

## **Canopy density classification of Matang Mangrove Forest Reserve using machine learning approach in remote sensing for transect establishment**

### **ABSTRACT**

Mangrove forests provide different goods and services. The unique environmental factors affecting the growth of mangroves are distance from the sea or the estuary bank, frequency and duration of tidal inundation, salinity, and composition of soil. These crucial factors may under certain circumstances be sources of obstacles in accessing and managing the mangroves. The application of remotely sensed imagery data can bring about a more accurate way of monitoring mangroves. In this study, a set of Landsat 8 satellite imagery covering Matang Mangrove Forest Reserve was classified by using an extension of ArcGIS application, namely Feature Analyst™. Canopy densities of four different classes were identified according to spatial association, size, shape, texture, pattern and shadow of features in the image; they are dense canopy, moderately dense canopy, low dense canopy, and open areas. Ultimately, three classes of disturbance were created based on the factors believed to have effects on the quality of mangroves which are as follows: least disturbed area, moderately disturbed area, and most disturbed area. The accuracy of the classes identified was validated through ground surveys by observing the abundance of vegetation. Subplots of ground validation were created by using random systematic line plot method. Most of the over-logged areas were replanted with *Rhizophora* species.

**Keyword:** Mangroves; Geospatial technology; Forest canopy; Malaysia