

NEW MEXICO

and Landsat

Landscapes of rose-colored deserts, broken mesas, and high, snow-capped peaks give New Mexico its reputation as the “Land of Enchantment.” To monitor the well-being of those natural resources, and to manage their recovery in the aftermath of disasters, New Mexico relies on observations from the Landsat series of satellites operated by USGS.

Data from Landsat also assists New Mexico in managing its precious water resources for agriculture, recreation, and industrial and community consumption. Landsat supports a variety of public and private sector decisions across New Mexico and the Nation for effective adaptation to changing landscapes.

Here are some examples of Landsat’s benefits to New Mexicans.

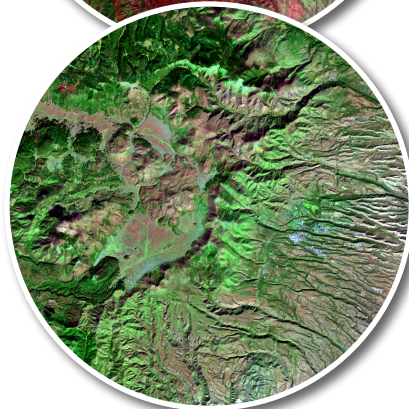
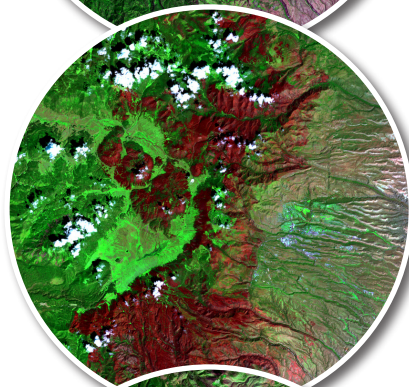
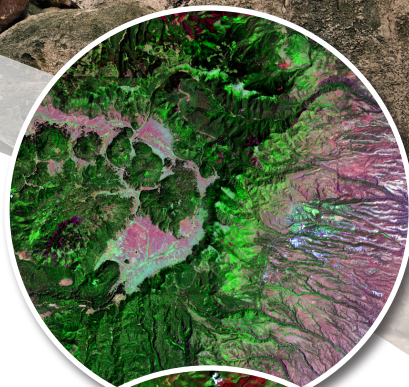
Wildland Fires

With warming temperatures, trees weaken and die at increasing rates. The result is climate-stressed vegetation burning in unusually large and severe wildfires across the West. New Mexico is no exception. Landsat data can inform New Mexico land managers on areas where fuel loads are high, and where prescribed burns can remove that fuel before wildfires occur.

Burn maps derived from Landsat data show managers where land is vulnerable after wildfires, exposing soil to erosion, flooding, and mudslides from subsequent rainstorms. Sediments running downhill and downstream can damage houses, fill reservoirs, and put endangered species and community water supplies at risk. Maps created from Landsat images identify those potential risk areas and help to inform mitigation efforts.

National Land Imaging Program Benefits: New Mexico

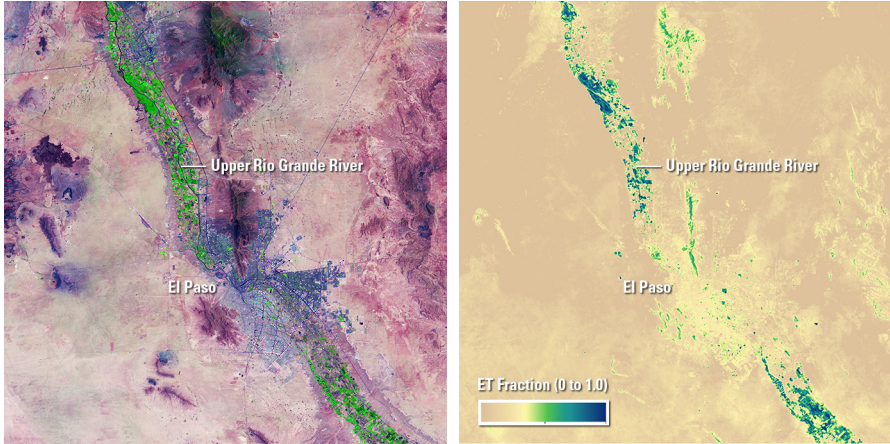
The U.S. Geological Survey (USGS) National Land Imaging Program provides to government, commercial, academic, and public users a wide range of satellite imagery and other remotely sensed and geospatial data. These activities include worldwide access to Landsat satellite data through the NLI-funded USGS Earth Resources Observation and Science (EROS) Center.



The depth of the Landsat archive tells the story of the Las Conchas wildfire that burned more than 156,000 acres near Los Alamos in June 2011. The top image was acquired days before the wildfire started. The center image shows the footprint of the burned area, and the bottom image from October 2019 shows the landscape’s recovery.

Managing Water Consumption

Water is crucial to agricultural, municipal, industrial, and recreational users throughout New Mexico's Upper Rio Grande Basin. With changes in climate, ongoing droughts, and decreased water levels in reservoirs, many look to groundwater sources to support agriculture, industry, and their communities. Researchers use Landsat data to accurately estimate how much groundwater is evaporating from the soil and vegetation surfaces or transpiring by plants. That information in turn helps measure water use on farm fields and municipalities, improving local water management decisions.



The Landsat 8 image at left from June 7, 2019, shows irrigated land along the Upper Rio Grande River down to El Paso, TX, and into Mexico. At right, using surface temperature from Landsat's sensor, the map shows an estimate as a percentage of how much potential water was lost through evaporation and plant transpiration on the same date, June 7, 2019, using a model developed by USGS EROS.

Commercial Landsat Applications

Urban and exurban landscapes throughout the world are growing at a rapid pace, with the total area of urban land cover estimated to triple between 2000 and 2030. New Mexico-based startup Descartes Labs explores the use of Landsat for mapping urban growth and urban heating using machine learning algorithms and geospatial big data. Of the many data sources Descartes Labs has ingested, the Landsat archive is one commonly used for long-term change analyses. In several recent projects, the company has utilized the Landsat archive and the Descartes Labs platform to map changes to urban and exurban environments.



August 2019 Landsat 8 image of the white sands of White Sands National Monument in southern New Mexico.

Preserving Natural Landscapes

New Mexico is known for its spectacular scenery, fascinating natural history, and unique cultural heritage. Landsat assists in the management and preservation of those landscapes. With the eight-day coverage of its two satellites and its almost 50-year archival record, Landsat can document the impacts of people and nature on New Mexico's many National Parks and thus help park managers make informed land management decisions. Where is disease impacting forests? Where is drought affecting biodiversity and ecosystems? Landsat helps to answer those questions.

The Landsat series is a joint effort of USGS and NASA. NASA develops and launches the spacecraft; USGS manages satellite operations, ground reception, data archiving, product generation, and data distribution. Funding for the National Land Imaging Program's Landsat operations and data management is provided through USGS.

Landsat: Critical Information Infrastructure for the Nation

Landsat is the most widely used land remote sensing data source within Federal civilian agencies. Local, State, and Federal agencies use Landsat to monitor and forecast a wide range of land surface phenomena. Information from Landsat contributes to day-to-day decisions on land, water, and resource use that protect life and property, safeguard the environment, advance science, technology and education, and grow the U.S. economy. Landsat's imagery provides a landscape-level view of land surface, inland lake, and coastal processes, both natural and human-induced. Landsat enables us to better understand the scope, nature, and speed of change to the natural and built environment.

Businesses draw upon Landsat data to provide customer-specific applications to improve logistics, resource allocation, and investment decisions. Commercial space imaging firms leverage Landsat data to refine product offerings and support new information services. A 2017 USGS study found **the total annual economic benefit of Landsat data in the U.S. to be \$2.06 billion**, far surpassing its development and operating costs.

Landsat 7 and Landsat 8 provide eight-day repeat coverage of the Earth's land surfaces. Landsat 9, which will replace the aging Landsat 7, is under development for launch in 2021. NASA and USGS are currently reviewing the findings from a joint Architecture Study Team, which will inform the design and implementation approach for Landsat Next, the follow-on mission to Landsat 9. Landsat 9 and its successors will provide a sustainable, space-based system to extend the nearly 50-year Landsat series of high-quality global land imaging measurements—the world's longest time series of the Earth's land surface.

The long-term availability of consistent and accurate Landsat data, combined with a no-cost data policy, allows users to analyze extensive geographic areas and better understand and manage long-term trends in land surface change. New cloud computing and data analytics technologies use Landsat data in a wide range of decision-support tools for government and industry. Much like GPS and weather data, Landsat data are used every day to help us better understand our dynamic planet.

For additional information on Landsat please contact:

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