

*Proceedings of the 2010 IEEE International Geoscience and Remote Sensing Symposium, 25-30 July 2010, Honolulu, Hawaii.*

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Detection of leafy spurge using hyper-spectral-spatial-temporal imagery.

Leafy spurge, a designated noxious weed that has infested large amounts of land in the Northern Great Plains states, is difficult to control and monitor. Development of an affordable technique to map and monitor leafy spurge would contribute to the control of this aggressive species. High spatial, spectral, and temporal imagery from a low-cost sensor was analyzed to detect and classify the amount of leafy spurge present on an unmanaged range site. Aerial hyperspectral images were acquired with 0.3-m ground resolution approximately every 10 days during the summer of 2009, and 50 2-m x 2-m reference areas were surveyed for percent cover of leafy spurge as well as several other variables. Single and multiple date classifications were performed using the random forest classifier. Leafy spurge was most accurately detected early and late in the growing season. Significant classification accuracy increases were observed with the multiple date classification. Single date accuracies achieved 90% overall accuracy in early June, while multiple date classifications achieved over 96% overall accuracy.