**NASA DEVELOP National Program**

USGS at Colorado State University - Fort Collins, CO

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**Short Title: Colorado Agriculture**

**Updated Abstract**

Timber harvests are a crucial part of Northern Colorado and Southern Wyoming’s local economy. The future health of the forests and ecological diversity are contingent upon appropriately managing the present forest resources. However, incomplete records of past harvests expose disparities concerning the accurate location, timing, and extent of the forest harvests. This project was designed to provide natural resource managers with a reliable map of the forest harvest history in an effort to facilitate the most educated decision making process. At the request of the three partners on this project, Ben Delatour Scout Ranch (BDSR), Bioenergy Alliance Network of the Rockies (BANR), and Colorado State Forest Service (CSFS), the team spectrally linked 41 years of Landsat data to create a continuous map delineating forest harvest history, wildfires, and mountain pine beetle kill. By accessing the Landsat archives, this project utilized 1974-2014 imagery from Landsat 1-3 Multispectral Scanner (MSS); Landsat 4-5 Thematic Mapper (TM); Landsat 7 Enhanced Thematic Mapper Plus (ETM+); and Landsat 8 Operational Land Imager (OLI). These collected scenes were preprocessed using LandsatLinkr to acquire consistent images atmospherically corrected for surface reflectance, masked for cloud cover, and stacked in a Tasseled Cap (Tcap) composite. The generated Brightness, Greenness, and Wetness bands (Tcap 1, 2, and 3) were run through the Landsat-based Detection of Trends in Disturbance and Recovery (LandTrendr) model to produce a visual representation of all magnitudes of disturbances within the designated area. By prioritizing timber harvest as a key disturbance, LandTrendr accurately delineated an annual forest harvest history in Northern Colorado and Southern Wyoming.