Up Front Geology

BY TOMMY NEWTON

AS ENVIRONMENTAL GEOLOGISTS, RESEARCHERS, AND CONCERNED CITIZENS, KEN KUEHN AND MIKE MAY AREN'T THE TYPES TO JUST SCRATCH THE SURFACE, WHETHER IT'S IN THE CLASSROOM, RESEARCH PROJECTS, COMMUNITY SERVICE, OR ELECTION CAMPAIGNS.

"As professional geologists we are concerned with sustainable development or what some have called intelligent development," Dr. May said. "In particular, we are interested in human interactions — good or bad; past, present, and future — with the geological environment which includes groundwater, surface water, air, rock, and soil."

Even though they've been called extremists, elitists, and environmentalists for their stance on development issues that affect the environment, the two members of Western's Department of Geography and Geology insist their main goal is education — both in the classroom and throughout the community.

Last November the pair appeared on the ballot as candidates for the Bowling Green City Commission. "It was a great opportunity to get our message out, to meet more of our neighbors, and to enjoy some attention from the media. Rarely have geologists stepped up like this, but rarely has so much been at stake," May said. "Although we were not among the winners, we made the point that there are qualified people on the Hill who are willing and able to take on leadership roles in the larger community. It was all very worthwhile," according to May. "We're not going to settle for less than a transformation of this community, a transformation in thinking, decision-making, and action," Dr. Kuehn said.

Kuehn and May want their students, the public, and the community's decision-makers to know that anything above and below the ground is affected by what's done or built on it.

They have studied the proposed transpark in northern Warren County, plans for Interstate 66 through southcentral Kentucky, and the impacts of geohazards (earthquakes, floods, and landslides) across Kentucky. They also served on Bowling Green's Storm Water Advisory Committee that has developed plans over the past two years to help the community comply with the federal Clean Water Act.

"Our students are really thrilled when their professors are involved in ongoing, real-world activities," Kuehn said. "They feel there's relevance to what they are learning."

The 2002 catastrophic collapse of Dishman Lane, when a 150-foot by 130-foot sinkhole opened in the Bowling Green road, was an example of a geohazard and a geological process that provided a valuable learning opportunity for many students in WKU's Ogden College of Science and Engineering, Kuehn said. "In this case, nature sent us a million dollar repair bill, but it was human activity on the surface that stimulated the collapse."

Geologic hazards, such as earthquakes and landslides, cause millions of dollars in losses in Kentucky each year. The types and severity of geologic hazards vary across the state, depending on the geology, topography, hydrology, and human activity.

According to the Kentucky Geological Survey, annual losses caused by earthquakes in Kentucky run about $18.7 million. A large landslide at Hickman in far western Kentucky destroyed many houses and more than $10 million has been spent to try to fix it.

The state's well-known karst hazards include sinkhole flooding, surface subsidence, sudden cover collapse, and leakage around dams. The estimated damage caused by these occurrences every year in Kentucky is between $500,000 and $1 million.

Since 2001, other roadway collapses have occurred on the Natcher Parkway between Bowling Green and Morgantown, on the Audubon Parkway between Owensboro and Henderson, and on the Nunn Parkway near Somerset. Each of these cost more than $1 million to repair.

As our existing infrastructure ages, the expanding economy and population are forcing new development in less desirable locations, which are more prone to geologic hazards and more likely to adversely impact the environment, May said. The Kentucky Geological Survey is striving to provide better information on geologic hazards in Kentucky, through technical research and assistance, as well as public education and awareness. (More information is available at http://www.uky.edu/KGS/geologichazards/geologichazards.html)

"Geology is the true environmental science because it looks at Earth as a system in which all subsystems interact and overlap," May said. "It's not just rocks, for example, but the interaction between rocks, water on the surface and underground, the atmosphere, life forms, and internal forces in the planet like plate tectonics."

In their research projects, the two geologists and their students use water data from the Environmental Protection Agency and Kentucky Division of Water; air quality data from Mammoth Cave National Park and other sources; geologic and hydrogeology maps from the Kentucky Geological Survey and the U.S. Geological Survey; and soil maps and soil photos from the U.S. Department of Agriculture.

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PHOTO BY MARCUS DUKES

Their research also requires extensive fieldwork and direct observation including taking samples of rock and soil and documenting sites. Western's emerging GIS (geographic information systems) program can provide valuable mapping, data analysis, and risk assessment, Kuehn and May said. Faculty and students can provide services and expertise on issues like storm water drainage, mapping sinkholes or abandoned landfills, development on karst terrain, climate, air quality, and earthquake risk assessments.

"Our students definitely want to be part of the research process that can be applied to the planning and future development of our community," May said.

PHOTO BY LADONNA HARMON

While Kuehn and May have been called impediments to economic progress, they contend that costly environmental problems locally, regionally, and statewide could have been and could be avoided by seeking input from geologists in the early stages of development planning.

Bowling Green's storm water management plan could cost a minimum of $1 million to $2 million per year. Landfills and other environmental cleanup problems have cost the community millions of dollars over the past 20 years.

"We've gotten to the point where we have a lot of growing pains and we're going to have to take some kind of medicine for those," May said. "A lot of times people don't like to take medicine."

In selecting areas for industrial development, Kuehn and May believe that environmental risks and the reduction of prime farmland must be considered. "We're not talking about a no-build option," May said. "We're saying let's think about where we want to build and whether the presumed benefits outweigh the true costs.

"Our continued growth is important, but only if our quality of life and environment are protected for ourselves and others," he said. "This means there must be true economic gains not tied to hidden costs of leaky landfills, rivers and lakes unfit for swimming, or polluted storm water. This can be assured only if geologists are brought in as an integral part of the planning process, not just used in scenarios that involve cleaning up hazardous materials after the fact."

"We live in a world renowned karst area located adjacent to a national park," May said. "We want everyone to know this is a special place. We know we can't save every tree or every sinkhole, but we do know there is a good way and a bad way to plan and manage development projects."

Kuehn and May hope that Western, the community, and the decision-makers can work together to solve environmental and economic development issues.

"Real economic development embraces good planning," May said. "We want to avoid the type of planning that says build, build, build at all costs because it's going to make us better. It isn't. The thing that's going to make Bowling Green prosperous is not growth alone — it's education and workforce development."

"In the next 20 years, Warren County, Kentucky, has the potential to be a completely different place than it is right now," Kuehn said. "We are working to ensure a positive transformation."

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Mike May (left) and Ken Kuehn (right)