

# NEXT-GENERATION FOREST CHANGE MAPPING ACROSS THE UNITED STATES: THE LANDSCAPE CHANGE MONITORING SYSTEM (LCMS)

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**Abstract**—Forest change information is critical in forest planning, ecosystem modeling, and in updating forest condition maps. The Landsat satellite platform has provided consistent observations of the world’s ecosystems since 1972. A number of innovative change detection algorithms have been developed to use the Landsat archive to identify and characterize forest change. The inter-agency Landscape Change Monitoring System (LCMS) has been launched to engage these cutting edge methodologies in a national-scale, sustained change monitoring operation. A Science Team supporting LCMS has evaluated the relative strengths of several leading algorithms in identifying different types of forest change across a variety of ecosystems. Additionally, a machine-learning approach has been developed that uses an ensemble of algorithm outputs to predict a surface which best matches independently collected reference data. This ensemble technique integrates the strengths of each individual algorithm in different situations, and has been shown to reduce overall error in LCMS trials. The LCMS Science Team has also, in collaboration with Google, overcome significant data processing hurdles associated with analyzing tens of thousands of large images. Following Science Team recommendations, LCMS is quickly moving toward production and maintenance of validated, nationally consistent maps of the causes and timing of historical forest change.

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