

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. Buffers for freshwater areas are determined based on hydroBASINS to capture watershed boundaries.

## ADELAIDE RIVER ISRA

### Australia and Southeast Indian Ocean Region

#### SUMMARY

Adelaide River is located in the Northern Territory, Australia. The area encompasses Adam Bay at the river mouth, the lower estuarine reaches, and extends inland to the Marrakai Road crossing in the river's mid reaches. It is characterised by muddy substrates, steep sloping banks, extremely turbid waters, and fringing vegetation ranging from mangroves to riparian monsoon forest. Adelaide River is a highly dynamic estuarine-riverine environment heavily influenced by a large tidal range and freshwater inflow during the wet season. Within the area there are: **threatened species** (e.g., Northern River Shark *Glyphis garricki*); **reproductive areas** (e.g., Largetooth Sawfish *Pristis pristis*); and **distinctive areas** (Speartooth Shark *Glyphis glyphis*).

#### CRITERIA

**Criterion A - Vulnerability; Sub-criterion C1 - Reproductive Areas; Sub-criterion D1 - Distinctiveness**

— AUSTRALIA —

— 0-30 metres —

— 81.78 km<sup>2</sup> —





## DESCRIPTION OF HABITAT

Adelaide River is located in the Northern Territory, Australia. The Adelaide River flows into Adam Bay within Van Diemen Gulf, a shallow semi-enclosed water body opening to the Timor Sea via two straits (one between the Cobourg Peninsula and Melville Island, and the other between Melville Island and Gunn Point which sits just west of Adam Bay). The Adelaide River catchment is 7,640 km<sup>2</sup> (NTG 2025). The area encompasses Adam Bay, the lower estuarine reaches, and extends inland to the Marrakai Road crossing in the river's mid reaches. The Adelaide River is a relatively deep and narrow river with steep sloping banks, and the river meanders heavily. Downstream habitats consist of muddy substrates but with limited areas of mudflats which are characteristic of many northern Australian rivers. Upper parts of the area are also dominated by muddy substrates with some rock bars. Vegetation is dominated by a diverse mangrove community transitioning to riparian monsoon forest in upper reaches of the area (Ball 1998). The area includes several small tributaries, namely Marrakai, Beatrice, and Kaissis creeks, and Manton River. Goat Island sits within the upper reaches of the area.

Adelaide River is a highly dynamic estuarine-riverine environment heavily influenced by very large semi-diurnal tides (tidal range up to 8 m) with the tidal extent reaching ~130 km inland, resulting in an extremely turbid river (Vertessy 1991). The region experiences a wet-dry monsoonal climate with nearly all rainfall occurring in the wet season (~December–April). During these months, the river is influenced by freshwater flows. During the dry season, tides push marine/brackish water upriver with saltwater reaching ~80 km inland (Buckley et al. 2020). Tropical storms and cyclonic activity are frequent during the wet season.

This Important Shark and Ray Area is benthic and pelagic and is delineated from inshore and surface waters (0 m) to 30 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 Critically Endangered Largetooth Sawfish (Espinoza et al. 2022), and the Vulnerable Northern River Shark (Kyne et al. 2021a) and Speartooth Shark (Kyne et al. 2021b).

### SUB-CRITERION C1 – REPRODUCTIVE AREAS

Adelaide River is an important reproductive area for two shark and one ray species.

Targeted research has been conducted on euryhaline sharks and rays in Adelaide River between 2012–2017 (Feutry et al. 2014, 2015, 2017, 2020; Kyne & Feutry 2017; Buckley et al. 2020; Constance 2025; Constance et al. 2025; Kyne et al. 2026; PM Kyne et al. unpubl. data 2012–2017). Surveys and sampling targeted river sharks (Northern River Shark, Speartooth Shark) and Largetooth Sawfish primarily using rod-and-line for sharks, and 29 m long gillnets (4–6-inch mesh size) for sawfish. The study area covered Adam Bay at the mouth of the river throughout tidal reaches of the river and small tributaries, upstream to near the Marrakai Road crossing (the upper extent of the area). An acoustic receiver array was deployed to cover this area and monitor survival and movements of Speartooth Shark and Largetooth Sawfish (Buckley et al. 2020; Constance 2025; Constance et al.

2025). Animals were measured (total length; TL), sexed, and tagged with passive integrated transponder (PIT) tags to monitor recaptures.

Northern River Sharks were caught throughout turbid brackish tidal reaches of the river (Feutry et al. 2020; Constance 2025; Constance et al. 2025; PM Kyne et al. unpubl. data 2013–2016). Between 2013–2016, a total of 49 Northern River Sharks were caught. Sharks ranged 55.5–175.5 cm TL (mean  $\pm$  standard deviation =  $106.1 \pm 32.3$  cm TL) and comprised 2 neonates (4.1%), 9 young-of-the-year (YOY; 18.4%), 30 juveniles (61.2%), and 8 adults (16.3%). Published size-at-birth for both river shark species is 50–65 cm TL (Pillans et al. 2009). Age-and-growth data are not available for Northern River Sharks. However, a YOY size threshold of 75 cm TL is used here, based on the threshold for the closely related Speartooth Shark (Kyne et al. 2026), which has the same size-at-birth (Pillans et al. 2009). Size-at-maturity for Northern River Shark is 142 cm TL (Pillans et al. 2009; PM Kyne et al. unpubl. data 2012–2024). Early life-stages (neonates and YOY combined;  $n = 11$ ) represented 22.4% of sharks and were recorded in November 2014 ( $n = 2$ ), November 2015 ( $n = 1$ ), December 2015 ( $n = 7$ ), and November 2016 ( $n = 1$ ) (Feutry et al. 2020; Constance 2025; Constance et al. 2025; PM Kyne et al. unpubl. data 2013–2016). An additional YOY specimen (66 cm TL) was found in the illegal catch of a recreational fisher in August 2014 (Kyne & Feutry 2017). Northern River Sharks appear to be at far lower abundance in this river relative to the more common Speartooth Shark (PM Kyne et al. unpubl. data 2012–2024).

Historically, early life-stage Speartooth Sharks have been documented from Adelaide River during Nurseryfish (*Kurtus gulliveri*) research in 2001–2009 (Berra 2010) and during targeted sampling in 2004 to examine short-term movement patterns using active acoustic telemetry (Pillans et al. 2009). Speartooth Sharks are the most common shark in contemporary surveys in Adelaide River and were regularly caught throughout turbid brackish tidal reaches of the river (Feutry et al. 2014, 2017; Constance 2025; Constance et al. 2025; Kyne et al. 2026; PM Kyne et al. unpubl. data 2012–2016). Between 2012–2016, a total of 282 Speartooth Sharks were caught, spread from the estuary to the upper reaches of the area along with tributaries. Sharks ranged 48.5–195.0 cm TL (mean  $\pm$  standard deviation =  $91.0 \pm 34.5$  cm TL) and comprised 135 neonates (47.9%), 10 YOY (3.5%), and 137 juvenile-subadult (48.6%; 2–11 years old). Early life-stages (neonates and YOY combined;  $n = 145$ ) represented 51.4% of sharks and were sampled in November 2012 ( $n = 2$ ), October 2013 ( $n = 2$ ), November 2013 ( $n = 12$ ), August 2014 ( $n = 1$ ), September 2014 ( $n = 1$ ), November 2014 ( $n = 14$ ), December 2014 ( $n = 20$ ), November 2015 ( $n = 9$ ), December 2015 ( $n = 60$ ), October 2016 ( $n = 6$ ), November 2016 ( $n = 14$ ), and December 2016 ( $n = 4$ ) (Feutry et al. 2014, 2017; Constance 2025; Constance et al. 2025; Kyne et al. 2026; PM Kyne et al. unpubl. data 2012–2016). An additional neonate specimen (~60 cm TL) was found in the illegal catch of a recreational fisher in December 2015 (Kyne & Feutry 2017). It is unknown where females give birth as very few adult Speartooth Sharks have been observed (none in the Northern Territory).

Juveniles of both Northern River Shark and Speartooth Shark, including neonates and YOY, are habitat specialists of brackish, highly turbid waters of large tidal rivers and estuaries and remain in these habitats throughout their juvenile years (Pillans et al. 2009; Constance 2025). Both river shark species undergo daily tidally-driven movements, where they move upstream with incoming tides and downstream with outgoing tides, and seasonal movements, where they penetrate the river during the dry season (as far inland as the upper boundary of the Adelaide River area), before abruptly moving downstream to the estuarine and coastal zone of the area with the first wet season flood events (Pillans et al. 2009; Constance 2025). These seasonal movements are repeated year after year (Constance 2025). Adelaide River is part of the Van Diemen Gulf population of both species which is genetically distinct and reproductively isolated (Feutry et al. 2014, 2017, 2020; PM Kyne et

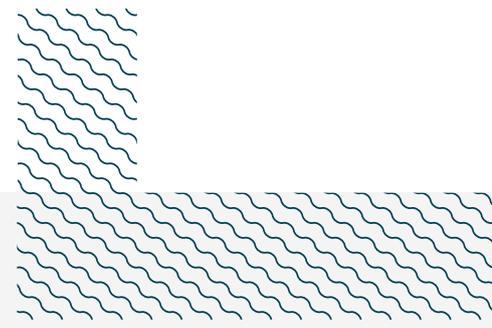
al. unpubl. data 2025). This highlights the importance of each breeding location across their limited geographic ranges (northern Australia and southern Papua New Guinea).

Early life-stage Largetooth Sawfish have regularly been captured throughout Adelaide River (Buckley et al. 2020; PM Kyne unpubl. data 2013–2017). Size-at-birth is 72–91 cm TL and YOY are estimated to measure <130 cm TL based on growth curves (Peverell 2009). Between 2013–2017, 24 Largetooth Sawfish were caught. Largetooth Sawfish ranged 83.7–158.0 cm TL (mean  $\pm$  standard deviation = 100.5  $\pm$  14.1 cm TL) and comprised 5 neonates (20.8%), 18 YOY (75.0%), and 1 juvenile (4.2%; 2 years old). Early life-stages (neonates and YOY combined; n = 23) represented 95.8% of Largetooth Sawfish and were sampled in March 2013 (n = 2), May 2013 (n = 1), June 2013 (n = 3), July 2013 (n = 2), October 2013 (n = 1), June 2014 (n = 1), July 2014 (n = 1), August 2014 (n = 7), September 2014 (n = 3), April 2015 (n = 1), and August 2017 (n = 1) (Buckley et al. 2020; PM Kyne unpubl. data 2013–2017). Additionally, the Adelaide River has long been a collection point for local public aquariums displaying Largetooth Sawfish which are caught as early life-stages and later released back into the river when they outgrow display tanks (Buckley et al. 2020). Since Largetooth Sawfish leave rivers only upon reaching sexual maturity (Peverell 2009), the presence of neonates and YOY indicates that Adelaide River is an important reproductive area for the species. Furthermore, Largetooth Sawfish display female philopatry with rivers representing genetically distinct and reproductively isolated systems (Phillips et al. 2011; Feutry et al. 2015).

## SUB-CRITERION D1 – DISTINCTIVENESS

Adelaide River is an important area for distinctiveness of one shark species.

Speartooth Sharks have been documented feeding on aquatic rodents in the area, representing a possible dietary specialisation not previously reported in sharks. In 2015–2016, ten Speartooth Shark stomachs from the area were examined opportunistically to provide insights into diet. Of these, four stomachs were empty. Of the six stomachs with food, four (66.7%) contained Rakali (*Hydromys chrysogaster*), a native aquatic rat. One stomach contained three Rakali, another contained two, and the other two contained one Rakali each. Sharks that had consumed Rakali were 101.5, 144.5, 161.0, and 189 cm TL and were captured in December 2015 (n = 2), October 2016 (n = 1), and November 2016 (n = 1). While sample size is small, the spread of observations over two years, three different months, and a range of shark sizes, together with the high proportion of stomachs with prey containing this prey item, suggests that feeding on Rakali may be selective and targeted. Rakali are a common native aquatic mammal of Australia and New Guinea and inhabit a diversity of aquatic environments including wetlands, rivers, and estuaries (Atkinson et al. 2008).



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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	
<b>SHARKS</b>													
<i>Glyphis garricki</i>	Northern River Shark	VU/EN	0-23	X		X							
<i>Glyphis glyphis</i>	Speartooth Shark	VU/CR	0-23	X		X						X	
<b>RAYs</b>													
<i>Pristis pristis</i>	Large-tooth Sawfish	CR/EN	0-60	X		X							

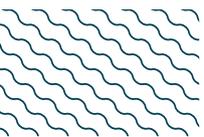
## SUPPORTING SPECIES



Scientific Name	Common Name	IUCN Red List Category
<b>SHARKS</b>		
<i>Carcharhinus leucas</i>	Bull Shark	VU
<i>Eusphyra blochii</i>	Winghead Shark	CR
<b>RAYS</b>		
<i>Glaucostegus typus</i>	Giant Guitarfish	CR
<i>Urogymnus dalyensis</i>	Freshwater Whipray	LC

*IUCN Red List of Threatened Species Categories are available by searching species names at [www.iucnredlist.org](http://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.*





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