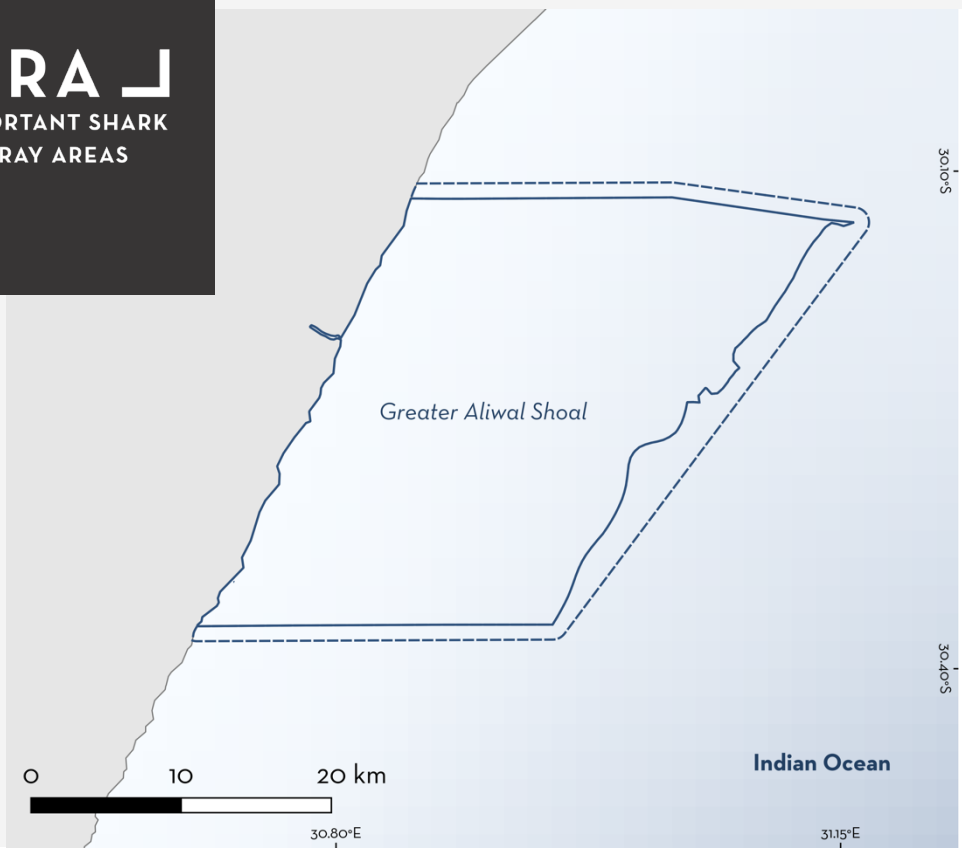
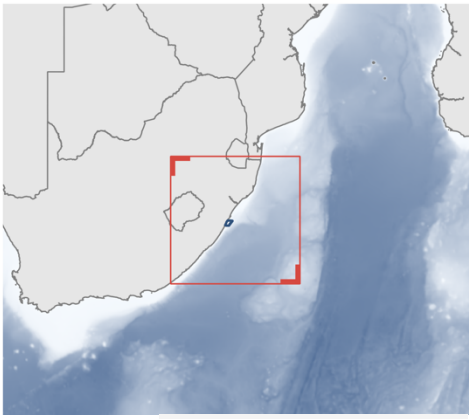
ISRA
IMPORTANT SHARK AND RAY AREAS





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

GREATER ALIWAL SHOAL ISRA

Western Indian Ocean Region

SOUTH AFRICA

0–500 metres

721.38 km²

SUMMARY

Greater Aliwal Shoal lies off the KwaZulu-Natal coast of South Africa, within a transition zone between the subtropical iSimangaliso area and the warm temperate reefs to the south. It hosts both shallow and mesophotic reefs, sandy substrates, estuaries, and pelagic waters. Within this area there are: **threatened species** (e.g., Copper Shark *Carcharhinus brachyurus)*; **reproductive areas** (Shorthorned Pygmy Devil Ray *Mobula kuhlii*); **feeding areas** (e.g., Spinner Shark *Carcharhinus brevipinna*); **resting areas** (Sand Tiger Shark *Carcharias taurus*); **undefined aggregations** (Spotted Eagle Ray *Aetobatus ocellatus*); and areas with **distinctive attributes** (Shorthorned Pygmy Devil Ray).

CRITERIA

Criterion A – Vulnerability; Sub-criterion C1 – Reproductive Areas; Sub-criterion C2 – Feeding Areas; Sub-criterion C3 – Resting Areas; Sub-criterion C5 – Undefined Aggregations; Sub-criterion D1 – Distinctiveness

DESCRIPTION OF HABITAT

Greater Aliwal Shoal lies off the KwaZulu-Natal (KZN) coast of South Africa, within a transition zone between the subtropical iSimangaliso region and the warm temperate reefs to the south. It hosts both shallow and deep reefs as well as critical habitats for various teleost species, including Geelbek *Atractoscion aequidens* and Dusky Kob *Argyrosomus japonicus* and the historic spawning grounds of the Seventy Four *Polysteganus undulosus* (Penney et al. 1999). The main reef of the area, Aliwal Shoal, lies ~4 km offshore of the Greenpoint lighthouse. This reef is a large outcrop of aeolianite or dune rock, ~4 km in length and parallel to the shore (Bosman et al. 2005). The shoal is ~280 m wide in the north, narrows slightly in the central region and then widens to ~2 km in the southern end. The large gullies on the shoal contain fine-grained quartz sand and the smaller gullies contain bioclastic or shelly sand (Ramsay 1998). The main reef area is exposed to heavy wave action with an annual average swell of 2.5 m but protects both shallow and mesophotic reefs. Major estuaries in Greater Aliwal Shoal include the iLovu, uMsimbazi, uMgababa, iNgane, uMkhomazi, uMahlongwane, aMahlongwa, and uMphambanyoni. Main ecosystem types in the area include the Natal Deep Shelf Edge and Southern KZN Shelf Mosaic (NBA 2018). This area also overlaps with the Sardine Run, which is an annual migration event of large schools of Sardine *Sardinops sagax* along the KZN south coast and occurs primarily in June and July (van der Lingen et al. 2010).

The area overlaps with the Aliwal Shoal Marine Protected Area (MPA). It also overlaps with the Protea Banks and Sardine Route Ecologically or Biologically Significant Marine Area (CBD 2023).

This Important Shark and Ray Area is benthopelagic and is delineated from inshore and surface waters (0 m) to 500 m based on the bathymetry of the area.

ISRA CRITERIA

CRITERION A – VULNERABILITY

Seven Qualifying Species considered threatened with extinction according to the IUCN Red List of Threatened Species™ regularly occur in the area. Threatened sharks comprise one Critically Endangered species, one Endangered species, and three Vulnerable species. Threatened rays comprise two Endangered species (IUCN 2023).

SUB-CRITERION C1 – REPRODUCTIVE AREAS

Greater Aliwal Shoal is an important reproductive area for one ray species.

The Shorthorned Pygmy Devil Ray is present in the area throughout the year, with observations of courtship behaviour and the presence of mature females with mating scars noted during recreational dives in the austral summer (Carpenter & Griffiths 2023). Courtship behaviour of the Shorthorned Pygmy Devil Ray was observed three times, in November 2020 and January 2021. Each mating train consisted of 4–5 individuals, and based on observations of a distended abdomen, one of the leading females was likely to be pregnant (Carpenter & Griffiths 2023). Furthermore, mating behaviour was observed at a recently discovered cleaning station in Greater Aliwal Shoal. Mature females (with mating scars) were observed, along with mature males, at the cleaning station (M Carpenter unpubl. data 2023).

SUB-CRITERION C2 – FEEDING AREAS

Greater Aliwal Shoal is an important feeding area for four shark species. Historical data from KZN shark net catches cover the period from 1952–2005 (Dudley & Cliff 2010). More recently, shark nets are removed from the beaches during the Sardine Run to avoid catches, but additional contemporary evidence from in-water encounters during the Sardine Run is provided to show that these species still seasonally feed on Sardine.

Based on historical data from the KZN shark net catches, Copper Sharks are the shark species most strongly associated with the annual Sardine Run, with 91% of non-empty stomachs containing Sardine (Dudley & Cliff 2010). This species is infrequently caught in these nets outside of the Sardine Run, further indicating that its presence is directly related to the presence of Sardines. Contemporary in-water observational evidence shows that Copper Sharks still regularly feed on Sardine (T Rogers pers. comm. 2023).

Spinner Sharks are another species which feeds on Sardines during the Sardine Run, with 89% of non-empty stomachs from individuals caught in the KZN shark nets at this time containing this species (Dudley & Cliff 2010). This species is frequently caught in nets within KZN Province outside of this event, but the seasonal shift in the winter to this area is regarded as a direct consequence of the Sardine Run (Dudley & Cliff 2010). Contemporary in-water observational evidence shows that Spinner Sharks still regularly feed on this species (R Daly pers. obs. 2023).

Blacktip Sharks also take advantage of the Sardine Run, with 40% of non-empty stomachs from individuals caught in the KZN shark nets at this time containing Sardine (Dudley & Cliff 2010). This species is frequently caught in nets within the area outside of this event and is sighted year-round by snorkel divers visiting the restricted area of the Aliwal Shoal MPA (M Addison pers. obs. 2023). Blacktip Sharks feed opportunistically on Sardine but their movements are less influenced by the Sardine Run than those of Copper and Spinner Sharks (Dudley & Cliff 2010). Contemporary in-water observational evidence shows that Blacktip Sharks still seasonally feed on this species (R Daly pers. obs. 2023).

Dusky Sharks also target the Sardine Run, with 68% of non-empty stomachs from individuals caught in the KZN shark nets at this time containing Sardine (Dudley & Cliff 2010). This species is frequently caught in nets outside of this event, but the occurrence of adolescent and adult sharks of both sexes in the southern subregion in winter are considered as being related to the seasonal abundance of Sardine (Dudley et al. 2005). This species is sighted regularly by snorkel divers visiting the restricted area of the Aliwal Shoal MPA. Individuals also follow large shoals of Dusky Kob and Geelbek during winter (M Addison pers. obs. 2023).

SUB-CRITERION C3 – RESTING AREAS

Greater Aliwal Shoal is an important resting area for one shark species.

Sand Tiger Sharks predictably rest at specific reefs with overhangs and caves within the Aliwal Shoal MPA (Dicken et al. 2006). Sand Tiger Sharks are usually seen resting in aggregations, slowly swimming around in caves and under overhangs (R Daly pers. obs. 2023). These aggregations of up to 30 individuals comprise mainly subadults, in what is perceived to be a seasonal northward migration between June and October when water temperatures are lowest (Dicken et al. 2006). In the period 2020–2022, Sand Tiger Sharks were observed on Aliwal Shoal in all months except March. As it is a nocturnal species, feeding is rarely observed, but individual sharks are regularly seen being cleaned (M Carpenter unpubl. data 2023).

SUB-CRITERION C5 – UNDEFINED AGGREGATIONS

Greater Aliwal Shoal is an important area for undefined aggregations of one ray species.

Spotted Eagle Rays are present year-round in the Aliwal Shoal MPA, with fewer sightings in winter when water temperatures are lowest. Most are observed in small groups of <5 individuals (Deane 2022), however, dive surveys from 2020–2022 recorded 22 aggregations of up to 12 individuals (mean = 4 individuals per aggregation; M Carpenter unpubl. data 2023). The reason for these aggregations remains unknown, although single individuals were occasionally observed being cleaned and resting on the sand next to the cleaning station (M Carpenter unpubl. data 2023).

SUB-CRITERION D1 – DISTINCTIVENESS

Shorthorned Pygmy Devil Rays have been found to regularly aggregate at a cleaning station on the southern end of Aliwal Shoal reef. Cleaning was the second-most recorded behaviour after cruising during a total of 329 dives/snorkelling drifts between September 2020–March 2022 (M Carpenter unpubl. data 2023). Rays were being cleaned by Bluestreak Cleaner Wrasse *Labroides dimidiatus*. Remote GoPro cameras were placed at the cleaning station opportunistically on 41 occasions between January 2021 and March 2022. Individuals were present on 19 occasions (46%), with 1–23 individuals (mean = 7) present for cleaning at the same time (M Carpenter unpubl. data 2023). The first Shorthorned Pygmy Devil Ray cleaning station was documented in the Bazaruto National Park, Mozambique (Murie & Marshall 2016), and the one in Greater Aliwal Shoal is the second known cleaning station for this species in the world.

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QUALIFYING SPECIES

Scientific Name	Common Name	IUCN Red List Category	Global Depth Range (m)	ISRA Criteria/Sub-criteria Met								
				A	B	C1	C2	C3	C4	C5	D1	D2
SHARKS												
Carcharhinus brachyurus	Copper Shark	VU	1–145	X			X					
Carcharhinus brevipinna	Spinner Shark	VU	0–200	X			X					
Carcharhinus limbatus	Blacktip Shark	VU	0–140	X			X					
Carcharhinus obscurus	Dusky Shark	EN	0–500	X			X					
Carcharias taurus	Sand Tiger Shark	CR	0–232	X				X				
RAYS												
Aetobatus ocellatus	Spotted Eagle Ray	EN	0–40	X						X		
Mobula kuhlii	Shorthorned Pygmy Devil Ray	EN	0–50	X		X					X	

SUPPORTING SPECIES

Scientific Name	Common Name	IUCN Red List Category
SHARKS		
Alopias vulpinus	Common Thresher	VU
Carcharhinus amboinensis	Pigeye Shark	VU
Carcharhinus humani	Human's Whaler Shark	DD
Carcharhinus leucas	Bull Shark	VU
Carcharhinus plumbeus	Sandbar Shark	EN
Carcharodon carcharias	White Shark	VU
Galeocerdo cuvier	Tiger Shark	NT
Halaelurus lineatus	Lined Catshark	LC
Haploblepharus fuscus	Brown Shyshark	VU
Haploblepharus kistnasamyi	Natal Shyshark	VU
Isurus oxyrinchus	Shortfin Mako	EN
Mustelus mosis	Arabian Smoothhound	NT
Mustelus mustelus	Common Smoothhound	EN
Rhincodon typus	Whale Shark	EN
Rhizoprionodon acutus	Milk Shark	VU
Scylliogaleus quecketti	Flapnose Houndshark	VU
Sphyrna lewini	Scalloped Hammerhead	CR
Sphyrna mokarran	Great Hammerhead	CR
Sphyrna zygaena	Smooth Hammerhead	VU
Squatina africana	African Angelshark	NT
Triaenodon obesus	Whitetip Reef Shark	VU
RAYS		
Acroteriobatus annulatus	Lesser Guitarfish	VU
Acroteriobatus leucospilus	Greyspot Guitarfish	EN
Aetomylaeus bovinus	Duckbill Eagle Ray	CR
Bathytoshia brevicaudata	Shorttail Stingray	LC
Dasyatis chrysonota	Blue Stingray	NT
Electrolux addisoni	Ornate Sleeper Ray	LC

Himantura leoparda	Leopard Whipray	EN
Himantura uarnak	Coach Whipray	EN
Mobula alfredi	Reef Manta Ray	VU
Mobula birostris	Oceanic Manta Ray	EN
Myliobatis aquila	Common Eagle Ray	CR
Rhina ancylostomus	Bowmouth Guitarfish	CR
Rhinoptera jayakari	Oman Cownose Ray	EN
Rhynchobatus djiddensis	Whitespotted Wedgefish	CR
Taeniura lymma	Bluespotted Lagoon Ray	LC
Taeniurops meyeni	Blotched Fantail Ray	VU
Torpedo sinuspersici	Gulf Torpedo	DD

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.

SUPPORTING INFORMATION

There are additional indications that Greater Aliwal Shoal is an important area for feeding and aggregating purposes for three shark and one ray species.

Dusky Sharks are a migratory species (Dudley & Dicken 2013). The population in KZN coastal waters comprises neonates, adolescents, and adults (Dudley & Cliff 2010). The core nursery areas are close inshore off sandy beaches on the central and southern KZN coast, where the juveniles are caught in very large numbers by recreational shore anglers (Bass et al. 1973; Dudley & Dicken 2013). A significant portion of this section of the population shows a southward, coastwise shift into waters of the Eastern Cape, possibly taking advantage of spawning of Chokka Squid *Loligo reynaudi* (Smale 1991; Hussey et al. 2009). Seasonally, larger sharks, comprising sub-adult and adults, including pregnant females, move inshore from the outer shelf (depths of 200–400 m) (Bass et al. 1973). A major driver of this movement is pursuit of Sardines during the annual Sardine Run (Dudley & Cliff 2010). The pregnant females will also use the opportunity to drop their pups (Bass et al. 1973).

Catches of Sand Tiger Sharks in the KZN shark nets from Richards Bay southwards comprise almost exclusively adults (Dudley & Simpfendorfer 2006). In May, individuals of both sexes enter southern KZN waters from the Eastern Cape. This coincides with the annual sardine migration. Although the sharks occasionally feed on sardines, their arrival is regarded as coincidental (Dudley & Cliff 2010). The sharks move slowly north and mating takes place around November, whereafter the males return south. Pregnant Sand Tiger Sharks have been seen in Greater Aliwal Shoal during summer months (M Carpenter pers. obs. 2020). The females continue north and spend much of their 9–10 month gestation in Maputaland, before heading south to pupping grounds of the Eastern Cape (Dicken et al. 2006).

In summer, Scalloped Hammerheads are often seen in aggregations at offshore reef systems including Aliwal Shoal (Cliff & Daly 2022). Further information is needed to understand the regularity and function of these aggregations.

Aliwal Shoal is the only known aggregation site for Oceanic Manta Rays in KZN Province, with 13 photo-identified individuals, which were re-sighted over a three-year period. The observed behaviours included surface feeding and cleaning by Bluestreak Cleaner Wrasse. Catches in the shark nets of largely unidentified manta rays (Reef Manta Ray *Mobula alfredi* or Oceanic Manta Ray *Mobula birostris*) are the highest along this section of the KZN coast, suggesting that it is potentially an important manta ray area (Carpenter et al. 2023).

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