

Assessment of the Landscaped Biodiversity in the National Park of Tlemcen (Algeria) Using Per-Object Analysis of Landsat Imagery

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Abstract : In the forest management practice, landscape and Mediterranean forest are never posed as linked objects. But sustainable forestry requires the valorization of the forest landscape, and this aim involves assessing the spatial distribution of biodiversity by mapping forest landscaped units and subunits and by monitoring the environmental trends. This contribution aims to highlight, through object-oriented classifications, the landscaped biodiversity of the National Park of Tlemcen (Algeria). The methodology used is based on ground data and on the basic processing units of object-oriented classification, that are segments, so-called image-objects, representing a relatively homogenous units on the ground. The classification of Landsat Enhanced Thematic Mapper plus (ETM+) imagery is performed on image objects and not on pixels. Advantages of object-oriented classification are to make full use of meaningful statistic and texture calculation, uncorrelated shape information (e.g., length-to-width ratio, direction, and area of an object, etc.), and topological features (neighbor, super-object, etc.), and the close relation between real-world objects and image objects. The results show that per object classification using the k-nearest neighbor's method is more efficient than per pixel one. It permits to simplify of the content of the image while preserving spectrally and spatially homogeneous types of land covers such as Aleppo pine stands, cork oak groves, mixed groves of cork oak, holm oak, and zen oak, mixed groves of holm oak and thuja, water plan, dense and open shrub-lands of oaks, vegetable crops or orchard, herbaceous plants, and bare soils. Texture attributes seem to provide no useful information, while spatial attributes of shape and compactness seem to be performant for all the dominant features, such as pure stands of Aleppo pine and/or cork oak and bare soils. Landscaped sub-units are individualized while conserving the spatial information. Continuously dominant dense stands over a large area were formed into a single class, such as dense, fragmented stands with clear stands. Low shrublands formations and high wooded shrublands are well individualized but with some confusion with enclaves for the former. Overall, a visual evaluation of the classification shows that the classification reflects the actual spatial state of the study area at the landscape level.

Keywords : forest, oaks, remote sensing, diversity, shrublands

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