

## GEOLOGIC AND GEOMORPHOLOGIC CHARACTERISTICS OF THE DAMES CAVE AREA, WITHLACOOCHEE STATE FOREST, FLORIDA

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### BACKGROUND

The Dames Cave area is located in the Citrus Tract portion of the Withlacoochee State Forest in Citrus County, Florida. The Dames Caves are found on a western portion of the Brooksville Ridge physiographic region. This landscape is dominated by karst landforms including uvalas, dolines, solution valleys, and caves. Drainage is largely multibasinal and subsurface. The Dames caves are not the only named karst features in the Citrus Tract of the Withlacoochee State Forest. The Lizzie Hart and Brush Sinks are found within 1-2 km of the caves. These 'sinks' are uvalas typical of the depressions found in this portion of the ridge and serve as inflow sites for aquifer recharge. Local relief is approximately 39 m.

The Brooksville Ridge is one of several parallel ridges found in peninsular Florida. The ridge is essentially a marine escarpment carved during the late Cenozoic. On top of and abutting the ridge, one finds Quaternary marine sands deposited during shoreline advances and retreats. Beneath the sands (if they are present at all) in the vicinity of the caves, one finds Oligocene Suwannee Limestone that unconformably overlies the Eocene Ocala Limestone. Between the limestone and the Quaternary sands is the thin Hawthorne Formation, a clayey residuum formed from the downward solution of limestone. In many places on the ridge, the Hawthorne Forma-

tion is exposed at the surface and is expressed as a reddish oxidized soil about 1 m thick. When present, these soils indicate the presence of bedrock near the surface. The caves on the ridge are all found associated with these soils near their entrances.

### CHARACTERISTICS OF DAMES CAVES AND IMPLICATIONS FOR THE UNDERSTANDING OF THE REGIONAL LANDSCAPE

Three distinct studies on the geomorphology and geology have been conducted in the last decade (Brinkmann and Reeder, 1993; Brinkmann and Reeder, 1994; and Wood, 1996). Although work by other researchers has been done in the vicinity on karst landscapes, the Brooksville Ridge, and the geology and geomorphology of the Florida Peninsula, the three studies listed above provide particular information about the Dames Caves area that is summarized below.

The Dames Caves are a group of caves that were probably once interconnected. Four of the caves have been named and mapped: Danger Cave, Vandal Cave, Peace Sign Cave, and Sick Bat Cave. Two small caves, openings really, have been found and mapped as annexes to Vandal Cave. The Tampa Bay Grotto and other caving organizations in the region have identified other caves in the State Forest.

The Dames Caves are interesting scientifically because they tell us a great deal about the geologic history of the Brooksville Ridge and the more recent human impact on the area. Geologically, the caves are among the oldest in Florida. In fact, they are in the process of breaking down. It is clear that they formed from phreatic movement of water when the water table was higher during the Cenozoic. The evidence for this is that the caves in many places have clear phreatic tube profiles and that the edges of the cave walls contain scallop features indicative of flowing water. It is clear that the flowing water took advantage of natural weaknesses inherent in the limestone, as the cave orientations are similar to natural joint patterns found in the region. The presence of flowing water at one time in the caves is fascinating since these caves are found on some of the highest land on the ridge. This indicates that the caves formed from solution processes when the water table was significantly higher. Perhaps they formed when the elevated seas created the escarpments that became the Brooksville Ridge. In fact, it seems possible that the caves formed in a mixing-zone environment (a zone where freshwater and saltwater meet) similar to what we have on our modern coastline where caves are actively forming.

Regardless of how the caves formed, at some point after the drop in sea level and concomitant drop in the water table on the Brooksville Ridge, the caves became aerated. Once this occurred, cave formations developed. It is clear that there were stalactites, stalagmites, columns, and cave drapery in these caves once. Sadly, over the years, vandals and souvenir seekers have destroyed many of the cave decorations that once adorned the cave. Natural processes also are destroying the caves. They are clearly in the process of col-

lapsing. There is a great deal of roof fall on the floors of the caves and there is ample evidence from scars on the roofs of the caves of recent collapses. Two striking collapses have created karst windows into Vandal Cave.

Not only are the caves collapsing, but they are filling with sediment as well. Although the caves are generally found in topographically high positions on the ridge, their entrances are at low elevations locally. Thus, the entrances are places where surface water flows during heavy storms. It is clear from research that there is a cyclic nature to this sedimentation with clean quartz sand entering during the heavy rains of summer and humus stained sands and organic debris entering during the winter. Unfortunately, sedimentation has increased in recent years due to the presence of maintained dirt forest roads in the area. These roads tend to be topographically low and they serve as ephemeral stream beds that transport sediment and water to the caves. In the last several years, I have noticed that areas of Dames Caves that we mapped in 1993 are not accessible due to infilling and collapse.

BRINKMANN, R., REEDER, P., 1993, The Relationship Between Surface Soils and Cave Sediments in West-central Florida, USA, *Cave and Karst Science*, V. 22, p. 95-102.

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WOOD, H.R., 1996, Recent Sedimentation in Vandal Cave, Citrus County, Florida, USF Honors Thesis, 41 p.