

# Campus flooding: geological mystery?

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A geological phenomenon combined with poor drainage in the Pembroke area may be the cause of campus "ponding" and could account for major flood damage during a severe storm.

Occasionally, the campus will experience ponding after torrential rains but topographic maps showing flood-risks and hydrology indicate that the University is surrounded by a large number of water sources.

"Some areas flood because the storm drains are clogged. There are also drainage ditches adjacent to roads and they may not work effectively or have become overloaded as university or residential development has occurred," said Dr. Martin Farley, chair of the Geology and Geography Department.

"Although it has not happened for several years, the campus itself has flooded in the face of severe rains. The exact cause of this is not clear. Pembroke is not in a floodplain as the Lumber River is a mile or so away, Dr. Farley said.

Geologists in Robeson County have been studying Carolina Bays, depressions in the land which run all the way from North Carolina, to the northern parts of Georgia. However, multiple theories to how the bays have come to be, range from a meteor shower years ago to the make-up of soil in this region of the United States.

The Carolina Bays are all angled in the same direction and are only visible from aerial views. Also, the bays are only a few feet deep and come in a wide range of widths and lengths. The unity in angles are what have the geologists' interest and despite the shallow depression in the land, the bays may be a cause of the ponding.

"It is possible that the campus is built on a Carolina Bay. These oval depressions pond water when it rains, so if the campus is on one, then ponding is likely in any serious rain. To the extent, the campus is a low area, there may be no way to avoid some ponding in severe rainfall events," Dr. Farley said.

Ponding is the excessive accumulation of water at low-lying areas that remains 48 hours after the end of rainfall, under conditions conducive to drying. The sitting water could still cause large amounts of damage and present health risks to the university.

"I suspect that the ponding in and around campus is the result of a combination of improper drainage techniques and the impermeable nature of the soils, coupled with the fact that the water table is close to the surface here, said Dr. Lee Stocks, an assistant professor in the Geology and Geography Department. "Most of the surface water, swamps and lakes, in the area result from low permeability of the soils."

"Flooding buildings have important costs. In



Students wade through water that flooded the area in front of Oak Hall Sept. 30.

Photo by Nick Phillips

some cities, streets and parking lots are designed to flood to avoid flooding homes and buildings. From that point of view, flooding of parking lots may be the best choice among alternatives. People need to be aware of the problems with some parking lots and either move their cars or avoid driving into water during big rainfall events," Dr. Farley said.

Dr. Farley believes the University's drainage problem can be helped but has no idea of how much it would cost to get a project underway.

"Keeping the storm drains open would allow

parking lots to drain. The broader drainage, such as the drainage ditches, might require storm water detention ponds to hold water and keep it out of buildings or roads," Dr. Farley said.

"Obviously, with increasing urbanization there are resulting changes in hydrology. For example, the Wal-Mart parking lot will increase runoff time, this will lower infiltration, directing storm water into high velocity channels, which increases erosion during storm events," Dr. Stocks said.

"This can lead to increased flash flooding risks, damage to property and a

plethora of other environmental hazards," he added.

Aside from the geological problems the campus may face during a severe storm, Dr. Stocks said there may be some health risks to the Pembroke community as well, many of which could result from the sitting water a major flood would bring to the area.

"Standing water will increase epidemiological risks from insect-borne factors, such as West Nile, malaria, etc. Of course, we have no shortage of standing water in Robeson County as is, so increasing this risk is unacceptable," Dr. Stocks said.



Photo by Nick Phillips

Water rushes into a storm drain on Faculty Row after heavy rains from Tropical Storm Nicole flooded parts of the campus.



Photo by Nick Phillips

Student cars located in Lot 13 behind Oak Hall sit in high water. This section of Faculty Row was blocked off to prevent cars from driving through the water.



Photo by Nick Phillips

A student surveys the water levels by inspecting how high the water reached another student's Yukon in Lot 13 behind Oak Hall.