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Title: Thirty Years of Change in Subalpine Forest Cover from Landsat Image Analysis in the Sierra Nevada Mountains of California

Abstract. Landsat imagery was analyzed to understand changes in subalpine forest stands since the mid-1980s in the Sierra-Nevada region of California. At locations where long-term plot measurements have shown that stands are becoming denser in the number of small tree stems (compared to the early 1930s), the 30-year analysis of Landsat greenness index (NDVI) indicated that no consistent increases in canopy leaf cover have occurred at these same locations since the mid-1980s. Interannual variations in stand NDVI closely followed snow accumulation amounts recorded at nearby stations. In contrast, at eastern Sierra whitebark pine stand locations where it has been observed that widespread tree mortality has occurred, decreasing NDVI trends over the past 5-10 years were consistent with rapid loss of forest canopy cover. Landsat imagery was further analyzed to understand patterns of post-wildfire vegetation recovery, focusing on high burn severity (HBS) patches within burned areas dating from the late 1940s. Analysis of landscape metrics showed that the percentage of total HBS area comprised by the largest patch of recovered woody cover was relatively small in all fires that occurred since 1995, but increased rapidly with time since fire. Patch complexity of recovered woody cover decreased notably after more than 50 years of regrowth, but was not readily associated with time for fires that occurred since the mid 1990s. The aggregation level of patches with recovery of woody cover increased steadily with time since fire. The study approach using satellite remote sensing can be expanded to assess the consequences of stand-replacing wildfires in all forests of the region.

Key Words: Fires, Landsat Satellites, Forests

Meeting URL: <http://www.nps.gov/yose/index.htm>
Yosemite Hydroclimate Meeting
Oct. 7-9, 2015
Yosemite National Park, Sierra Nevada, CA