishing. The key species have been assessed with most being assessed as ‘sustainable’ (Stewardson et al. 2016). A small number of species or stocks are considered either overfished or depleted beyond desirable levels. However, most of these have been protected and management measures have been established to recover the species or stocks.

All jurisdictions have consultative forums that involve relevant stakeholders in the development of advice for management. Some roles within these forums require specific skill sets (such as the development and execution of statistical stock assessment models).

The bulk of shark catch in Australian fisheries is taken as bycatch or byproduct. No Australian jurisdiction condones the wastage of unwanted sharks taken in commercial fisheries and all implement some form of management or control aimed at minimising the take or wastage of sharks. The use of bycatch reduction devices and/or gear controls that reduce unwanted shark catch and wastage is widespread.

All Australian jurisdictions report at least some shark catch under non-species specific group or catch-all codes. Codes commonly used include 'other shark' or 'unspecified shark'. As such, all jurisdictions could improve the resolution of their catch data. However, the costs and benefits of increasing species resolution will always be a consideration for fisheries management.

The pool of knowledge on the biological characteristics of sharks in Australia continues to increase. Every year sees more investment in a better understanding of the marine environment and the factors influencing it (including fishing). Australia's 2012 NPOA—Sharks identified research priorities and future plans should continue this tradition.

Regular production of a shark assessment report and reporting associated with implementation of the NPOA–Sharks are important but resource-intensive aspects of shark management across Australia. The efficiency and effectiveness of these processes should be maximised to deliver on the goals of the IPOA–Sharks in a cost effective way.

The standard of Australian fisheries management processes is widely acknowledged to be high, and Australia can already show it has delivered against the goals of the IPOA–Sharks. However, the IPOA–Sharks and NPOA–Sharks are not considered to be primary drivers for Australia's management of shark stocks. Other jurisdictional, national and international practices and processes have a larger bearing on day-to-day shark management across Australia. An updated NPOA–Sharks should acknowledge existing processes and practices and focus on areas not already covered by day-to-day practices. An updated NPOA–Sharks should focus on areas where it can offer a point of difference and provide benefits.

Members of the SRG are most likely best placed to identify the focal points of the next NPOA. However, possible areas may include monitoring and data collection, research prioritisation, mutually beneficial research and improved coordination in the management of shared stocks.

Appendix: Status classes for Status of Australian Fish Stocks 2016

Status class	Definition
Sustainable	Biomass (or biomass proxy) is at a level sufficient to ensure that, on average, future levels of recruitment are adequate (that is, the stock is not recruitment overfished) and that fishing pressure is adequately controlled to avoid the stock becoming recruitment overfished.
Transitional recovering	Biomass is recruitment overfished, but management measures are in place to promote stock recovery, and recovery is occurring.
Transitional depleting	Biomass is not yet recruitment overfished, but fishing pressure is too high and moving the stock in the direction of becoming recruitment overfished.
Overfished	Spawning stock biomass has been reduced through catch, so that average recruitment levels are significantly reduced (that is, the stock is recruitment overfished). Current management is not adequate to recover the stock; or adequate management measures have been put in place but have not yet resulted in measurable improvements.
Environmentally limited	Spawning stock biomass has been reduced to the point where average recruitment levels are significantly reduced, primarily as a result of substantial environmental changes or disease outbreaks (that is, the stock is not recruitment overfished). Fisheries management has responded appropriately to the environmental change in productivity.
Undefined	Insufficient information exists to determine stock status.
Negligible	Catches by all fisheries are so low as to be considered negligible, and that inadequate information exists upon which to base a status classification.

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