

# **An Estuary Is Identified As An Important Habitat For Critically Endangered Stingrays**

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## **Submission:**

### **Background**

Estuaries are important socio-ecological ecosystems in the Western Indian Ocean (WIO), fulfilling vital ecological roles (for example through the provision of nursery habitat to a variety of fish species) and social roles (through the provision of fish resources to local communities). They are also subject to many anthropogenic stressors, given their often close proximity to human settlements. However, these ecosystems remain underrepresented in terms of spatial protection efforts.

Furthermore, despite anecdotal evidence that elasmobranchs occur within estuaries in the WIO, their relative importance as a habitat type to elasmobranch communities remains unquantified. This is a dire oversight, given the declining populations of many elasmobranch species within the WIO. Therefore, this study aimed to quantify the presence and relative abundance of elasmobranchs in a permanently open, warm temperate estuary on the south coast of South Africa, a country recognised as a global hotspot for threatened and endemic elasmobranchs. Specific aims included 1) determining the elasmobranch species composition in the estuary and their relative abundance; 2) whether elasmobranch species were present year-round, seasonally or ephemerally; 3) what areas of the estuary were elasmobranchs encountered in; and 4) to what extent did environmental parameters such as temperature and tide influence elasmobranch presence in the estuary.

### **Method**

A number of complementary methods were used to sample the Keurbooms Estuary, Plettenberg Bay, South Africa, for one year (2021/22). These included weekly Baited Remote Underwater Video System (BRUVS) surveys, visual boat surveys, and visual snorkel surveys. Additionally, water temperature, tidal stage and other environmental variables were collected during surveys. Opportunistic sightings through recreational use of the estuary were also collected.

### **Results**

Six species of elasmobranchs (indicating IUCN Red List status) were encountered in the Keurbooms Estuary throughout the sampling period - common eagle ray *Myliobatis aquila* (critically endangered), bull ray *Aetomylaeus bovinus* (critically endangered), diamond ray *Gymnura natalensis* (least concern, endemic), blue stingray *Dasyatis chrysonota* (near threatened, endemic), lesser sandshark *Acroteriobatus annulatus* (vulnerable, endemic) and common smoothhound shark *Mustelus mustelus* (vulnerable). However, the only species that was consistently encountered year-round was the common eagle ray, with sightings recorded in every month. This species was encountered on 44% of all sampling occasions (48 out of 109 samples), with a total of 140 individuals sighted (the same individuals may have

been encountered across different samples). The number of common eagle ray individuals encountered per sample ranged from 1 – 12 with a mean of 3 individuals per sample. Furthermore, the vast majority of common eagle rays encountered were juveniles, with adults only encountered on 2 occasions. The bull ray was only encountered in summer and early autumn and only on 17 out of 109 (16%) samples, with a total of 19 individuals sighted (mean of 1 individual per sample). Both common eagle and bull rays were encountered during all tidal stages. Common eagle rays were encountered across a wide range of temperatures (12 – 26 °C, mean 19 °C), while bull rays were encountered at slightly warmer temperatures (15 – 25 °C, mean 21 °C). Both of these species were encountered up to 3km from the estuary mouth and were both seen to feed within the estuary. The diamond ray, blue stingray, lesser sandshark, and common smoothound shark were each only encountered once. It was found to be imperative to use a variety of sampling methodologies; the maximum number of individuals recorded by the BRUVS was one and only through complementary sampling methods were trends in relative abundance able to be identified (i.e. it was only through visual boat and snorkel sampling methods that more than one individual per sample was encountered). Additionally, some of the lesser encountered species were rarely or not detected at all on the BRUVS.

## **Conclusion**

This study presents initial evidence to suggest that the Keurbooms Estuary is an important year-round habitat to juveniles of a critically endangered stingray species, and a seasonal habitat to a second critically endangered stingray species. This has ramifications for South Africa and other regions in the WIO, where additional estuaries may be functioning as critical habitats for elasmobranchs. Ensuring these habitats remain healthy may be an important tool in the conservation of threatened elasmobranchs. There are also pros and cons to the various elasmobranch sampling methodologies in shallow-water estuaries, and the use of complementary methods to assess elasmobranch use of estuaries is advised.