

A Comparison of Remote Sensing Methods for Estimating Summer Annual Plant Cover. Roxanne Foss, Department of Environmental Science, Policy & Management, University of California, Berkeley, CA

Yellow star-thistle (*Centaurea solstitialis*; YST) is a noxious weed invading California's grasslands statewide, outcompeting native grasses, native forbs, and non-native annual grass forage (Bradley et al 2009, Pitcairn et al 2006). A considerable amount of research and a number of integrated pest management (IPM) programs have sought to reduce the density and extent of YST by burning, grazing, applying herbicide, and mechanically removing individuals (DiTomaso et al. 2006). This case study examines the accuracy of multiple classification methods in identification of potential YST cover across Briones Regional Park, within Contra Costa County, CA. Late summer annual plant cover was estimated with 2014 National Agriculture Imagery Program (NAIP) imagery and Landsat 8 near-infrared data using unsupervised, supervised, machine learning, and decision tree classification methods. All methods initially had low overall accuracy (less than 63%), but accuracy improved when cover classes with similar spectral signatures were combined. The vector machine learning classification method had the highest overall accuracy of all tested classification schemes (84.66% overall accuracy). However, the supervised classification method had the highest user and producer accuracy in identifying herbaceous cover with a high infrared signature (79.67% user; 89.09% producer). The classification of plant cover with high NIR signatures corresponds to a suite of summer annual species of management concern at Briones Regional Park. This replicable approach is applicable to land managers across California that face similar invasions of YST and other summer-maturing invasive plants.