

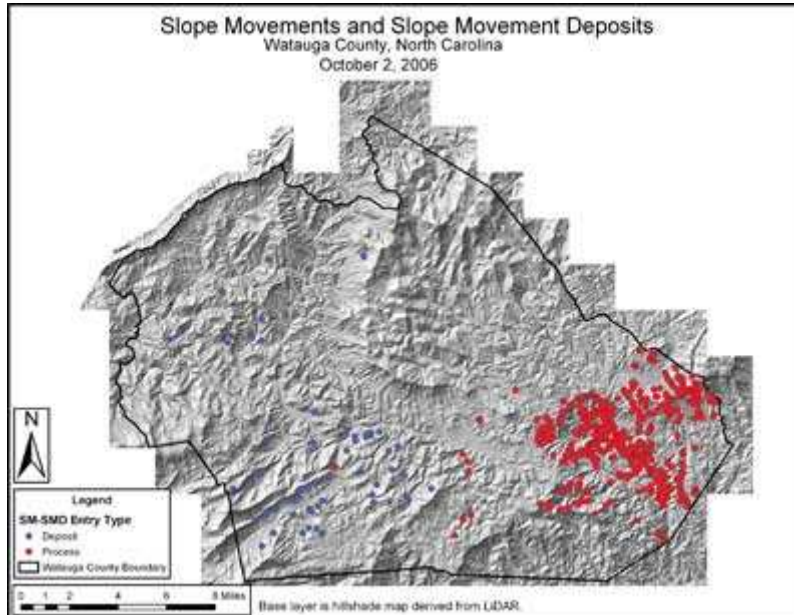
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(Top) A map shows historic landslide activity in Watauga County. For a larger version, please [click here](#).

Watauga tops landslide list

By Scott Nicholson
nicholson@wataugademocrat.com

Watauga County is the most likely county in the western North Carolina region to experience hazardous mud slides, according to an analysis underway by a state geology team.

Rick Wooten, a senior geologist with the N.C. Geologic Survey, said of the six counties targeted for landslide hazard mapping, Watauga showed the most data suggesting previous landslides, which he said was a predictor of future episodes. Of 2,000 landslides listed by the geologists in compiling a database of modern and prehistoric landslides in the mountain and Piedmont counties, 600 of those were in Watauga.

Geologists were in Watauga County this week collecting data for the county map, which should be released next year. Wooten said the information will include three maps: one showing where slides have occurred in the past as determined by ancient soil deposits; one showing where they might happen in the future; and one showing where those mud slides might end up.

Wooten said mud slides range in severity and are usually triggered by storms and heavy rain. How much erosion constitutes a "landslide" is a

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bit of a subjective determination, but Wooten said for modern landslides the accounting is based on structural damage to homes or roadways and are otherwise expensive to clean up.

The series of maps in the five counties will enable communities to evaluate and reduce the risks of building homes and other structures in landslide-prone areas of the North Carolina mountains, according to the Department of Environment and Natural Resources. DENR's Geological Survey section recently finished maps for Macon County, which suffered a fatal landslide during Hurricane Ivan in 2004. Five people were killed and 16 injured when a mud slide traveled more than two miles. Hurricanes Ivan and Francis triggered 140 landslides in the state during a one-week period.

Because of the potential for down-slope damage, Wooten said it's important to understand how and where the mud and debris will travel. "They travel beyond the slopes," Wooten said. "The debris flows and carries a lot of water, so a landslide is mobile. We need to know how far it might go."

Wooten cited the 1940 flood, in which a number of people lost their lives, as an example of mud sweeping for miles and carrying away houses and victims. He said that flood affected Elk Creek and Stony Fork the most, suggesting those areas might be more prone to fatal landslides in the future. "That part of the escarpment is susceptible," Wooten said. "It's not evenly distributed (across the county)."

Wooten's team developed the landslide hazard maps for Macon County and will complete maps for five other mountain counties during the next two years.

Landslide hazard maps will be available for Buncombe and Watauga counties by next summer, according to DENR. Maps for Haywood, Henderson and Jackson counties are expected to be available in 2008.

The three-year Landslide Hazard Mapping Program was funded with \$1.3 million from the state Hurricane Recovery Act of 2005. The act was designed to provide disaster assistance to people, businesses and public agencies that suffered damage from any of the six hurricanes that struck North Carolina in 2004.

Wooten is senior geologist on the six-member team assigned to work on the project. They have mapped the locations of both recent and old landslides recognized by deposits of rock, sand and clay. The geologists are using several state-of-the-art technologies, including topographic data from a system called "Light Detecting and Ranging" that uses laser beams to more accurately calculate distances. They also used computer modeling, satellite and aerial photography, and data from geographic information and global positioning systems.

Wooten said the information will be distributed as widely as possible, especially in digital formats and Web sites that allow for easy public access. He said local governments could easily integrate the data using



global information system mapping and consider the information in land use planning.

Wooten said the team had looked at the mud slide at the White Laurel housing development in Boone several years ago and had also been following the Town of Boone's steep-slope ordinance debate. "These maps strictly pertain to safety and slope stability," Wooten said. "They'll be available to anybody and we're working out how to distribute them in a fully functional format."

A 23-page booklet titled "When the Ground Moves: A Citizen's Guide To Geologic Hazards in North Carolina," provides information about landslides, abandoned mines, sinkholes, flooding and other developments. While there are fees for physical copies of the maps or booklets, Wooten said it should be available on the DENR Web site when completed (<http://www.enr.state.nc.us/>).

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