

Abstract

This work evaluates and reports the accuracy assessment of Maximum Likelihood Supervised Classification (MLSC) using the different stages of Mountain Pine Beetle (MPB) infestations outside the Lake Tahoe Basin Management Unit (LTBMU) using Landsat 8 OLI 30m and WorldView-02 (WV02) 2m (comparatively higher) spatial resolution imagery. Using ArcGIS 10.3, the accuracy of satellite imagery using MLSC and the Enhanced Wetness Difference Index (EWDI) provide a good comparison of the imagery at dissimilar spatial resolutions.

MPB infestations at epidemic population levels can cause economic losses and have detrimental effects ecologically in Lodgepole pine tree stands. Detecting endemic populations of MPB can prevent epidemic infestations, preventing economic and ecological losses. After pre-processing, using the different stages of the MPB infestations as a control points, MLSC and the calculation of Tasseled Cap Transformation (TCT) indices (e.g., to calculate EWDI) are used to assess the accuracy of each type of imagery. The overall accuracy results of MLSC of Landsat 8 OLI 30m (51.22%) supersede those of WV02 imagery (26.82%) and are shown in error matrices within this thesis. Accomplishments of this project include the advantage to using WV02 imagery to locate MPB infestations at their endemic stage rather than relying on annual ADS's. Improvements in positional accuracy of Global Positioning System (GPS) data collection devices and improved Remote Sensing (RS) software for image analysis may improve this analysis.