SPATIAL MODELING FOR ECOSYSTEM DISTURBANCE DISTRIBUTION IN "HUTAN PENDIDIKAN WANAGAMA I"

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ABSTRACT

Hutan Pendidikan Wanagama I (HPW I) gives a lot of benefits for the local community, indicated by the rapid increasing of cultivation land within the area. However, human activities can be a threat for forest ecosystem within HPW I area. Therefore, it is necessary to determine forest ecosystem disturbance experienced by HPW I. The balance of stands' ecosystem can be quantified using stand basal area. The objectives of this study are to: (1) Determine the stand basal area in HPW I; (2) Map the ecosystem disturbance due to human activities in HPW I; and (3) Develop spatial model for ecosystem disturbances in HPW I.

Worldview-2 satellite imagery was classified to obtain land cover and forest strata maps which then used to locate the basal area sampling point. Accuracy on the classification results were quantified using kappa statistic. Stand basal area was measured using Bitterlich's method. Spatial analysis with Geographic Information System (GIS) was done to map five disturbance parameters; i.e.: distance to rural road, distance to macadam road, distance to settlement, slope and entropy value. Disturbance distribution in HPW I was modelled using regression analysis.

The results showed that average stands basal area of HPW I was 17,2 m^2/ha. Spatial analysis on five disturbance parameters showed that HPW I can be classified into three areas: the high disturbed area 178,7 ha (stand basal area 0 – 13,6 m^2/ha) the moderate disturbed area 246,7 ha (stand basal area 13,7 – 19,1 m^2/ha) and the less disturbed area 189,2 ha (stand basal area 19,2 m^2/ha up). Spatial modelling using regression analysis showed that only slope and entropy were statistically significant in explaining the LBDS's variance. Ecosystem disturbance model in HPW I using multiple linear regression equation was obtained as follows:

$$y = 22{,}451\text{-}23{,}164X_1\text{+}0{,}243X_2$$

Where y is basal area (m^2/ha) , X_1 and X_2 are entropy and slope (%).

Key words: HPW I, basal area, ecosystem disturbance

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