Proffit Mountain Upper Reservoir Failure

USGS science for a changing world

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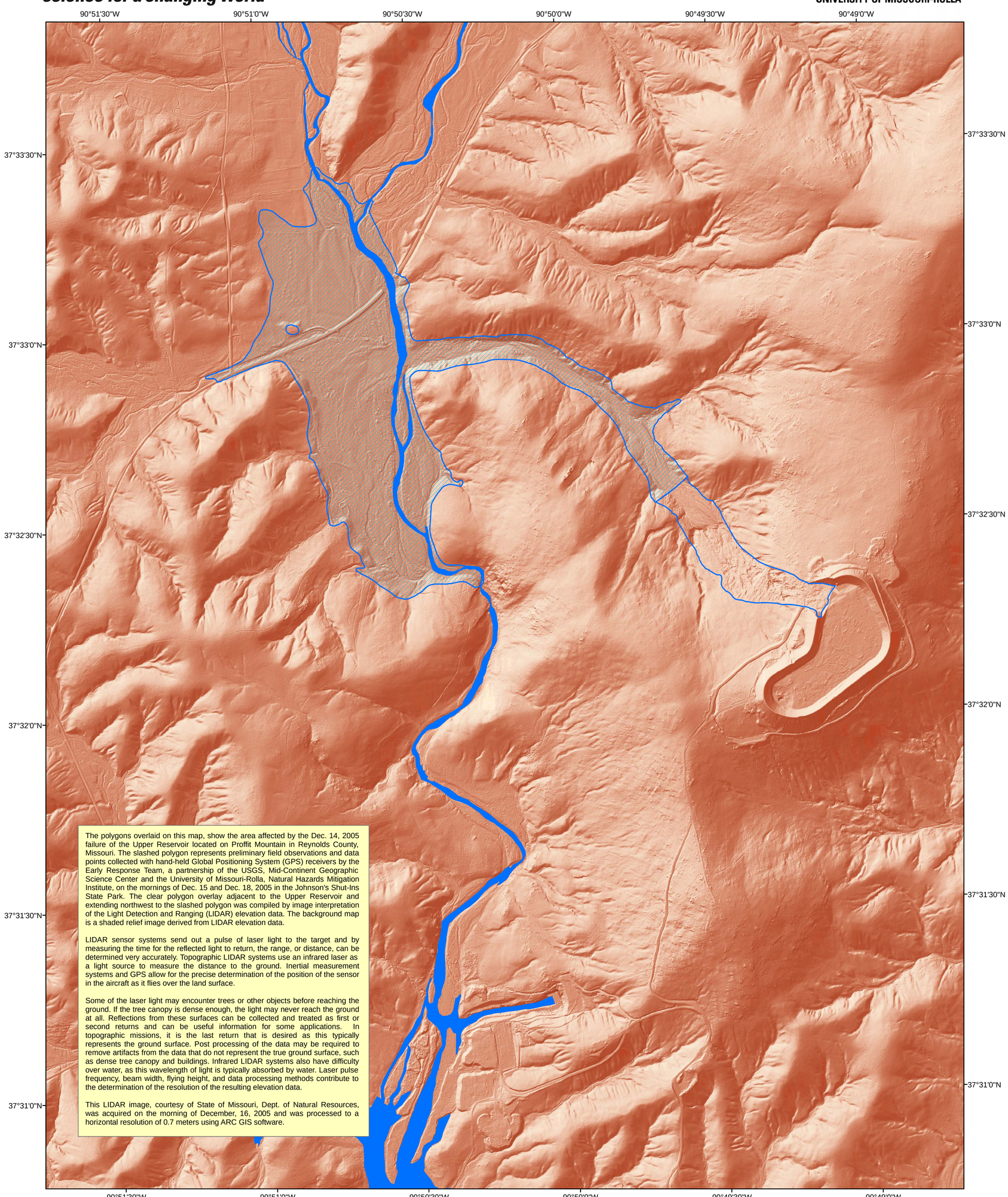

The polygons overlaid on this map, show the area affected by the Dec. 14, 2005 failure of the Upper Reservoir located on Proffit Mountain in Reynolds County, Missouri. The slashed polygon represents preliminary field observations and data points collected with hand-held Global Positioning System (GPS) receivers by the Early Response Team, a partnership of the USGS, Mid-Continent Geographic Science Center and the University of Missouri-Rolla, Natural Hazards Mitigation Institute, on the mornings of Dec. 15 and Dec. 18, 2005 in the Johnson's Shut-Ins State Park. The clear polygon overlay adjacent to the Upper Reservoir and extending northwest to the slashed polygon was compiled by image interpretation of the Light Detection and Ranging (LIDAR) elevation data. The background map is a shaded relief image derived from LIDAR elevation data.

LIDAR sensor systems send out a pulse of laser light to the target and by measuring the time for the reflected light to return, the range, or distance, can be determined very accurately. Topographic LIDAR systems use an infrared laser as a light source to measure the distance to the ground. Inertial measurement systems and GPS allow for the precise determination of the position of the sensor in the aircraft as it flies over the land surface.

Some of the laser light may encounter trees or other objects before reaching the ground. If the tree canopy is dense enough, the light may never reach the ground at all. Reflections from these surfaces can be collected and treated as first or second returns and can be useful information for some applications. In topographic missions, it is the last return that is desired as this typically represents the ground surface. Post processing of the data may be required to remove artifacts from the data that do not represent the true ground surface, such as dense tree canopy and buildings. Infrared LIDAR systems also have difficulty over water, as this wavelength of light is typically absorbed by water. Laser pulse frequency, beam width, flying height, and data processing methods contribute to the determination of the resolution of the resulting elevation data.

This LIDAR image, courtesy of State of Missouri, Dept. of Natural Resources, was acquired on the morning of December, 16, 2005 and was processed to a horizontal resolution of 0.7 meters using ARC GIS software.

Mid-Continent Geographic Science Center

MCGSC web address: http://mcmcweb.er.usgs.gov/mcgsc

N W E S

0 0.125 0.25 0.5 0.75 1 Miles

This map was produced by the United States Geological Survey in partnership with the University of Missouri-Rolla through the cooperative efforts of the Mid-Continent Geographic Science Center and the Natural Hazards Mitigation Institute.

Location map

NATURAL HAZARDS MITIGATION INSTITUTE

LIDAR image Source Date: Dec. 16, 2005, Projection: Universal Transverse Mercator, Datum: NAD 1983,