TWO IMAGE CLASSIFICATION OPTIONS FOR QUANTIFYING EASTERN REDCEDAR (*JUNIPERUS VIRGINIANA*) ENCROACHMENT INTO THE CROSS TIMBERS REGION

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Abstract—Encroachment of eastern redcedar (ERC) (*Juniperus virginiana*) into the *Quercus*-dominated Cross Timbers region of the Southern Great Plains is an ongoing management issue that affects ecosystem services and wildfire risk. The location and density of ERC canopy in the forest understory and midstory and in forest gaps are important information for fire managers seeking to estimate the behavior of fires or anticipate resources and attack methods needed to contain wildland fires. We compared a supervised classification method of 3-band (RGB) imagery taken from Google Earth and an unsupervised isocluster classification of multispectral RGB + Near Infrared imagery augmented with an NDVI and texture layer to identify the canopy of ERC on 124 forested field plots located in the Cross Timbers forest matrix of Pawnee and Payne Counties, OK, USA. The 3-band imagery detected approximately 50 percent of the canopy area (R^2 = 0.78, n = 124):

$$ACA = 1.95 \times CCA + 13.01$$

where

ACA= Actual Canopy Area (m2)
CCA=Classified Canopy Area (m2)

The multispectral imagery identified a greater proportion of ERC canopy area (95 percent) but had higher variance, particularly for plots with less ERC canopy area (R^2 = 0.43, n = 124):

$$ACA = 1.05 \times CCA + 19.62$$

Both of these techniques can be used throughout the Cross Timbers region to identify the best locations for fuels reduction treatments, such as mastication or prescribed fire, to reduce wildfire risk and potential property damage.

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