

# Making a molehill out of a mountain

DEC. 02 1994

**O**ut of sight, but not out of mind. This describes the underground water system winding slowly around the north coast, a water supply being eyed for expanded exploitation in the aftermath of the drought.

So far, officials appear to be taking an appropriately cautious approach to further tapping this resource, which already supplies about one quarter of the island's water. Any more dipping into this limited supply must be preceded by thorough study of the potential consequences.

And, to keep this bounty flowing, the government will need to respect the link between underground aquifers and the land surface, which contains sinkholes, *mogotes* and other limestone hills.

As it is, developers have been gnawing away at these hills and plains in the name of urbanization.

It's convenient to plot roads right over the *mogotes*, thus allowing construction companies to harvest the limestone while using some of it for road fill.

It's convenient, but it's risky for the groundwater supplies.

Just as razing watersheds for urban development around reservoirs leads to their sedimentation, destruction of *mogotes* for roads and housing projects can clog up aquifers' recharge areas.

"We need to develop an effective policy — not develop, implement," said geomorphologist José Molinelli Freytes, director of the University of Puerto Rico's environmental sciences program, correcting himself to reflect that the necessary laws are on the books; they're just



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ignored.

Let's step back and look at why the land's surface is so important to the aquifers hidden below.

The region that hosts the north coast's groundwater supply began its existence on the floor of shallow seas, as microscopic skeletons and sediments rained down, Molinelli explained. Geological shifts lifted these formations upward about 35 million years ago, when they surfaced as limestone.

Later, water in trickles and streams carved tunnels through this limestone, creating caves and forging the complex maze that characterizes a karst region. (Composed of calcium carbonate, limestone is a basic material that can dissolve in rainwater, which tends to be slightly acidic.)

The ongoing rains shape the northern landscape into what Molinelli describes as an "egg tray topography" — the resistant portions form the hills, while the least resistant may form a series of bowl-shaped depressions called sinkholes.

Both formations encourage the capture and storage of rainwater. The limestone serves as a sponge, drawing in water

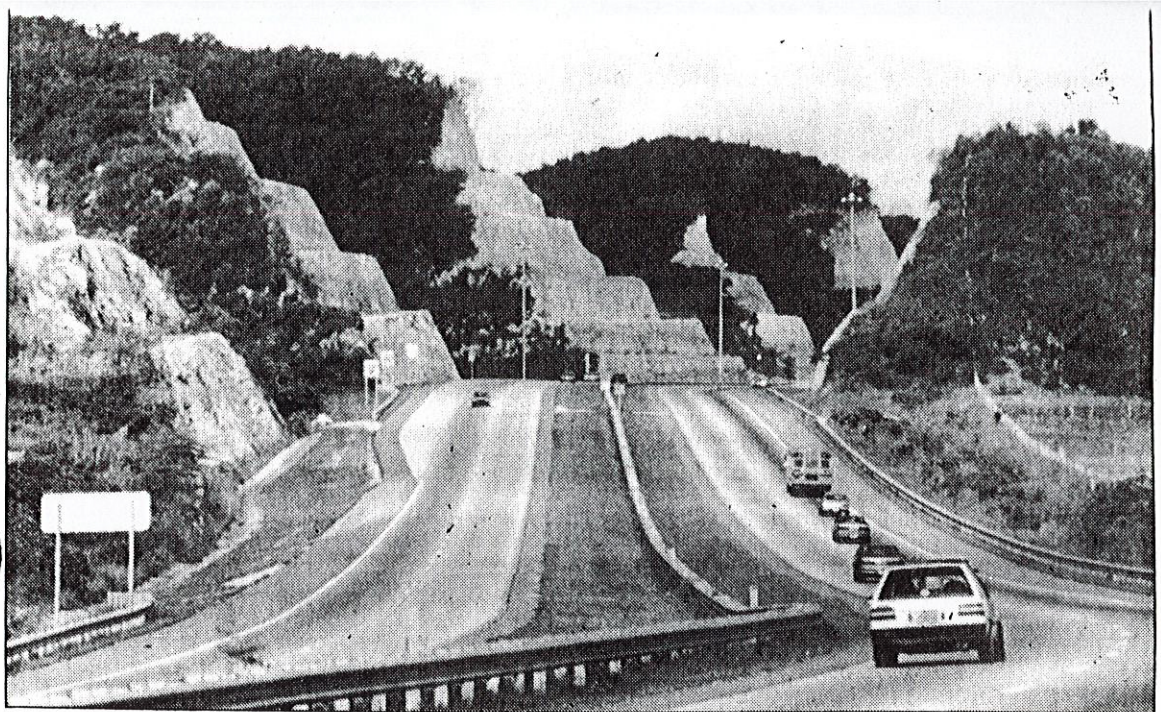


Photo special to the STAR by Jorge Fernández

Highway 22 between Vega Alta and Manatí ploughs through the limestone hills peppering the north coast. The hills help collect water to be stored in underground aquifers.

through its porous surface. At the same time, the undulating formations increase the area of absorption available to rainwater. (Think of the difference between the surface area of a deflated balloon compared to one filled with air.) This rainwater moves through a web of caves and passages to the aquifer below.

Flattening a hill or filling in a sinkhole reduces the surface area exposed to rainwater, and often destroys the underlying cave systems as well. As a result, more of the surface rain runs over the land and goes seaward instead of downward.

When less freshwater comes in, or more groundwater is removed via wells, seawater may intrude, rendering the aquifer too salty to drink. This could become a problem with some wells near the coast, said Rep. José Granados Navedo, who heads the House committee examining the Superaqueduct

proposal.

Granados Navedo suggests, in a report he expects the committee to release next week, that ASA consider using groundwater to supplement Utuado's Dos Bocas supply in its quest to bring about 200 million gallons of water a day from the central/northern region to the north coast and San Juan.

He also notes, however, that the \$300 million Superaqueduct could lessen the need for groundwater, if ASA finds enough surface sources. He stresses the need for ASA to hire a neutral party to determine just what is there before proceeding on this ambitious project, and rightly so.

"We can't say how much water is available. Nobody can say that," Granados Navedo said.

The Department of Natural and Environmental Resources, which has jurisdiction over water resources, also has suggested expanding the use of

groundwater, especially in times of drought. Meteorologists predict that the next few years will bring more dry spells to the island like the drought that left residents with limited water supplies for much of this past summer.

During the drought, the Legislature assigned \$1.7 million to study groundwater resources, at the urging of DNER Director Pedro Gélabert. The money is funding a joint project between DNER and the Environmental Quality Board that will focus on underground water quality, hopefully honing in on contaminated portions for possible cleanup.

As underground water sources increasingly come in the sights of those looking for more water supplies, the importance of protecting the karst region and its hills must be understood.

Faith can move mountains. But it takes wisdom to leave them alone.