

Potential for Groundwater Pollution of the Floridan Aquifer, Based Upon Surficial Drainage, Karst Development, and Overburden Characteristics.

Explanatory Text

BARRY F. BECK

Much of Florida's land surface is karst, a landscape characterized by sinkholes, caves, and underground drainage. The karst topography determines the path of the water that recharges the Floridan Aquifer, and the movement of water within the aquifer. The nature of the karst aquifer and the movement of water within the aquifer are determined by the karst topography. The karst topography is determined by the karst aquifer and the movement of water within the aquifer. The karst topography is determined by the karst aquifer and the movement of water within the aquifer.

Karst topography occurs in Florida because limestone and dolomite underlie much of the state. These rocks are soluble in water, and the dissolution process creates a network of interconnected cavities. The upper portion (i.e., permeable) of the limestone is known as the Floridan Aquifer. The lower portion (i.e., impermeable) is known as the Hawthorn Group. The Floridan Aquifer is a karst aquifer, and the Hawthorn Group is a non-karst aquifer. The karst topography is determined by the karst aquifer and the movement of water within the aquifer.

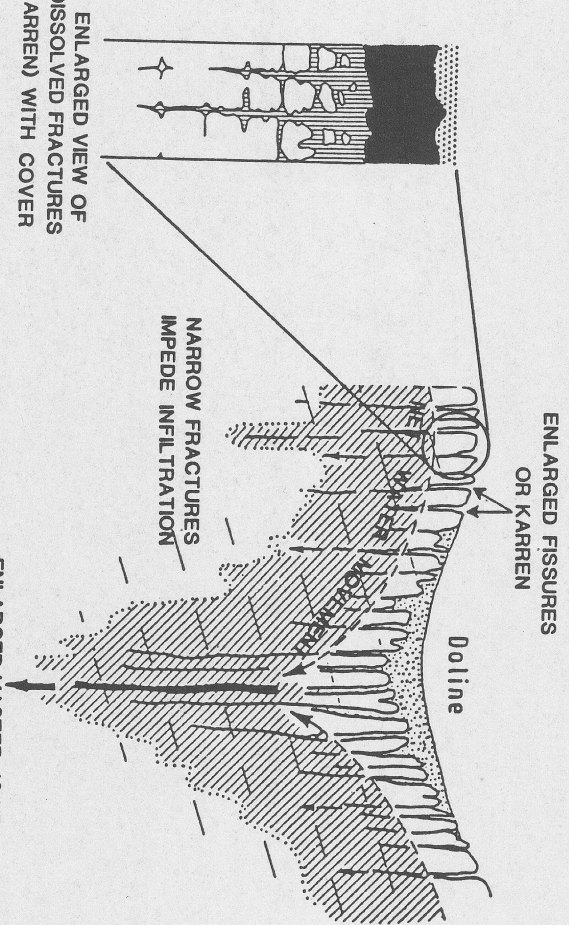


Figure 1. Generalized cross-section of the upper portion of the Hawthorn and the overlying sediment. The separate zone (modified from Williams, 1989).

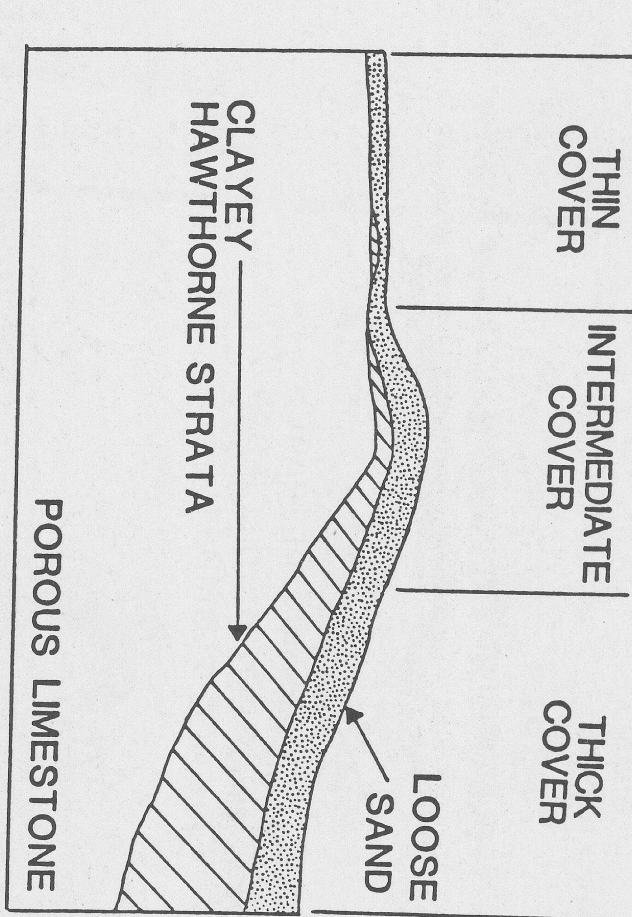
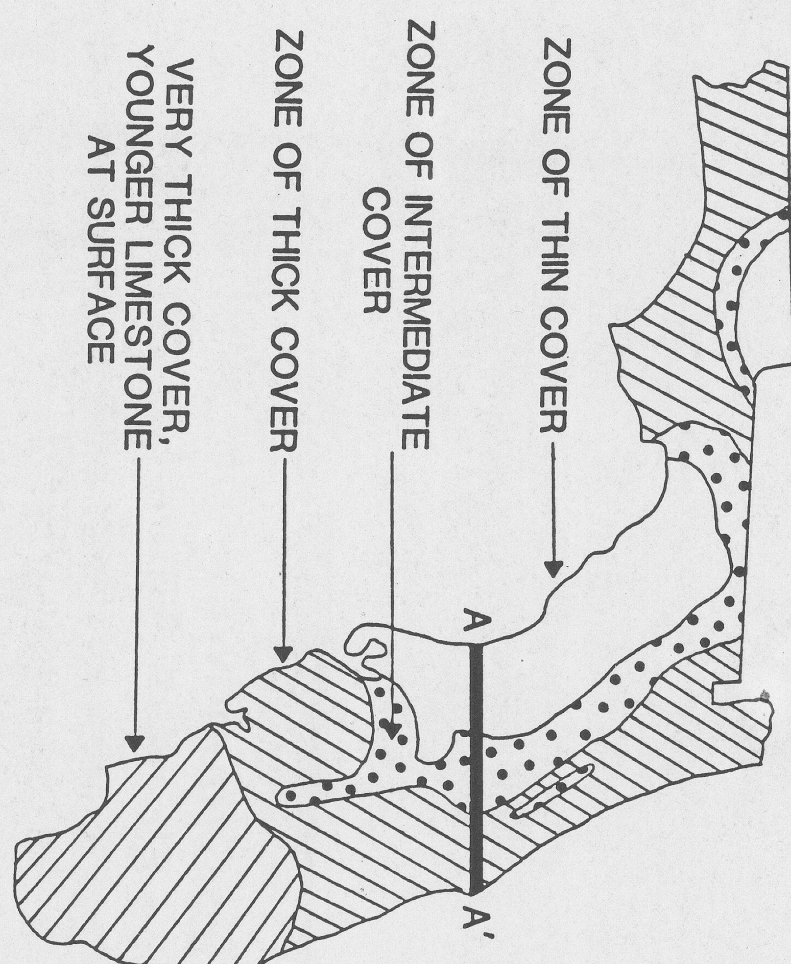


Figure 2. Generalized map and cross-section of areas of karst geomorphology as related to the tertiary limestone in Florida.

During the last two million years, the Florida peninsula has been subjected to a series of sea level changes. The sea level has risen and fallen, and the land surface has been eroded and deposited. The karst topography is determined by the karst aquifer and the movement of water within the aquifer.

In the thickly mantled zone the limestone generally is overlain by less than 25' of clayey confining beds overlain by less than 25' of surficial sand and gravel (ideal 100'). The karst topography is determined by the karst aquifer and the movement of water within the aquifer.

Within the intermediate zone there are few karst features, but the karst topography is determined by the karst aquifer and the movement of water within the aquifer.

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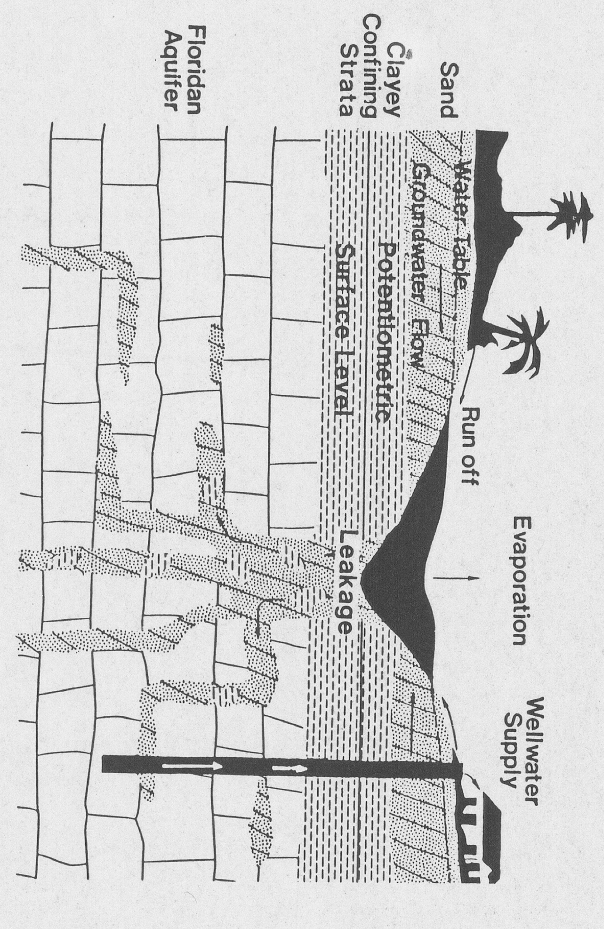


Figure 3. Landmarks through the bottom of a sinkhole lake in Florida.

Many localities throughout Florida have completely covered ancient sinkholes. The karst topography is determined by the karst aquifer and the movement of water within the aquifer.

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In northern Florida, some of the surface drainage flows westward or southward from the intermediate zone onto the thickly mantled zone. Where the surface drainage flows westward or southward, the karst topography is determined by the karst aquifer and the movement of water within the aquifer.

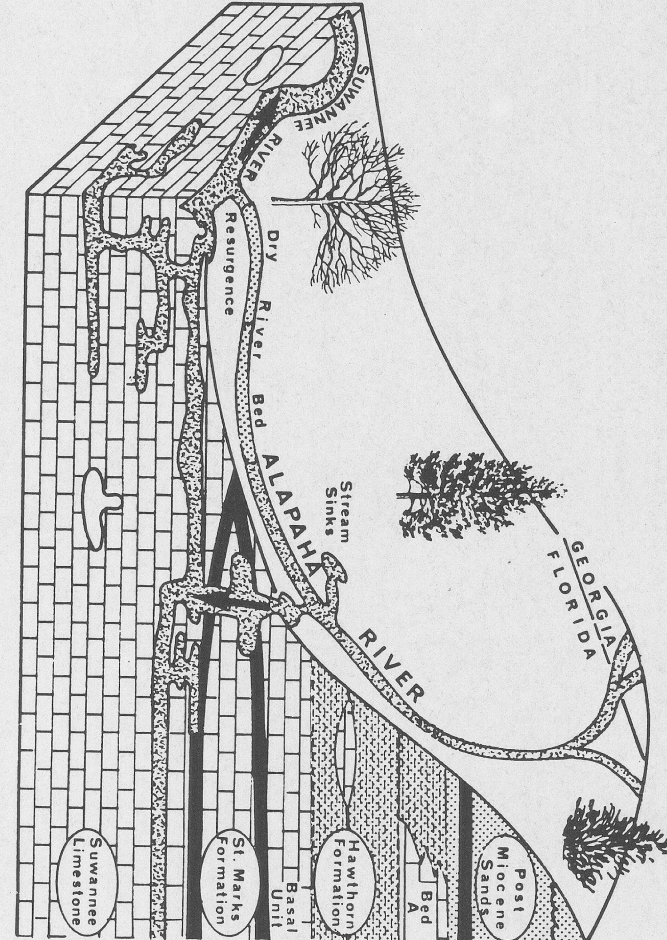


Figure 4. Cross-section showing surface drainage, including a karst spring. The boundary (right side) is the thickly covered zone. The steep change in elevation at the boundary is called the Cady Swamp. Modified from Calkin, 1977.

References Cited

Calkin, D. 1977. A hydrogeology of a new basin in a karst terrain—Alachua County, Florida. *Florida Geological Survey Bulletin*, 10, 1-24. Williams, P.W., 1985. Subsurface hydrology and the development of karst. *Florida Geological Survey Bulletin*, 10, 1-24.

Sources of Map Data

This series of fourteen maps was prepared from published data only. The hydrographic and drainage data were derived from the USGS 7.5' topographic maps and the Florida Geological Survey maps. The karst topography is determined by the karst aquifer and the movement of water within the aquifer.

ADDITIONAL INFORMATION ON KARST IN FLORIDA

Beck, B.F., 1984. Sinkholes: Their geology, engineering and environmental significance. *Florida Geological Survey Bulletin*, 10, 1-24. Beck, B.F., 1985. Sinkholes in Florida: An introduction. *Florida Geological Survey Bulletin*, 10, 1-24.

EASTERN UNITED STATES 1:250,000

DAYTONA BEACH

SECTION 3

NH 178



LEGEND

KEY TO NUMBERED AREAS

- GROUP I: Areas where the limestone aquifer is confined by overlying impermeable strata.
- GROUP II: Areas where the limestone is at, or very close to, the land surface and there is no infiltration because ground water level in the limestone is lowered, such as by heavy pumping or severe drought, such areas may later to category 3.

Category 3: Areas where the limestone is at, or very close to, the land surface and there is no infiltration because ground water level in the limestone is lowered, such as by heavy pumping or severe drought, such areas may later to category 3.

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No. 7 of 14 Sheets in This Series

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