

The Depositional History of Three Freshwater Lakes in North-Central Florida: Brooklyn Lake, Levys Prairie, and Cowpen Lake

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Florida has approximately 7800 lakes that are heavily concentrated in the north-central part of the state—a mantled karst terrain. Although much research has been conducted in Florida's lakes, there is not much information on the sedimentary infill. The focus of this research is to define the sedimentary infill of three closely spaced lakes (Brooklyn Lake, Levys Prairie, and Cowpen Lake) in north-central Florida and determine the relative importance of the various sedimentary inputs and their associated processes. Interlake lithostratigraphy comparison helped determine if they experienced a similar depositional infilling history or a unique one.

Twenty-three vibracores were taken (12 in Brooklyn Lake; 8 in Levys Prairie; 3 in Cowpen Lake) from which 331 sub-samples were analyzed for grain size, carbonate content, LOI index for total organic content, pollen content, mineralogy, and internal structures. Five sedimentary facies were defined in Brooklyn Lake, four in Levys Prairie, and three in Cowpen Lake. Using lithologic cross sections a depositional scenario was developed for each lake. Subaqueous and subaerial environments in conjunction with groundwater fluctuation and subsidence activity are key factors in lake development. The comparison of sediment infill of these three lakes reveals that Brooklyn Lake and Cowpen Lake are most similar in sediment facies content, basin morphology and the extent of subsidence depicted in the developmental scenarios, whereas, Levys Prairie is much different in sediment facies and basin morphology.

A doubling in pine pollen from Brooklyn Lake and Levys Prairie indicate a change from drier to a wetter environment. This change is present in Sheelar Lake and Mud Lake and carbon-14 dated at 7200 yrs BP and 5070±150 yrs BP (Watts and Stuiver, 1980, Watts, 1969 respectively). This suggests that Brooklyn Lake and Levys Prairie are older than 7200 yrs BP.

Sediment infill from Brooklyn Lake, Levys Prairie and Cowpen Lake is conducive to understanding the depositional processes and environments that contributed to their development. Based on results and evidence presented in this study, it can be expected that lake development in a karst terrain will include subaqueous and subaerial intervals, and times of subsidence that can be recorded in the lake sediments.