

Development of National Land Change Products

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Changes in land cover and land use can occur in response to both human (e.g., changes motivated by economic drivers or public policy) and natural drivers (e.g., weather and climate variability, geologic events). Changes in land cover can also impact local to global scale weather and climate by altering the flow of energy, water, and greenhouse gases between the land and the atmosphere. Land change science is about the understanding the interactions between people and nature that lead to changes in the type, intensity, condition, and location of land use and land cover. Remote sensing data have been widely used to map and monitor land use and land cover change and to distinguish between human and anthropogenic change.

The U.S. Geological Survey (USGS) has a long history to produce land cover dataset. Several major land cover and land cover change datasets have been produced by the USGS Earth Resources Observation and Science (EROS) Center including both international and national scale products since early 1970s. Systematic large area land cover monitoring has become prevalent in recent years after Landsat data were made available free of charge by the USGS. These products have contributed to understanding past and present land use, land cover, and land condition change needed for variety research and applications including natural resources management and land change assessments. However, there are increasingly demands for more timely, accurate, and relevant land change products across government and academic organizations. Land change (specifically land use and land cover) dynamics is one of 21st century grand challenges on human and natural systems, including contributions to anthropogenic releases of CO₂ to the atmosphere, changes in hydrologic dynamics, modifications of terrestrial habitat, disruptions of species migration, and role in the spread of disease vectors.

In this presentation, products of several main USGS land change products including National Land Cover Database and recent Land Change Monitoring, Assessment, and Projection initiative are introduced. The efforts and accomplishments we have made in using remote sensing data to characterize land cover condition and change are explained. Challenges and opportunities for producing future land change product are also discussed.