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Title:

Using Satellite Remote Sensing to Map Changes in Aquatic Invasive Plant Cover in the Sacramento-San Joaquin River Delta of California

Key Words: Satellite Remote Sensing, Map Changes, Invasive Plant Cover

Abstract:

Waterways of the Sacramento San Joaquin Delta have recently become infested with invasive aquatic weeds such as floating water hyacinth (*Eichhorhria crassipes*) and water primrose (*Ludwigia peploides*). These invasive plants cause many negative impacts, including, but not limited to: the blocking of waterways for commercial shipping and boating; clogging of irrigation screens, pumps and canals; and degradation of biological habitat through shading. Zhang et al. (1997, *Ecological Applications*, 7(3), 1039–1053) used NASA Landsat satellite imagery together with field calibration measurements to map physical and biological processes within marshlands of the San Francisco Bay. Live green biomass (LGB) and related variables were correlated with a simple vegetation index ratio of red and near infra-red bands from Landsat images. More recently, the percent (water area) cover of water hyacinth plotted against estimated LGB of emergent aquatic vegetation in the Delta from September 2014 Landsat imagery showed a 80% overall accuracy. For the past two years, we have partnered with the U. S. Department of Agriculture (USDA) and the Department of Plant Sciences, University of California at Davis to conduct new validation surveys of water hyacinth and water primrose coverage and LGB in Delta waterways. A plan is underway to transfer decision support tools developed at NASA's Ames Research Center based on Landsat satellite images to improve Delta-wide integrated management of floating aquatic weeds, while reducing chemical control costs. The main end-user for this application project will be the Division of Boating and Waterways (DBW) of the California Department of Parks and Recreation, who has the responsibility for chemical control of water hyacinth in the Delta.