

ISME/GLOMIS Electronic Journal

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Management implications of the Sibyte Mangrove Forest Reserve in Sabah based on inventory data

Background

The first inventory of mangrove forests in Sabah was conducted in 1969/1970 (FORESTAL, 1973). As information gathered from the inventory was inadequate for the sustainable management and conservation of mangroves, a second inventory was carried out by the Sabah Forestry Department as part of the Project entitled, "Sustainable Management and Conservation of Mangrove Ecosystems" (2006-2010) in Sabah.

The Sibyte Mangrove Forest Reserve (MFR) (5°57'N, 118° 02'E) was chosen as the site to initiate this project for logistic convenience. The reserve of about 2,364 ha is located about 23 km northwest of Sandakan (Fig. 1). It has been managed for production of charcoal and piling poles with harvesting coupes ranging from 1-5 ha (Tangah & Lee, 2005). The only charcoal mill, which operates three kilns, is located in Kg. Sg. Batang, Sandakan.

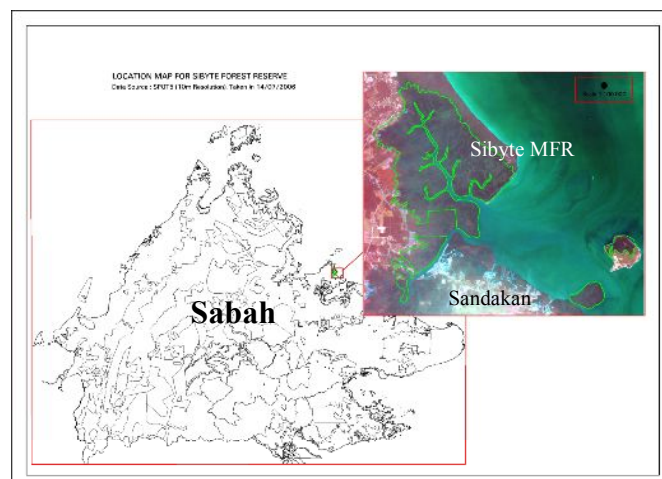


Fig. 1. Location of the Sibyte Mangrove Forest Reserve

Methodology

An inventory of tree resources in the Sibyte MFR was carried out in 2007/2008. A total of 416 sample plots of 20 x 20 m (0.04 ha) each were established. The plots were located mostly along rivers of Sibyte, Pintas, Sibugal, Pamaguan and Batang. Within each plot, trees ≥ 10 cm diameter at breast height (dbh) were tagged, enumerated, measured and identified. Measurements included dbh and total tree height. The quality and type of mangrove forests were described and their extent was verified using SPOT 5 Images (10 m resolution).

Results and discussion

Based on plot occurrence, the dominant tree species were *Rhizophora apiculata*, *Xylocarpus granatum*, *Ceriops tagal*, *Bruguiera parviflora* and *Rhizophora mucronata* which are found in more than 50% of the plots (Table 1). Of these species, *R. apiculata*, *R. mucronata* and *C. tagal* are of commercial importance for forestry. *Rhizophora apiculata* was most dominant, occurring in 97% of the plots and contributing to 38% of the total volume of 184,120 m³ or 78 m³/ha.

Table 1. Dominance and volume of tree species in the Sibyte MFR

Species	Plot occurrence	Mean vol. (m ³)	Total vol. (m ³)
<i>R. apiculata</i>	403	29.5	69,659
<i>X. granatum</i>	337	15.0	35,500
<i>C. tagal</i>	333	3.62	8,559
<i>B. parviflora</i>	307	7.34	17,343
<i>R. mucronata</i>	235	12.6	29,661
<i>E. agallocha</i>	66	3.18	7,506
<i>S. hydrophyllaceae</i>	16	1.59	3,762
<i>C. decandra</i>	8	3.42	8,082
<i>B. sexangula</i>	1	1.71	4,048
Total			184,120

Commercially important species accounted for a total mean volume of 46 m³ and 59% of the total volume. Other species recorded in the plots were *Excoecaria agallocha*, *Ceriops decandra*, *Bruguiera sexangula* and *Scyphiphora hydrophyllaceae*.

Table 2. Extent of forest types in the Sibyte MFR in 1969/1970 and 2007/2008

Forest type	Extent (ha)	
	1969/1970	2007/2008
<i>Rhizophora</i>	1,993	420
Mixed species	-	1,739
<i>Excoecaria</i>	212	83
Agriculture	59	-
Development	100	122
Total	2,364	2,364

Based on the inventory data supported by analysis of SPOT 5 Images, the total extent of the Sibyte MFR remained unchanged from 1969/1970 to 2007/2008 (Table 2).

The 59 ha allocated for agriculture in 1969/1970 were abandoned with part designated for development and part reverted back to MFR. Development was mainly for human settlement and shrimp pond farming.

From the data, the most significant change was in the composition of forests previously dominated by *Rhizophora* species. Most of these forests (1,993 ha in 1969/1970) have become mixed species forests (1,739 ha in 2007/2008). This could be attributed to the harvesting of primarily *Rhizophora* trees for charcoal and pole production, and retaining the non-commercial species. The logged-over forests with their open canopies encouraged the natural regeneration of other tree species e.g. *X. granatum* and *B. parviflora*. This would affect future production of charcoal and poles from the MFR. It has been recommended that proper harvesting guidelines be developed for implementation and enrichment planting of *Rhizophora* species be carried out following forest harvesting.

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