

Michael W. Sole
Secretary



OPEN-FILE MAP SERIES 99-03
GEOMORPHOLOGY, SPRINGS, AND KARST FEATURES FOR THE WESTERN PORTION
OF THE USGS PERRY 30 X 60 MINUTE QUADRANGLE, NORTHERN FLORIDA

2008

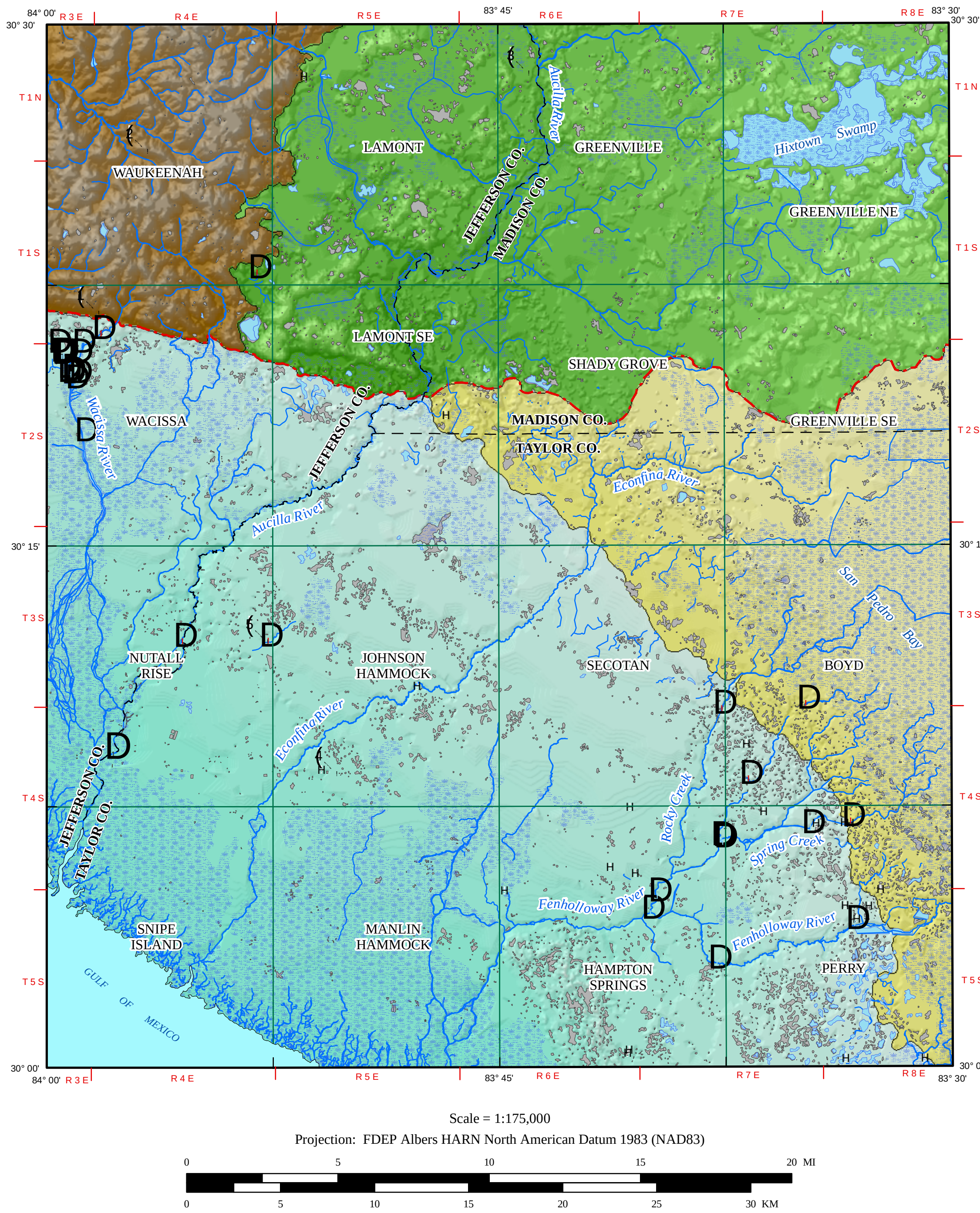
BY

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CLINTON KROMHOUT, P.G., AND THOMAS M. SCOTT, P.G.



Walter Schmidt
State Geologist and Director

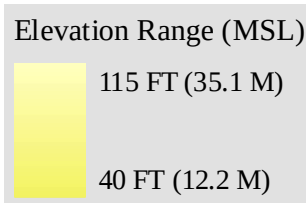
Figure 1. Geomorphology, modified from Scott (in preparation), Springs, and Karst features, shown with 15 Meter Digital Elevation Model (DEM).



LEGEND

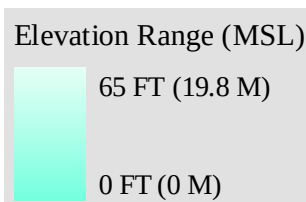
Ocala Karst District

Perry Karst / San Pedro Bay



The Perry Karst/San Pedro Bay complex extends regionally from Madison County southward to the Gulf of Mexico in Dixie County (Figure 3). The Perry Karst is the transition zone between the Woodville Karst Plain to the west and San Pedro Bay on the east. Elevations range from less than 5 feet (1.5 meters) to in excess of 100 feet (30.5 meters) above MSL. The elevations in San Pedro Bay are generally higher than in the Perry Karst area or the Branford Karst Plain. Elevations decline to the south toward the Gulf Coast. The Perry Karst area is poorly to moderately drained while San Pedro Bay is extremely poorly drained. Copeland (2005) provides an excellent discussion of the San Pedro Bay, its origin and surrounding areas. The Perry Karst/San Pedro Bay complex occupies the central-eastern portion of the study area. Within the map area, elevations of the Perry Karst/San Pedro Bay range from 40 feet (12.2 meters) to over 100 feet (30.5 meters) above mean sea level (MSL). The Suwannee Limestone underlies the Perry Karst/San Pedro Bay in this area. In the San Pedro Bay, a clay layer up to five feet (1.5 meters) thick overlies the limestone, providing confinement to the Floridan aquifer system (FAS) (Copeland, 1982). Plio-Pleistocene sediments cover the entire area, and the unit is poorly to very poorly drained. Recharge to the FAS is low to moderate in San Pedro Bay, while recharge to the FAS may be moderate to high along the transition from San Pedro Bay to the Perry Karst.

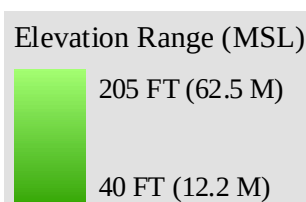
Woodville Karst Plain



The Woodville Karst Plain extends from Wakulla and Leon Counties southward to the Taylor-Dixie County line (Figure 3). Elevations, in general, range from sea level to approximately 50 feet (15.2 meters) above MSL. A number of rivers and streams traverse the Woodville Karst Plain including the St. Marks, Aucilla, Wacissa, and Econfinia Rivers. Relief is very low over the entire area and drainage is poor, resulting in vast swamps. An impressive dune field lies in the south-central portion of the study area, with dune crest elevations exceeding 65 feet (19.8 meters) above MSL. The Lower Oligocene Suwannee Limestone underlies the karst plain in Taylor and Jefferson Counties. The Lower Miocene St. Marks Formation occurs in one small area along the central west edge of the map area in the headwaters of the Wacissa River (OFMS 99-01). Springs, swallets and river rises commonly occur in this area (Scott et al., 2004).

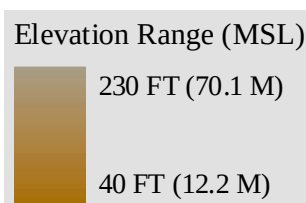
Tifton Upland District

Madison Hills



The Madison Hills extend from the eastern end of the Tallahassee Hills in central Jefferson County eastward to eastern Madison County on the west side of the Withlacoochee River. A small area of northwestern Hamilton County is occupied by the Madison Hills which is separated from the main body of this zone by the Withlacoochee River Valley (Figure 3). The elevation of the Madison Hills is generally lower than in the Tallahassee Hills, with hill tops often below 200 feet (61.0 meters) above MSL. In the study area, elevations range from 40 feet (12.2 meters) to slightly more than 200 feet (61.0 meters) above MSL. The valleys are broad and poorly drained. The Miccosukee Formation forms the higher areas while the Hawthorn Group sediments underlie the lower portions of the landscape. Karst features occur more commonly in the Madison Hills than in the Tallahassee Hills. The Lower Oligocene Suwannee Limestone underlies the Hawthorn Group in the Madison Hills.

Tallahassee Hills

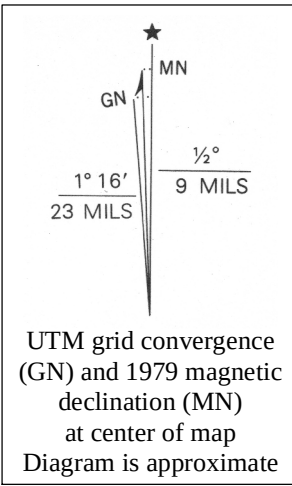


The Tallahassee Hills extend from the Apalachicola Bluffs and Ravines in Gadsden and Liberty Counties to eastern Jefferson County. Elevations of hill tops range to more than 300 feet (91.4 meters) above MSL. The lowest elevations are approximately 50 feet (15.2 meters) above MSL along the Cody Scarp, which forms the boundary between the Tallahassee Hills and the Woodville Karst Plain. Well drained valleys have local relief often exceeding 150 feet (45.7 meters) above MSL. In general, the hill top elevations decrease from west to east and north to south. This area is generally well drained with swampy conditions existing in the lower elevations. Within the study area, the Tallahassee Hills are developed on the Hawthorn Group and Miccosukee Formation siliciclastic sediments. Karst features are present within this zone where the carbonates of the St. Marks Formation and Suwannee Limestone are near the surface.

Cody Scarp

The Cody Scarp has been described as "...the most persistent topographic break in the State" (Puri and Vernon, 1964). White (1970) interpreted the scarp as being a combination of fluvial and karst erosion and shoreline development. The scarp is a multiphasic scarp in that it may have initially been a sea-level scarp but subsequently was highly modified, at least in part, by karstification and surficial erosion. It is named for Cody in Jefferson County which is just west of the map area. Upchurch (2007) describes the Cody Scarp as "a classic example of a karst escarpment with numerous poljes, uvalas, sinkholes, sinking streams, siphons, springs, and other karst features along its length." The difference between a karst escarpment and any other topographic scarp is that the toe of the scarp is characterized by limestone or dolomite that is dissolved by the surface water and groundwater as the scarp retreats (Upchurch, 2007). The scarp is very well developed near Wacissa where it appears to be primarily a sea-level scarp and separates the Tallahassee Hills from the Woodville Karst Plain. Further east, where the scarp forms the boundary between the Madison Hills and the subdivisions of the Ocala Karst District, it becomes less distinctive as more karstification and surficial erosion have altered it. Where the Cody Scarp occurs between the Tallahassee Hills and the Woodville Karst Plain, the toe of the scarp is at approximately 50 feet (15.2 meters) and the crest is at 125 feet (38.1 meters) above MSL. In the eastern portion of the map area, the scarp is fairly indistinct with the toe at approximately 75 feet (22.9 meters) and the crest at more than 125 feet (38.1 meters) above MSL.

See Open-File Report 92 for references and further discussion.



ADJOINING MAPS		
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7	8	

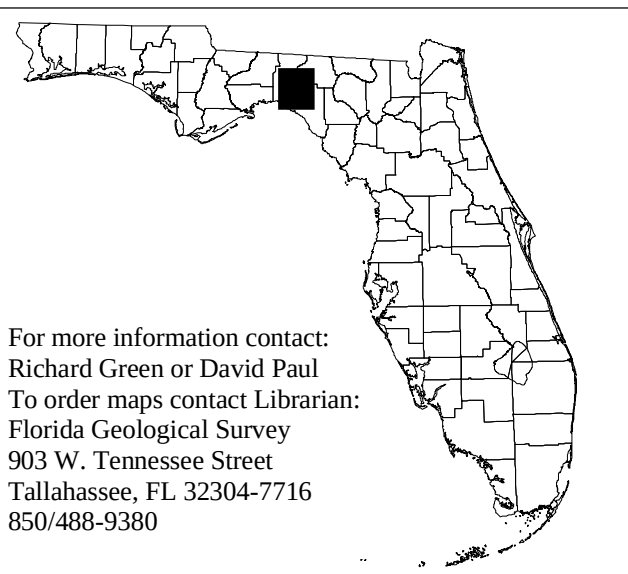
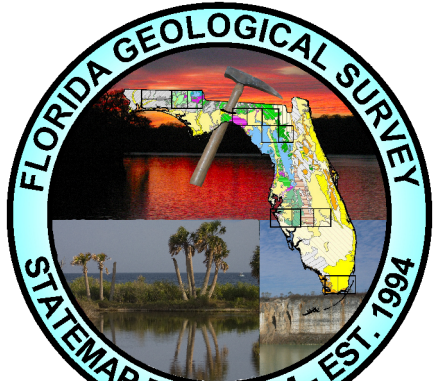
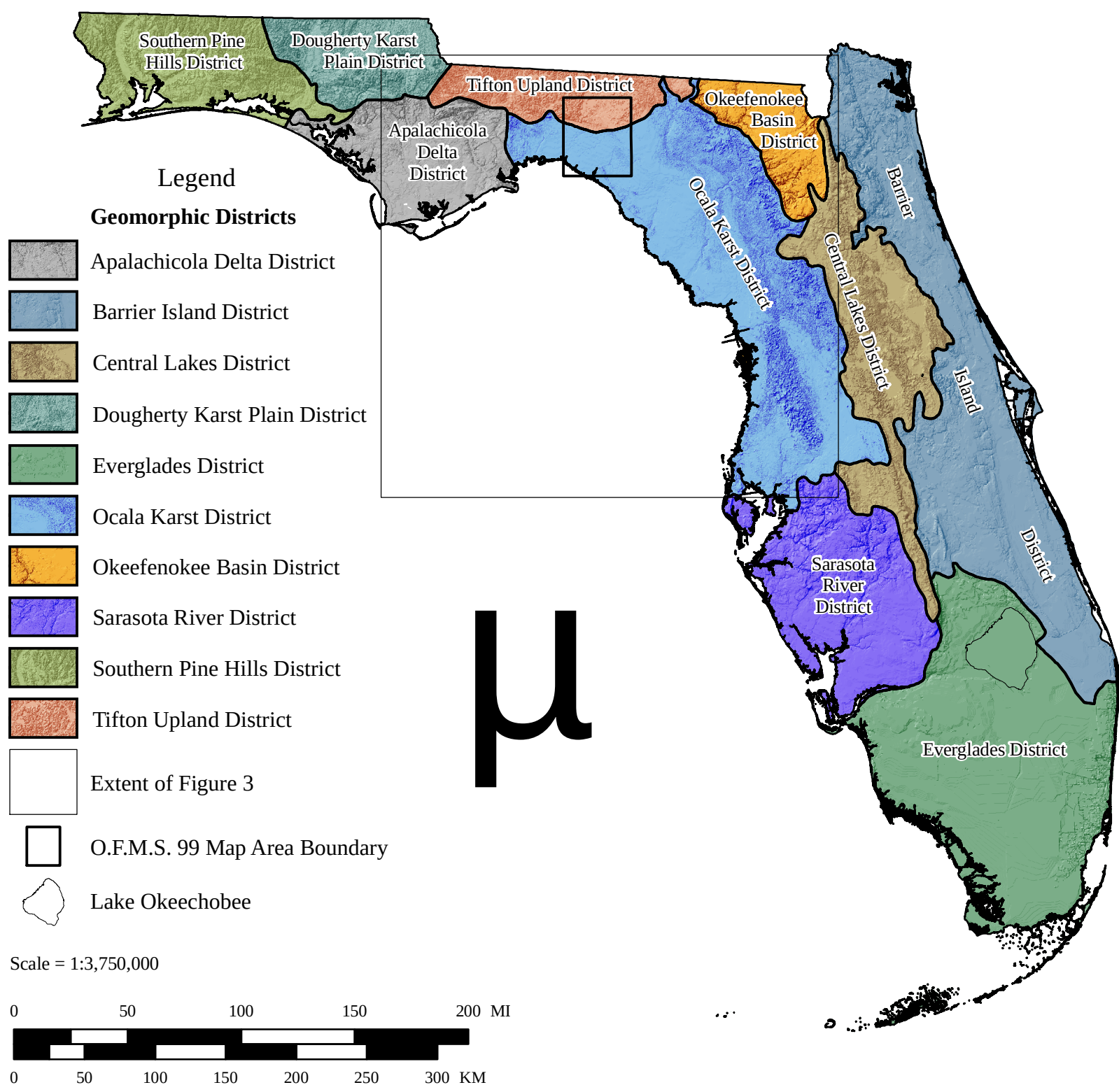
1 Bainbridge
2 Valdosta
3 Okefenokee Swamp
4 Tallahassee
5 Lake City
6 Carrabelle
7 Cross City
8 Gainesville

Legend for Figure 1

- County Boundary
- Cody Scarp - Generalized Trace
- River or Stream
- Lake or Pond
- Swamp or Marsh
- Closed Topographic Depressions (CTDs)
- 7.5 Minute Quadrangle

- Photo Location Callout
- Karst Features
 - First Magnitude Spring
 - Second, Third, or Forth Magnitude Spring
 - Swallet
 - Sinkhole
 - MSL = Mean Sea Level

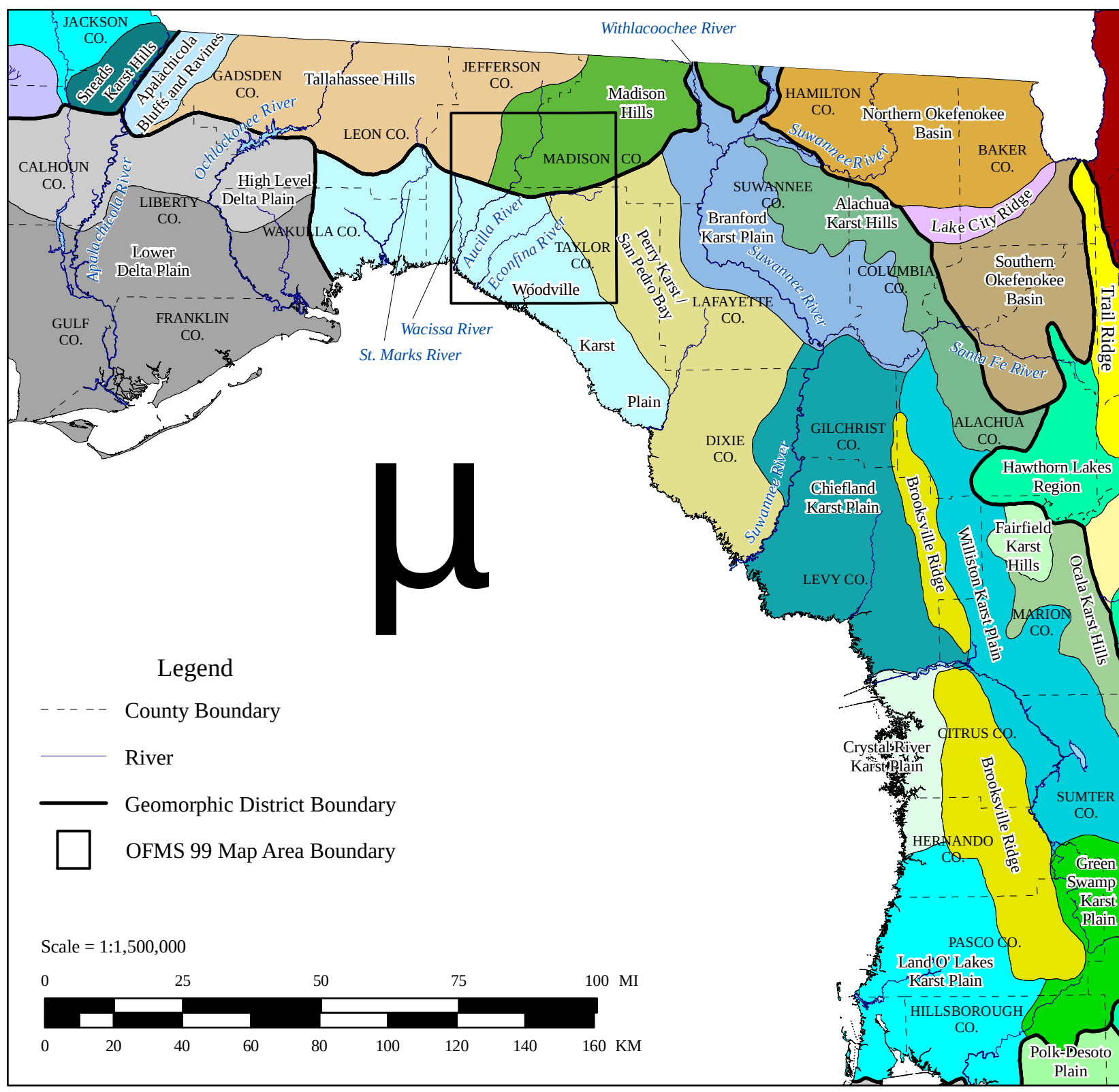
Figure 2. Geomorphic Districts (modified from Scott, 2005).



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Figure 3. Geomorphic Provinces (modified from Scott, 2005).



SELECTED PHOTOGRAPHS



Photo 1. View south from Cody Scarp along County Road 259
Located at: T 01 S, R 04 E, S. 31
Photo by Richard C. Green
Date taken: 4/23/2008



Photo 2. Exposure of Miccosukee Formation at intersection along County Road 259
Located at: T 01 N, R 04 E, S. 32
Photo by Richard C. Green
Date taken: 7/30/2008



Photo 3. Exposure of Torreya Formation (Hawthorn Group) in borrow pit
Located at: T 01 N, R 06 E, S. 21
Photo by Richard C. Green
Date taken: 2/26/2008



Photo 4. Suwannee Limestone exposed in Cow Creek (dry), ~2 miles west of Aucilla River.
Located at: T 03 S, R 04 E, S. 20
Photo by Clinton Kromhout
Date taken: 2/7/2008



Photo 5. David Wagner and David Paul examine exposure of Suwannee Limestone in swallet ~0.3 mi east of Aucilla River
Located at: T 03 S, R 04 E, S. 27
Photo by Clinton Kromhout
Date taken: 12/7/2008