

Blue lines indicate the area meeting the ISRA Criteria; dashed lines indicate the suggested buffer for use in the development of appropriate place-based conservation measures

COCKBURN SOUND ISRA

Australia and Southeast Indian Ocean Region

SUMMARY

Cockburn Sound is located south of Fremantle, Western Australia. This sheltered marine embayment is bounded by steep slopes of the surrounding banks, shoals, and shoreline to the north, south and west, while to the east, it is fringed by a gently sloping bank supporting extensive seagrass meadows. The area overlaps the Carnac Island (Perth) Key Biodiversity Area. Within this area there are: **threatened species** (e.g., Copper Shark *Carcharhinus brachyurus*); **reproductive areas** (Spinner Shark *Carcharhinus brevipinna*); and **feeding areas** (e.g., White Shark *Carcharodon carcharias*).

CRITERIA

Criterion A - Vulnerability; Sub-criterion C1 - Reproductive Areas; Sub-criterion C2 - Feeding Areas

— AUSTRALIA —

— 0-23 metres —

— 121.3 km² —





DESCRIPTION OF HABITAT

Cockburn Sound is located south of the Swan–Canning River mouth in Fremantle, Western Australia. This sheltered marine embayment has a relatively large, low gradient, deep central basin (17–23 metres depth) flanked by the relatively steep slopes of the surrounding banks, shoals, and shoreline to the north, south and west, while to the east it is fringed by a gently sloping bank supporting extensive seagrass meadows and organic rich silts in the deeper basin (CSMC 2022). Garden Island is located within the area and extends along the western side of Cockburn Sound, providing protection from prevailing winds and ocean swells (CSMC 2022).

This area overlaps with Carnac Island (Perth) Key Biodiversity Area (KBA 2025).

This Important Shark and Ray Area is benthic and pelagic and is delineated from inshore and surface waters (0 m) to 23 m based on the bathymetry of the area.

ISRA CRITERIA

CRITERION A – VULNERABILITY

Three Qualifying Species considered threatened with extinction according to the IUCN Red List of Threatened Species regularly occur in the area. These are the Vulnerable Spinner Shark (Rigby et al. 2020), Copper Shark (Huveneers et al. 2020), and White Shark (Rigby et al. 2022).

SUB-CRITERION C₁ – REPRODUCTIVE AREAS

Cockburn Sound is an important reproductive area for one shark species.

Fishery-independent research cruises aimed at tagging large sharks were conducted in this area between 2022 and 2024. A total of 279 Spinner Sharks were tagged, of which nine (3.2%) were neonates (<67.2 cm total length; TL) and 180 (64.5%) were young-of-the-year (YOY; <92.6 cm TL) (Species Distribution Modeling Project [SDMP] unpubl. data 2025). Size-at-birth of Spinner Sharks is 60–75 cm TL (Ebert et al. 2021). Additional information on the presence of pregnant females was not available from these surveys.

A comprehensive database of shark, ray, and chimaera occurrence across Western Australia (WA) using fisheries data has been compiled (SDMP unpubl. data 2025). Data were obtained from: (1) logbook and observer programs from the Australian Fisheries Management Authority (AFMA) and Department of Primary Industries and Regional Development (DPIRD) Western Australia, covering all commercial sectors, multiple gear types, and both targeted and incidental catch records; (2) biodiversity repositories including Global Biodiversity Information Facility (GBIF) and Ocean Biodiversity Information System (OBIS); (3) the Atlas of Living Australia (ALA) providing georeferenced species-level occurrence records from museums, research institutions, and citizen science, and where missing or erroneous coordinates and invalid, ambiguous, updated names, and outdated names were removed; (4) survey data that encompassed heterogeneous sources, including institutional surveys (DPIRD WA, Australian Ocean Data Network [AODN], Commonwealth Scientific and Industrial Research Organisation [CSIRO], and IMOS [Integrated Marine Observing System]); and (5) published and unpublished datasets sourced from academic researchers. Based on all sources, records of individuals with size estimate were plotted for the whole state showing that neonate and YOY Spinner Sharks are more commonly encountered in this area than other areas. Records from sources (1) and (4) in 2022, 2023, and 2024, support the occurrence of neonate and

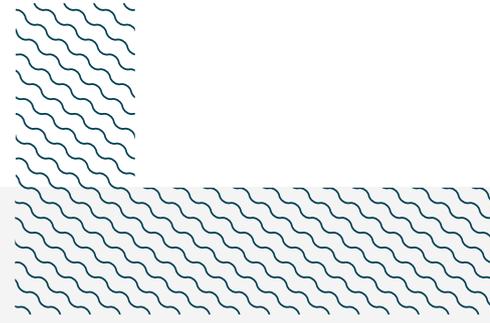
YOY Spinner Sharks in the area year-round and shows that the area is repeatedly used across years supporting the nursery area criteria of Heupel et al. (2007) (SDMP unpubl. data 2025).

SUB-CRITERION C2 - FEEDING AREAS

Cockburn Sound is an important feeding area for two shark species.

Cockburn Sound is a well-documented critical spawning ground for the Gilt-head Seabream *Chrysophrys auratus* with spawning aggregations in the area occurring between August and January, with a peak in November (Crisafulli et al. 2019). The seasonal increases in Gilt-head Seabream abundance have been consistently linked to increased presence of sharks (Mitchell et al. 2025). Copper Sharks and White Sharks have been detected in Cockburn Sound primarily during the Gilt-head Seabream spawning season (Jakobs & Braccini 2019), supporting the importance of this area as prey-driven habitat use.

Observations of both species actively feeding on Gilt-head Seabream aggregations were the first evidence that prompted DPIRD tagging surveys during this period (M Braccini pers. obs. 2025). Between 2009 and 2015, 46 tagged Copper Sharks and 64 tagged White Sharks were detected by the Shark Monitoring Network, which consisted of more than 183 acoustic receivers from Esperance to Ningaloo, Western Australia, along with 151 associated compatible receivers (McAuley et al. 2016). The highest number of Copper Sharks (n = 30; 65.2%) and White Sharks (n = 9; 14%) were detected within this area, and detection-day frequencies showed a similar pattern for both species (McAuley et al. 2016). Copper Sharks and White Sharks tagged with acoustic transmitters were recorded more frequently in Cockburn Sound, particularly during the Gilt-head Seabream spawning aggregation season, than in adjacent areas (McAuley et al. 2016).



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We acknowledge the Traditional Owners of Country throughout Australia and recognise the continuing connection to land, waters, and culture. We pay our respects to Elders past, present, and emerging.

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QUALIFYING SPECIES

Scientific Name	Common Name	IUCN Red List Category/ EPBC Act	Global Depth Range (m)	ISRA Criteria/Sub-criteria Met								
				A	B	C1	C2	C3	C4	C5	D1	D2
SHARKS												
<i>Carcharhinus brachyurus</i>	Copper Shark (Bronze Whaler)	VU	0-145	X			X					
<i>Carcharhinus brevipinna</i>	Spinner Shark	VU	0-200	X		X						
<i>Carcharodon carcharias</i>	White Shark	VU/VU*	0-1,277	X			X					

SUPPORTING SPECIES

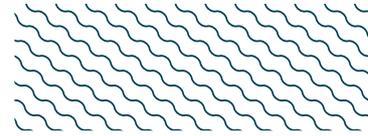
Scientific Name	Common Name	IUCN Red List Category
SHARKS		
<i>Carcharias taurus</i>	Sand Tiger Shark (Grey Nurse Shark)	CR
<i>Galeocerdo cuvier</i>	Tiger Shark	NT
<i>Heterodontus portusjacksoni</i>	Port Jackson Shark	LC
<i>Mustelus antarcticus</i>	Gummy Shark	LC
<i>Sphyrna lewini</i>	Scalloped Hammerhead	CR
<i>Sphyrna zygaena</i>	Smooth Hammerhead	VU
<i>Squalus acanthias</i>	Spiny Dogfish	VU
<i>Squatina australis</i>	Australian Angelshark	LC
<i>Sutorectus tentaculatus</i>	Cobbler Wobbegong	LC
<i>Zameus squamulosus</i>	Velvet Dogfish	LC
RAYS		
<i>Aptychotrema vincentiana</i>	Western Shovelnose Ray	LC
<i>Bathytoshia brevicaudata</i>	Smooth Stingray	LC
<i>Hypnos monopterygius</i>	Coffin Ray	LC
<i>Myliobatis tenuicaudatus</i>	Southern Eagle Ray	LC
<i>Rhynchobatus australiae</i>	Bottlenose Wedgefish	CR
<i>Trygonoptera personata</i>	Masked Stingaree	LC
<i>Trygonorrhina dumerilii</i>	Southern Fiddler Ray	LC
<i>Urolophus paucimaculatus</i>	Sparsely-Spotted Stingaree	LC

IUCN Red List of Threatened Species Categories are available by searching species names at www.iucnredlist.org Abbreviations refer to: CR, Critically Endangered; EN, Endangered; VU, Vulnerable; NT, Near Threatened; LC, Least Concern; DD, Data Deficient.

Australian Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) categories are available at: <https://www.dcceew.gov.au/environment/epbc/our-role/approved-lists> Abbreviations refer to: CR, Critically Endangered; EN, Endangered; VU, Vulnerable; CD, Conservation Dependent.



SUPPORTING INFORMATION



There are additional indications that this area may be important for one shark species.

Sand Tiger Shark movement patterns, shifting from Cockburn Sound to adjacent channels, coincide with Gilt-head Seabream movements (Harasti et al. 2015; Crisafulli et al. 2019). Between 2012 and 2014, two females (160 and 220 cm fork length; FL) and one male (200 cm FL) were acoustically tagged in this area ($n = 1$) and in southern Western Australia ($n = 2$) (Jakobs & Braccini 2019). Of these, two individuals (one female and one male) were detected post-release on an acoustic receiver network. The female was detected between October 2014 and May 2015. Most detections occurred between October and January, predominantly within Cockburn Sound. From February to May, detections were fewer and more dispersed outside Cockburn Sound. During October–January, this female Sand Tiger Shark exhibited a clear daily movement pattern within the Perth array, with detection frequency peaking during the day, particularly from late morning to early afternoon. This diel and seasonal pattern closely matches Gilt-head Seabream behaviour, which aggregates to spawn in Cockburn Sound between August and January (peaking in November) and shows increased daytime activity (Harasti et al. 2015; Crisafulli et al. 2019). Gilt-head Seabream are more active during the day, seeking shelter during the night in small caves and crevices (Harasti et al. 2015).



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