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FISH AND FISHERY SURVEY OF THE LOWER SUGUT RIVER AND THE SUGUT FOREST RESERVE

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SUMMARY

A survey on fish diversity and fisheries in the Lower Sugut showed that despite being fishermen communities, the people inhabiting the Lower Sugut do not practice shore and inland fishery in an extensive scale. The existing practices and the available facilities in the Lower Sugut provides options for tourism, conservation, education and scientific research. The types of landuse upstream of the Lower Sugut, however, are many and monitoring for the Sugut Forest Reserve should go beyond the reserve boundaries. Positive impacts of the Sugut Forest Reserve reclassification would be through the community engagement, which would allow mutually benefitting activities between the community and the management.

1.0 INTRODUCTION

The part of Sugut Forest Reserve lying in the southern bank of the Sugut River, comprises much of mangrove, freshwater swamp and some dryland, which covers an area of about 8000ha. It is currently classified as a Class II Commercial Forest. This area is targeted for an option for re-classification either into a Class I Protection Forest. As a part of additional information for this re-classification, surveys are carried out to assess current status of flora, fauna and the related issues linked to the initiative.

This report covers a survey for fish and fisheries concentrating on two waterways i.e. the Lower Sugut, which extends from the rivermouth up to Kg Pantai Buring; and along the Sugut Prai River, which is located in the central part of the area to the south of Lower Sugut. It was done between 12th and 18th June 2014. Earlier, Suliansa (1998) reported a survey in the Lower Sugut, which notes that fisheries activities carried by the fishermen in the area are still on a low scale. This report was used as a comparison to this survey.

The objectives of this work are to investigate the diversity of fish in the Lower Sugut and the surrounding; to identify species of fish that are harvested and the harvesting methods employed by the villagers. These objectives are related to assess the possible impacts of the re-classified forest to the communities living in the Lower Sugut.

2. MATERIAL AND METHODS

Two waterways were surveyed for fish: The lower Sugut extending from the rivermouth up to Kg Pantai Buring in the upstream, and the Sugut Prai River extending from the rivermouth to the narrow point at which the river branches out into the upper deltas. On a smaller scale, the shallows of the Lower Sugut opening out to the Sulu Sea were also surveyed. Fishes were also caught and recorded at one point near Kuala Sabang, located at the lower part of the reserve. All sampling points are marked (Figure 1).

Fishes were caught using gill nets, cast nets and fishing lines. On three different occasions, landed fish at Kg Trusan Sugut, which were purchased by a middle-man were also examined for species diversity and prices.

Other observations included interviews with villagers, fishermen and observation on the surrounding within the communities. Visits were also carried out along other waterways which included Sg Timbang, Sg Timbang I, Sg Timbang II and Kuala Sabang.

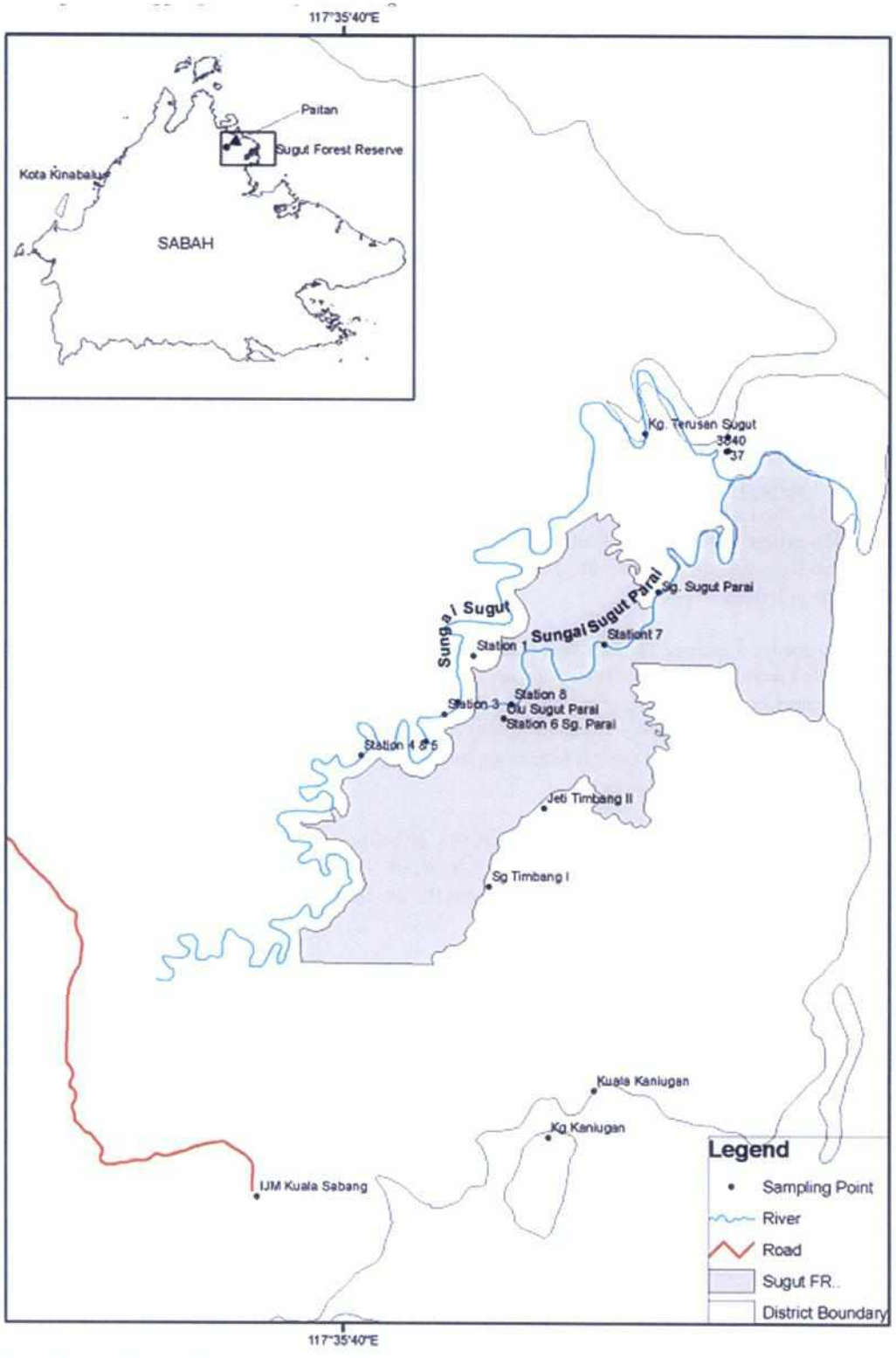

Figure 1: Map showing the Sugut Forest Reserve and sampling stations.

Photo 1: Casting net used in sampling along Sugut River.

Photo 2: Setting gill nets upstream of Sugut Prai.

3.0 FISHERIES

Sabah is known to be a popular tourist destination and in part, is also due to the fresh seafood delicacy. As a general a background, however, the contribution of fishery to the State's GDP is about 3% (see Anon 2003), and is barely making an impact to the national economy. Its value in 2001 was RM10.1 billion. Still, the sector is indeed growing and Sabah has shown to have been recording higher fish landings compared to Sarawak and Peninsula Malaysia (FAO, 1991).

In general, the community of Kg Trusan Sugut are traditional fishermen. In contrast to Suliansa (1998) a middle-man has always been in Kg Trusan Sugut for a long time. At the time of survey, fishermen sold their catch to the middle-man for an agreed price. On average, the difference in the price of

commercial fishes did not vary much and has always been between RM5-6/kg. Of note, trash fishes are also sold and all catch are kept fresh in ice-boxes, sent to Sandakan and marketed wholesale.

3.1 Inland fisheries

Species involved in inland fisheries include the freshwater fishes such as the catfishes (usually *Pangasius* spp) and the giant river prawn (*Macrobrachium rosenbergii*). The catfishes and other species are caught in gill nets and cast nets, although at times, trammel nets are also used. However, due to the high diversity of smaller fishes, trammel nets are used more often near the shore and at sea by the people at Kg Trusan Sugut. Fishermen at Kg Pantai Buring are mostly inland fishermen. The fish and prawns are usually taken to the small town of Paitan, in which a middle-man keeps a collecting facility and sells the catch wholesale and retail. Kg Pantai Buring is the last village that is connected by road leading to the main Paitan-Sapi Nangoh road.

Photo 3: A female river prawn with eggs - Sugut River.

3.2 Shore fisheries

Shore fisheries are the main economic activity of the people of Kg Trusan Sugut. On a large part, this activity serves as the sustenance for protein, whilst the fish landed for the market are sold to middlemen. It is a significant sight for the lack of trawler boats in the village although trammel nets, gill nets and cast nets are always present in all houses along the channel. Smaller boats to the maximum of 9m are the majority of the support for logistics. At a glance, even shore fisheries, although is an important economic activity, is not carried out in a massive scale.

With an exception for the middleman, it appeared that shore fisheries as done in Kg Trusan Sugut is rather opportunistic and for subsistence instead of being a major economic activity of the community as a whole.

Photo 4: High tide at Kg Trusan Sugut. Fish landing area with heaps of fishing nets are a common sight.

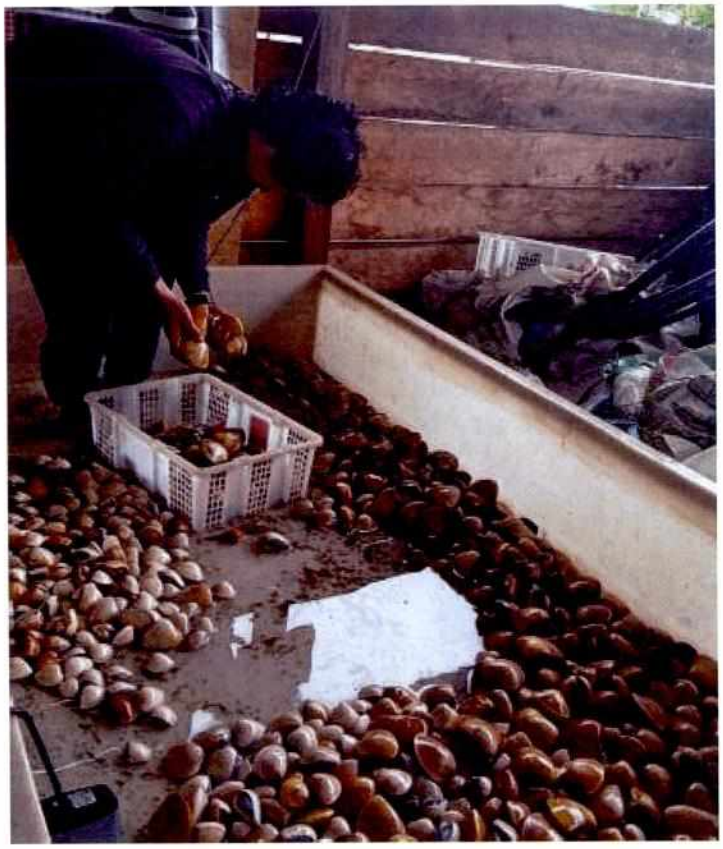

Photo 5: Mussels being graded.

It is also important to note that this survey was done during the Southwesterly monsoon (May to September), during which fishes are supposed to be less abundant. The main fishing season is during the Northeasterly monsoon (November to March) which brings fish in high diversity and abundance.

Within the five days of the survey, the amount of landed fish at the collection centre was about 1 tonne, including the trash fish. Other catch include the mollusks, which are also sold to the middleman. Whilst the larger jacks (Carangidae) are caught using fishing line at sea, all other fish recorded at the collection centre were captured using gillnets and trammelnets. All fish that were managed at the collection centre during the survey were to be taken directly to Sandakan.

3.3 Aquaculture

Aquaculture is not practiced regularly in Kg Trusan Sugut. In contrast, commercial fish are reared in net cages in the island village of Kg Kaniogan, near Beluran. Elsewhere in Sandakan and Sabah's west coast, commercial finfish cage operators are running good profit. In earlier analysis, all smallholders for finfish cage operation in Sandakan Bay area were running at a loss (Biusing et al, 1999). Despite the high-end prices for all commercial finfish from aquaculture operations, smallholders are to survive on subsidies of boats, cages and unpaid family labour. Until late 90s, the major source of fish seed was from the wild.

At some point in mid 2000s, some villagers in Trusan Sugut were supplied with floating net cages and fingerlings for fish rearing. The barramundi (*Lates calcarifer*), red perch (*Lutjanus* sp) and the grouper (*Epinephelus* sp) were used as stock. None of the cages survived to the point of marketing, and some fish were sold as food or to interested people who rear fish in net cages. It appeared that amongst the problems causing the failure include the unfamiliarity to the activity as against the traditional fishing and the problems associated with the fingerlings. Because the fingerlings were small and needed to be fed with commercial grower pellets, feed were lost into the flowing waters and the growth was very slow.

Earlier than that, a local fisherman developed his own floating net-cages to rear fish, using the same three species. However, he collected live-fish from the wild either using nets or fishing lines. In this way, his initial population of fish was in much larger size and was fed with trash fish from his own fishing activities. His fish, especially the giant grouper, once reached between 80-100kg and were sold off when his cages began seasoning off. When visited during this survey, he was still keeping three cages of barramundi (*Lates calcarifer*) which contain about 300 fishes on average 10kg each.

Photo 6: Finfish cages constructed by a local fisherman. These fish are fed irregularly with trashfish from his fishing trips. Note the withering timber.

4.0 FISH SPECIES

There were 29 species of fish recorded during this survey. However, this number is still small compared to the possible diversity of fish species in the area. Because the method used i.e. involving cast nets, trammel net and gill nets are still limited and only provide a small proportion of catchable fish. Considering the depths of the water channels, types of microhabitats, seasonal and tidal movement of fish and monsoonal changes in the area, the diversity of commercial marine/brackish fish in the Lower Sugut could increase, as well as the abundance. However, it is not known of the absence of large trawling boats in the village are related to ownership of boats or if the trawling boats are operating elsewhere during off-season.

The diversity of freshwater fish species was not demonstrated well because of the tidal influence that was still strong in the upstream areas where sampling was carried out. It is expected that the diversity of fish could significantly increase if sampling were done much further upstream. The non-tidal parts of Kinabatangan, for example, recorded more than 90 species of fish (Lim & Wong, 1994).

Some of the known species of commercial fish from the area were not recorded in the netting efforts during this survey, especially the barramundi. The results of the fish collection and survey are given in Tables 1, 2 and 3 below, followed by the rank of abundance for freshwater and brackish/marine fish (Figure 2 and 3). Pictures of fish species is given in Appendix I. None of the fish listed from this survey are endangered species.

Table 1: Freshwater fish captured at different locations in the lower Sugut.

Local/Common Name	Family	Species Name	Location/ Station	Ref: Suliansa (1998)
Jalan/Pangal/ Haruan/striped-snakehead	Channidae	*Channa striatus*	St 1	No
Turungou	Cyprinidae	*Osteochilus*	St 3,4,5	Yes
Turungou	Cyprinidae	*Cyclocheilichthys enolops*	St 2,4,5	No
Lais	Siluridae	*Kryptopterus*	St 1, 4	Yes

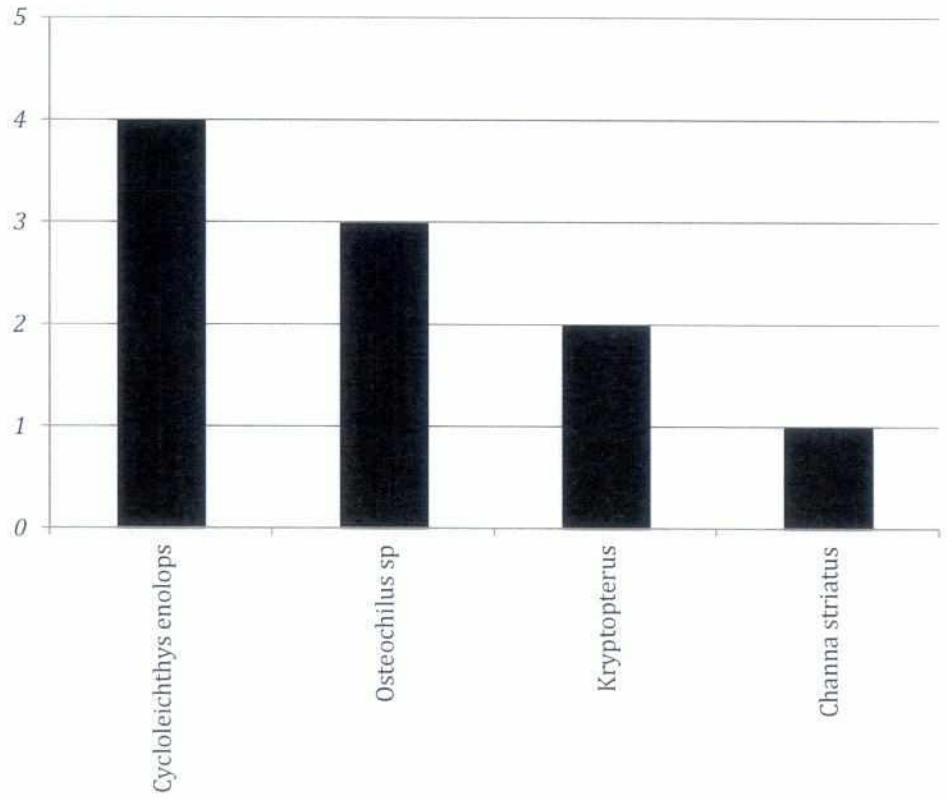

Figure 2: Abundance of freshwater fish in the Lower Sugut (x axis = number of fish)

Table 2: Brackish/Marine fish captured in the Lower Sugut, Sugut Bay and Kuala Sabang. Commercial fish species are marked with an asterisk (*).

Local/Common Name	Family	Species Name	Location/ Station	Ref: Suliansa (1998)
	Leiognathidae	*Leiognathus equulus*	St 6,7,8	No
		Leiognathus sp	St 6,7,8	Yes
Belanak	Mugilidae	**Liza tade*	St 6,7,8, Sugut Bay	No
	Drepanidae	**Drepane punctana*	St 6,7,8	No
	Gerreidae	*Gerres kapas*	St 6,7,8	No
	Ambassidae	*Ambassis kopsii*	St 6,7	No
Sembilang laut	Plotosidae	*Plotosus* sp	St 8, Kuala Sabang	No
Ikan sumpit	Toxotidae	*Toxotes chatareus*	St 6,7,8	No
	Siganidae	**Siganus vermiculatus*	St 7,8	No
	Tetraodontodae	*Tetraodon sp*		No
Talang, Ikan putih	Carangidae	**Scomberoides* sp	Sugut Bay	No
		**Caranx* sp		No
Kanai	Lutjanidae	**Lutjanus* sp	St 7	No
	Megalopidae	**Megalops* sp	St 6,7	No
	Sciaenidae	**Nibea soldado*	St 7,8	No
Tembakul	Gobiidae	*Periopthalmus* sp	St 6	No
	Terapontidae	**Mesopristes* sp	St 6	No

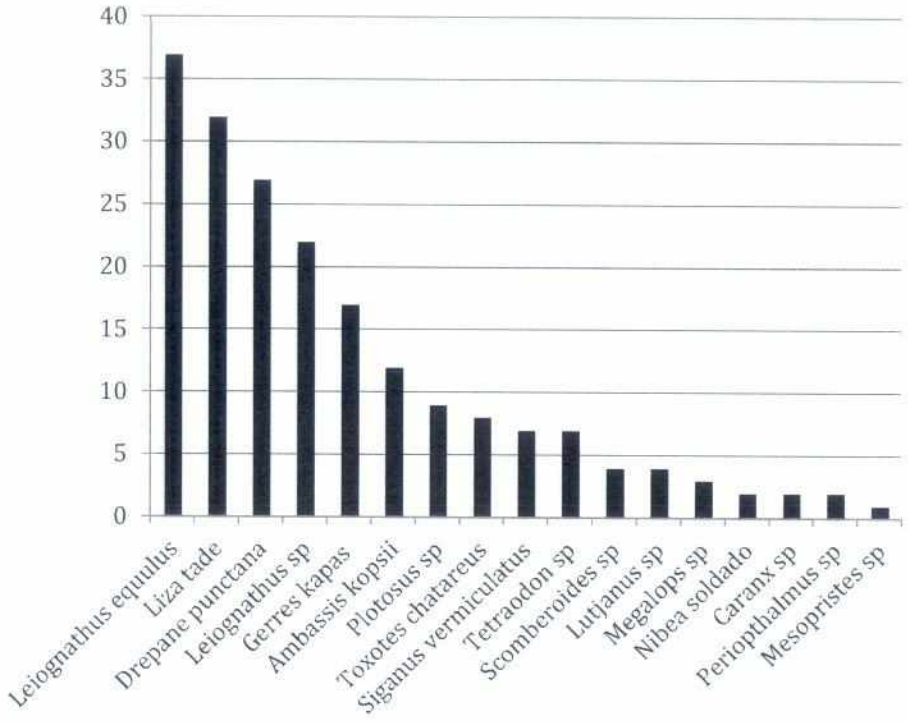

Figure 3: Abundance of brackish/marine fish captured in the lower Sugut, Sugut Bay and Kuala Sabang (x axis = number of fish)

Table 3: Marine fish recorded at the collection centre.

Local/Common Name	Family	Species Name	Ref: Suliansa (1998)
Senangin	Polynemidae	**Eleutheronema rhadinum*	No
	Sillaginidae	**Sillago* sp	No
Belanak	Mugilidae	**Liza vaigiensis*	No
	Scatophagidae	*Scatophagus* sp	No
Kanai	Lutjanidae	**Lutjanus russeli*	No
	Monodactylidae	*Monodactylus argenteus*	No
	Clupeidae	*Hilsa keele*	No

Recording fish species in a large area that is also subjected to seasonal and daily changes requires a long-term effort. However, this effort might also be paired with fishermen's activities, albeit there may be a bias towards larger and valuable species of fish.

It is suggested the more important aspect of fisheries studies in the Lower Sugut would be the studies that involve examination of the ecological functions of the ecosystem and how the quality of the ambiance changes over time. Information on the movement of fish would further assist future

management of the area, including all of the conservation and commercial activities that might develop into management options in the future.

5.0 OTHER ECONOMIC ACTIVITIES

Apart from fishery, the communities in Kg Pantai Buring and Kg Trusan Sugut are involved in various other activities, albeit on smaller scales or as participants in plantation schemes.

5.1 Plantations

In the last 10 years, all families of Kg Trusan Sugut joined a planting scheme for oil palm, a project headed by the former Assemblyman from the area. As a result, families also receive a continuous monthly income from this scheme. This activity, however, does not involve the villagers directly and they are not a part of the plantation system other than being investing landowners. Based on their share of land, each participant receives between RM500-1000 a month on a regular basis.

5.2 Homestays and Sport Fishing

In recent years, avid anglers arrive in Kg Trusan Sugut and spend time fishing. Although it developed without a systematic arrangement, anglers have been coming from abroad including Hong Kong, Singapore and Thailand. The main entry point is Sandakan from which connections were made using boats from the village. Accommodation is provided at homestays in the village and local skippers and boats are used in their fishing trips.

Fishing is done either at sea or within the lower Sugut itself. It is interesting to learn that many of the international anglers are practicing catch-and-release method specifically targeting the barramundi.

Related to this activity, some villagers especially those who are involved in providing accommodation and boats to anglers have informally expressed their suggestion for the introduction of the "tagal" concept along the Sugut Prai river. Tagal is a community-participated program in which harvest for a particular resource or from a particularly demarcated area are controlled with distribution of benefits to the community that controls the resource. In the case of Sugut Prai, the idea of *tagal* is for the protection of the river from all fish-harvest but catch-and-release is allowed.

Although this idea is from the community, based on their experience on the incoming sport anglers, Sugut Prai lies within the Sugut Forest Reserve. In pursuant of this idea, should it become a desirable program, community engagement by the Sabah Forestry Department might be a viable developing option.

6.0 DEVELOPMENT OF SCIENTIFICALLY BASED FR MANAGEMENT

The mangrove part of the Sugut Forest Reserve have been little disturbed and is still in a pristine condition. However, it also a fact that the larger parts of the drier lands upstream of mangrove and freshwater swamp, which form the reserve are already planted with oil palm. At the same time, concentration of scientific work has not been given to this area as compared to the Segama and Kinabatangan. The strength for management of this reserve must be developed through a strategically planned scientific programme. Baseline, applied research programmes should be initiated to build capacity for corrective measures in the future.

Because Sugut river empties into the mangrove deltas and later into the sea, it receives inputs of pollutants on a continuous basis. The types of materials that are dissolved depend on the land-use activities in the upstream of the river. It is known that euthropication would be the obvious result of plantation in the upstream. However, other materials including chemicals, heavy metals, sediment loads and solid wastes are also coming this way. It is therefore suggested that scientific programmes are to be implemented beyond the boundaries of the forest reserve.

6.1 Data collection for fisheries

The impacts of environmental changes can be measured based on the amount of resources being harvested by the community. As mentioned earlier in section 3.2, the source of data in Kg Trusan Sugut (and perhaps similar in other smaller upstream villages) could be identified and representatives from fishermen and/or the middlemen are to be involved in the data collection. It is suggested that long-term data are collected on a simplified manner but would serve the objective of the initiative. Important information such as the number of active fishermen and fish landing could be recorded on a monthly basis.

7.0 OTHER ISSUES

This report was written in the wake of a security alert in the east coast of Sabah. The security breach that took place in Lahad Datu in early 2013 has now taken a different forms and it involves kidnapping and loss of lives. The presence of security personnel has also assisted the Sabah Forestry Department in demolishing a squatter settlement in the mangrove.

8.0 POTENTIAL IMPACTS OF RECLASSIFICATION OF SUGUT FOREST RESERVE

The reclassification of the Sugut Forest Reserve from Class II to Class I Protection forest would ensure the long-term existence of sensitive ecosystems i.e. the mangrove and the freshwater swamp. Hence, a reclassification from Class II would ensure a significant decrease of sediment loads from the forest reserve itself. It is therefore important to consider the positive potential impacts of the reclassification to the surrounding communities and conservation of two very sensitive wetland ecosystems.

The potentials for scientific research are very high given that the area has not been given proper attention in the past. The setting up of field stations will serve this purpose significantly. In planning for the scientific programmes, initiative might be taken early for the involvement of new institutions from Malaysia and abroad. The models being used in Maliau Basin and Danum Valley could be used, especially in setting up of the future Management Committee.

It is possible to generate revenues from the forest reserve, which could be used for its own conservation. However, this will take a significant amount of time before a proper economic model could be developed.

9.0 CONCLUSIONS

The area is small but is made of two very important ecosystem i.e. the mangrove and the freshwater swamp. The decision to reclassify the forest reserve away from Class II Commercial Forest will give positive impact both to the State of Sabah and to the environment. The process will have a far reaching consequence including the development of tourism, conservation programs and commercial fisheries. It is also concluded that the fishery activities in the Lower Sugut should be looked into seriously; that it is a lucrative but is still less developed; and that it is important to plan for the future to ensure a sustainable fishery development.

The idea for the management of fishery resources in the Lower Sugut can be simplified as follows:

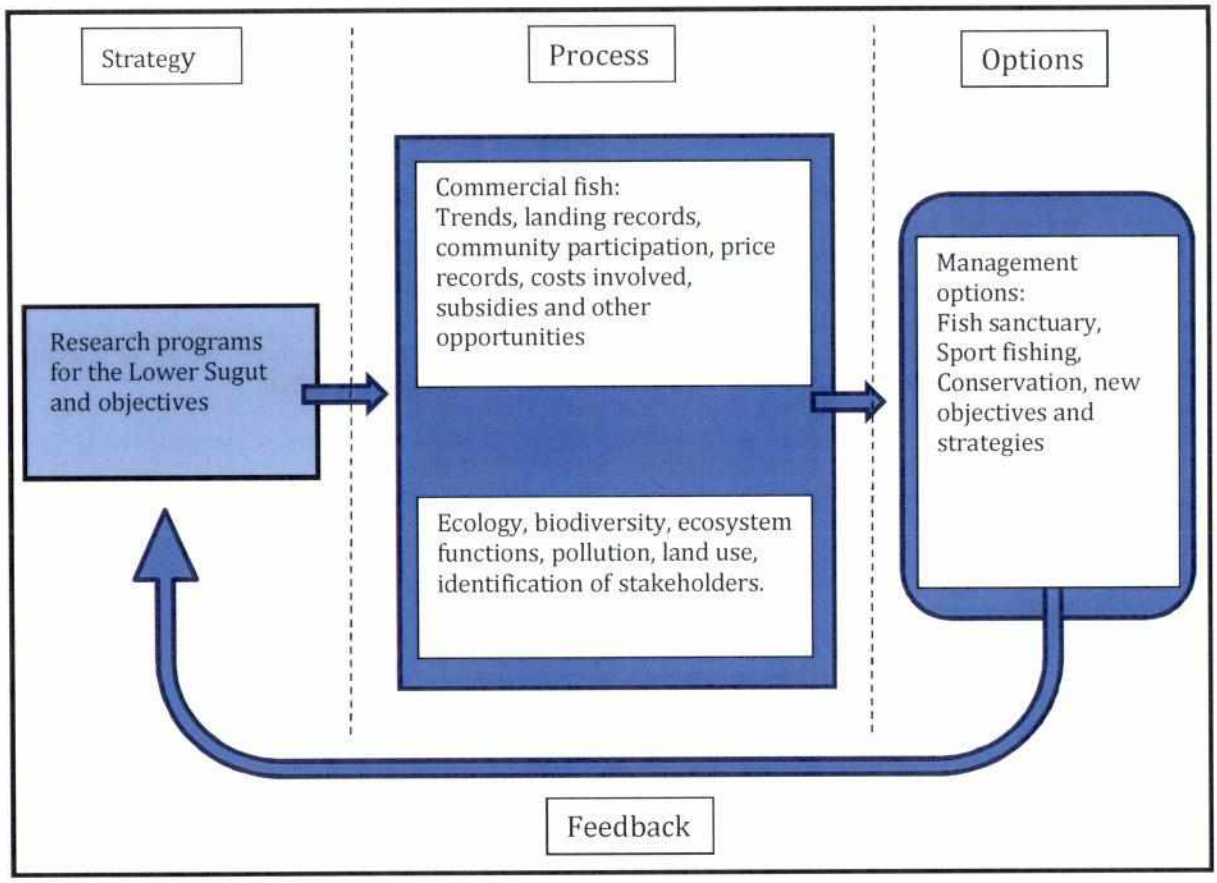

Figure 4: Simplification of ideas to support the scientifically-based management of resources related to fisheries in the Lower Sugut.

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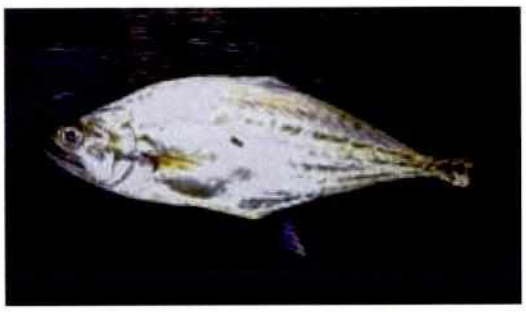
APPENDIX I: PHOTOS OF THE FISH SPECIES RECORDED IN THIS SURVEY

Eleutheronema rhadinum

Sillago sp

Caranx sp.



Scomberoides sp

Liza tade

Liza vaigiensis

Lutjanus sp

Megalops sp

Mesopristes sp.

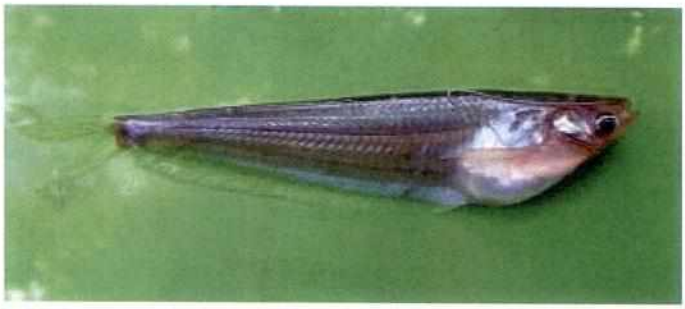
Gerres kapas

Cylocheilichthys enolops

Megalops sp

Toxotes chatareus

Plotosus sp.



Kryptopterus sp

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Hilsa keele

Periopthalmus sp.

Tetraodon sp.

Channa striatus

Scatophagus argus

Leiognathus sp

Osteochilus sp

Leiognathus equulus

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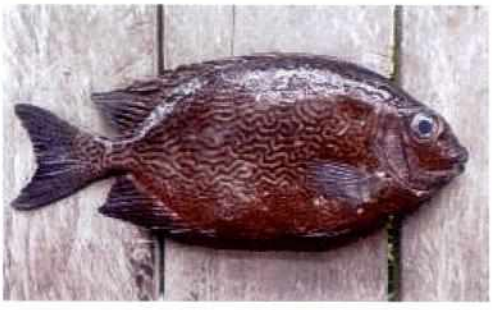
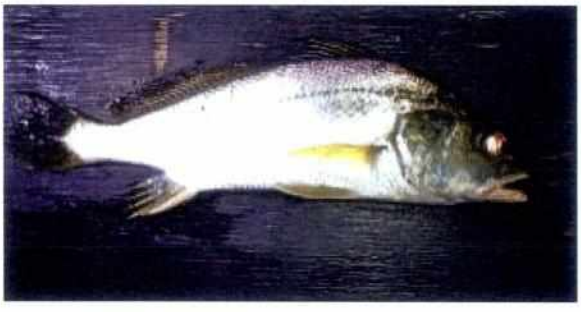


Siganus vermiculatus

Ambassis kopsii



Nibea soldado

Drepane punctata

Lutjanus russeli

Monodactylus argenteus

Large specimen of *Caranx sp >20kg*.

Tiger prawn *Paneus monodon*