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ARIZONA GEOLOGICAL SURVEY

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MISSION

To provide unbiased information to the public to enhance understanding of Arizona's geologic framework and to support prudent management and use of land, water, mineral, and energy resources.

FUNCTIONS

- Provide information about Arizona geology
- Map and describe bedrock and surficial geology
- Map and characterize mineral and energy resources
- Investigate geologic hazards and limitations
- Prepare and publish geologic maps and reports
- Maintain databases and files
- Maintain geology library
- Maintain rock cuttings and core repository
- Provide administrative and staff support for the Oil and Gas Conservation Commission

A.R.S. § 27-152

Nora's Tears Cause Landowner Fears

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Hurricane Nora breezed through Yuma and western Arizona in September 1997 dropping 2½ inches of rain in 4 to 5 hours. An unexpected result was that a 4,400-foot-long earth fissure opened in the Harquahala Plain about 70 miles west of Phoenix. After the storm, Al Rogers, a long-time area resident, discovered a 5-foot-deep, 10-foot-wide gully crossing the dirt road over which he drove several times every week before the storm.

Earth fissures of this type develop in areas where pumping has caused ground-water levels to be lowered, dewatered layers to compact, and, commonly, the land surface to subside.

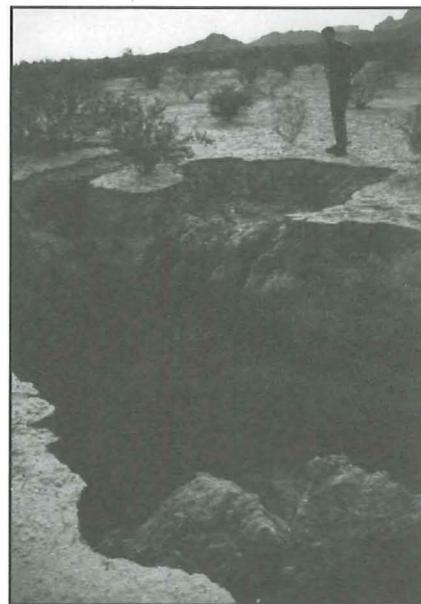
The Harquahala Plain overlies a broad, elongated alluvium-filled

ground-water basin. The alluvium is more than 5,000 feet thick. Ground water has been pumped to irrigate crops there since the 1940's. Water levels dropped 200 to 300 feet in some wells in the southeastern portion of the basin. Since 1985, when pumping began to be significantly reduced, water levels have risen by as much as 50 feet in some wells. Water levels have continued to decline slightly, however, in other parts of the basin.

The earth fissure is located near the juncture of the shallow bedrock pediment on the southwest and the deep ground-water basin on the northeast. No other fissures have been reported in this immediate area. The width of the fissure ranges from less than half an inch at its ends to 20 to 30 feet. The typical width is 5 to 20 feet. In

most places the fissure is 5 to 15 feet deep, but it exceeds 30 feet in depth locally.

Rains associated with Hurricane Nora caused an unseen earth crack to develop into a major fissure in only a few hours. Similar unseen cracks could develop in other areas where pumping has caused substantial lowering of ground-water levels.



View toward the upslope side of the fissure, showing erosion caused by water flowing into the fissure. Photograph by L.A. Ramsey.