

# **Conservation Status of Sharks and Rays in the Lower Kinabatangan: Preliminary findings**

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## INTRODUCTION

Although known for terrestrial biodiversity, Borneo is also a hotspot for aquatic diversity, with 38% of its freshwater fish species endemic to the island. Within the most isolated of the island's watersheds, the Kinabatangan River has the highest levels of freshwater endemism. Sharks and rays have long been a part of this landscape, either spending part of their lives in the freshwater environment, or their entire lives depending on the species. Long-lived, late maturing, and slow breeding species, elasmobranchs are particularly sensitive to habitat disturbance. However, they and other aquatic life here are highly threatened by unsustainable development. The onset of forest conversion to industrial-scale oil palm plantations has had many negative effects on local communities, who have traditionally relied on the river for food security, livelihoods, and culture.

The Kinabatangan River Spirit Initiative (KRSI) is a freshwater fish conservation project working closely with several local communities through village leadership and community-based organizations in the Lower Kinabatangan. Active since 2012, the project envisages a healthy Kinabatangan river, which supports robust freshwater biodiversity, persistence of local culture, and sustainable development. This project was conceived on the basis that community participation in research and management is critical for achieving a healthy river, and developed based on the needs identified by the local Kinabatangan community. Using fish as a surrogate, the project goals are to enhance: 1) knowledge of freshwater fish diversity, ecology and conservation status; and, 2) local capacity and commitment for management and conservation of freshwater fish.

This report presents the preliminary findings relating to the conservation status of sharks and rays in the Lower Kinabatangan.

## METHODS

The information in this report has been compiled based on general discussions with community members, and interview surveys conducted between the months of April and September 2013 in 5 villages Abai, Sukau, Bilit, Batu Puteh and Mengaris (see map below) with 111 respondents. These surveys were conducted to identify the value of fish and the river to local inhabitants, the changes and threats to the river, and solutions to these threats. The questions relating to aquatic life were geared towards the multispecies fishery and not single species. Therefore, no specific questions were asked about sharks and rays; however, information was gleaned based on answers from the following questions:



1. Comparing now and when you were growing up, what kinds of fish populations have declined?
2. Comparing now and when you were growing up, what kinds of fish have gone extinct/can no longer be found in your village?

Other results from the interview surveys came from questions that related to general fish populations in terms of size and abundance.

## RESULTS

### *Fishing Activities*

In relation to the overall fishery, 94.6% of respondents felt that fish populations in the Lower Kinabatangan had declined, and 66.7% felt that fish were smaller than before. Of these, 48.6% felt that fish were slightly smaller while another 51.4% felt that fish were much smaller.

Specific to sharks and rays, at this stage of our investigation, it seems that the shark and ray fishery in the Lower Kinabatangan is seasonal and opportunistic. It is not a preferred species for consumption, and when a shark is caught and not preferred, it is given or sold to other villagers. As far as we can tell at this point, sharks or their parts are not sold commercially as is the case with *udang galah* (*Macrobrachium rosenbergii*) or *ikan ubi* (*Oxyeleotris marmorata*) (i.e. middlemen buy catch from the villages to sell in Sandakan or to exporters). This could be because of irregular supply of shark from the Lower Kinabatangan.

Based on local knowledge, sharks and rays are usually caught during the dry-season after at least 2 weeks without rain when the water levels are low. The primary gear type used to catch sharks and rays in the river is long-line, however estate workers in Bilit reportedly caught rays with hook and line from the riverbank. The long-lines are stretched across the Kinabatangan River width (tied to trees at the riverbanks). The line is weighed down with rocks, to a depth roughly 3 meters below the surface. When targeting sharks and rays, the hooks are baited with small fish (usually caught using cast nets (*rambat*)).

### *Shark and Ray Species: Occurrence, perceived population trends, and uses*

Based on our work so far, at least 2 species of sharks and 2 species of rays (including sawfish) have been identified to exist, or have existed in the freshwater Lower Kinabatangan area. This is based on personal observation, anecdotal information, photographs and dried rostrums (sawfish) obtained since 2012.

#### 1. Largetooth sawfish (*Pristis pristis*, formerly known as *P. microdon*)

- IUCN Red List: Critically Endangered
- CITES: Appendix I

According to fishermen in the study area, this species was present in the river and oxbow lake areas in all 5 villages, and caught as far upriver as Lokan. Our interview surveys found that 65% of interview respondents believed the sawfish (*Parangan* or *Bilas* in *Bahasa Sungai*) to be locally extinct while 6.3% believed the sawfish to still exist in the river, but in far fewer numbers than before. All respondents from Bilit and 88.4% respondents from Sukau believe the sawfish to be gone. The breakdown between villages is shown in the table below:

| Village (# interviews) | %     |
|------------------------|-------|
| Batu Puteh (45)        | 40.0  |
| Abai (12)              | 41.7  |
| Bilit (11)             | 100.0 |
| Sukau (43)             | 88.4  |

Figure 1 Percentage of respondents believing the sawfish to be locally extinct by village

For those believing the sawfish to be extinct, the cause for the perceived extinction of sawfish was asked. Only 12.5% answered this question, with pollution, overfishing/destructive fishing methods being the leading responses. In general discussions with local communities,

very few people believed that fishing activities had anything to do with its demise, as the sawfish were generally not targeted but accidental catch in gillnets.

Based on Manjaji (in Fowler *et al.* 2002), one specimen of this species was caught in May 1996. Most interview respondents reported that in the 70s, these sawfish were still abundant, but have not seen it since the 1990s. One individual in Sukau claimed to have caught a large sawfish in 2002 downriver from the village, but this is not verifiable.

When caught, the meat was consumed and the rostrum (saw) dried and kept outside the entrance of the house to ward against evil spirits. During interview surveys, we managed to find one sample (although we asked around in each village) in the village of Abai (see picture at right). The rostrum was very small and belonged to a very young individual. The age of the sample (i.e. when the family initially caught the individual) was not known.



## 2. Borneo River shark (*Glyphis fowlerae*)

- IUCN Red List: Not evaluated
- CITES: Not listed

Although only described by scientists in 2010 from specimens collected during the Darwin Project on Elasmobranch Biodiversity, Conservation and Management in Sabah, fishermen in Abai have long been catching this shark opportunistically. Based on current information, this shark has not been reported further upriver than the Abai area. Based on interview surveys, 6.3% of respondents voluntarily identified the 'Yu sungai' populations to be declining or extinct. One adult individual was caught close to Abai by a fisherman in April 2013 and several pictures of the specimen were taken (see picture at right).



## 3. Bull shark (*Carcharhinus leucas*)

- IUCN Red List: Near Threatened
- CITES: Not listed

A villager contributed some pictures that he took in 2010 of a juvenile Bull shark (identification was made based on these photographs) (see pictures below). It was caught in the main Kinabatangan River close to the Malbumi estate (freshwater habitat approximately 40 km upriver from the estuary). According to Manjaji (Fowler *et al.* 2002), only one record of this species (a dried fin provided by a villager in Sukau in 1996) had been reported in the river previously.





#### 4. Giant Freshwater whipray (*Himantura polylepis*, formerly known as *H. polylepis*)

- IUCN Red List: Endangered
- CITES: Not listed

Interview surveys indicate that 22.5% of all respondents named the whipray to be on the decline while 6.3% believed that the whipray was locally extinct. In November 2013, one in Sukau fisherman claimed that he had caught 6 rays within one week, however this was unverifiable. The rays he caught were small, with a diameter of approximately 0.5 meters. Based on anecdotal information, the whiprays caught in Bilit were generally not larger than 0.5 meters in diameter. However, photographs of whipray catch (see below, left from Sukau, unknown date, probably between 2010 and 2012; center from Sukau, March 2013; right from Abai, October 2013) are more than 1 meter in diameter, though these may be exceptionally large individuals, thus warranting photographs by fisherman. As far as we can tell, whipray are consumed locally and not traded commercially. The tail of the whipray has historically been used to sand wooden boats. It has also been kept as a whip/weapon.



9.0% of respondents identified sharks in general as being on the decline or extinct, with most of these respondents being from the villages of Abai and Sukau, specifically, 41.7% of all Abai respondents, and 11.6% of Sukau respondents. One fisherman reported that in 1983, he caught a 7-meter long shark in Batu Puteh. This story is unverifiable, and this size of shark is much bigger than any other shark species that has been reported in the river.

## DISCUSSION

Due to the fact that the interview surveys conducted did not specifically ask about sharks and rays, the mention of sharks and rays was unprompted. Therefore, the number of respondents who actually perceive decline or extinction of these species is most likely much higher. Initial surveys indicate a trend of declining populations, which needs to be further investigated.

The perceived extinction of the Largetooth sawfish is a matter of concern, which requires further investigation. Globally, the principle threat to the species has been entanglement in fishing gear (Kyne *et al.* 2013). In the Lower Kinabatangan, preliminary investigation suggests that the current method of stretching gill nets across tributaries is a recent development (see picture at right). Previously, long (wide) nets were hard to obtain, and although fishermen would still set their nets across the river, the nets were not long enough to reach from riverbank to riverbank as they do today. Therefore, although fishermen still feel that fishing practices are unchanged from before and therefore still sustainable, this may be untrue. We will



continue to investigate this matter to determine when this change took place, and whether other aquatic species are being affected by this method of fishing.

The Borneo River shark and the Giant Freshwater whipray continue to be caught by local fishermen at an undocumented rate. Based on literature, other species have provisionally been reported in the Kinabatangan, such as the Ganges stingray (*Himantura fluviatilis*) (Compagno in Fowler *et al.* 2002). The perceived local extinction of the Largetooth sawfish raise the question whether there have been other less prominent species of sharks and rays, or other fish species that have existed here in the recent past but are now locally extinct.

Preliminary findings suggest following **existing threats** to shark and ray populations in the Lower Kinabatangan, which affect prey species as well:

*Habitat degradation:* Unsustainable development practices upriver, as well as the destruction of riparian along the Kinabatangan and its tributaries deprive sawfish of critical habitat.

*Pollution:* There is increasing evidence that pollution from large-scale oil palm plantations (which make up a significant part of the land-use in the lower Kinabatangan) and mills is significant (ERE 2009). Chemical pollution has the potential to affect development and reproduction, and ultimately the survival of species.

*Overfishing (including the catch of juveniles) and by-catch:* Anecdotal information suggests that the Giant Freshwater whipray is being caught at smaller and smaller sizes (less than size at maturity of 110 cm, Vidthayanon *et al.* 2011).

*By-catch:* By-catch seems to have had a large impact on Largetooth sawfish populations in the past. It also seems that a significant proportion of Borneo River shark caught are unintentional as well.

*Depletion of prey species:* The general decline in freshwater fish and prawn in the Lower Kinabatangan is a problem for shark species. Little is known about the benthic community in the Lower Kinabatangan, which would be a food source for the Giant Freshwater whipray and other benthic feeders, but the high levels of sedimentation and chemical pollution undoubtedly has some effect.

*Lack of knowledge:* Little is known about the abundance, distribution and status of sharks and ray species in the Lower Kinabatangan, and this impedes proper management.

Based on the preliminary findings presented, we identify the following **knowledge gaps** that need to be filled to properly manage sharks and rays in the Lower Kinabatangan and other freshwater environments in Sabah:

- Knowledge on species present, seasonally or year-round;
- Distribution and population status;
- Fishing pressure;
- Food availability;
- Other threats.

### **Proposed follow-up actions**

- i. Follow-up interview surveys specific to sharks and rays in the Lower Kinabatangan to gather in-depth local ecological knowledge about the species present, distribution and population status;

- ii. Community-mapping to estimate past and present distribution, and abundance of shark and ray species.
- iii. Fisher-catch surveys to estimate the fishing pressure on sharks and rays, as well as determine the pressure on fish stocks in general (affecting food availability).
- iv. Fish and water quality sampling to determine the species present, distribution, population status and potential areas of critical habitat;
- v. Long-term monitoring of water quality for freshwater biodiversity.

## CONCLUSION

Not only are sharks and rays sensitive to depletion because of their slow growth and maturation, but they also have “limited biological flexibility” to habitat degradation and pollution (Compagno in Fowler *et al.* 2002, p.177). Habitat degradation and pollution not only affect freshwater species, but also potentially marine species as well. Estuarine areas are important as breeding grounds and nurseries for many shark and rays species and the continued sedimentation and pollution from agro-industrial plantation in the Kinabatangan may be having an untold effect on both freshwater and marine shark and ray species.

The rich biodiversity in Sabah, and within the Coral-Triangle provides food and livelihoods to millions of coastal and riverine communities. The loss of one species, as large and iconic as the sawfish is just the tip of the iceberg for the potential silent extinctions that may be occurring here. This species may prove to be Sabah’s first species extinction in recent history and this should not be taken lightly as it reflects not only on Sabah’s aquatic environment, but also on biodiversity conservation here as a whole.

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