

STATE OF FLORIDA

FLORIDA GEOLOGICAL SURVEY
Guy H. Means, *State Geologist and Director*



OPEN-FILE REPORT 114

**Text to accompany geologic map of the
USGS Naples 30 x 60 minute quadrangle, southwestern Florida**

By

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ABSTRACT

The accompanying 1:100,000 scale geologic map (Open-File Map Series 117, Plate 1) depicts the areal distribution of surficial geologic units for the U.S. Geological Survey (USGS) Naples 30 x 60 minute quadrangle. The map was constructed using a combination of field mapping (at 1:24,000 scale), compilation of data from existing maps (various scales), borehole core and cuttings analyses and descriptions, and analyses of various Geographic Information System (GIS) data sources. The resulting data were compiled in ESRI® ArcGIS® ArcPro™ 3.2.1 software for publication as part of the Florida Geological Survey Open-File Map Series. Mapped geologic units range in age from Pliocene to Holocene. Important resources in the mapped area include potable groundwater, sand, fossil shells, and limestone.

The geologic map and accompanying plates produced for this area not only provide a greater understanding of the interaction between the geologic units and ecosystems but have utility as a land management tool for economic development, mineral and energy production, and environmental protection for Florida. Examples include designing new construction projects, siting new water supply wells, wastewater treatment plants, energy production facilities, waste management and storage facilities, locating sources of mineable resources, and protecting surface and groundwater quality.

Keywords: Florida, geologic map, Hawthorn Group, Arcadia Formation, Peace River Formation, Tamiami Formation, Tertiary/Quaternary undifferentiated shelly sediments, geomorphology, hydrogeology, Floridan aquifer system, Collier County, Hendry County, Lee County, Bonita Springs, Estero, Immokalee, Naples

INTRODUCTION

Florida Geological Survey (FGS) Open-File Report (OFR) 114 accompanies Open-File Map Series (OFMS) 117, which is comprised of two plates. Plate 1 depicts the near-surface geology of the USGS Naples 30 x 60 minute quadrangle. Plate 2 depicts six geologic cross sections, a stratigraphic correlation chart, and an index geologic map with cross-section lines for the study area.

The study area is in southwestern Florida (Figure 1) and covers portions of Collier, Hendry, and Lee counties. It includes the communities of Bonita Springs, Estero, Immokalee, and Naples. The quadrangle is bounded to the north by the USGS Fort Myers 30 x 60 minute quadrangle (Green et al., 2024a; Green et al., 2024b), to the east by the USGS Fort Lauderdale 30 x 60 minute quadrangle (to be mapped 2024-2025), to the south by the USGS Everglades City 30 x 60 minute quadrangle, and to the west by the Sanibel 30 x 60 minute quadrangle.

One objective of this report is to provide basic geologic information for the accompanying OFMS 117. Information provided in this report and on the plates from OFMS 117 is intended for a diverse audience of professionals in geology, hydrology, engineering, environmental and urban planning, and laypersons, all of whom have varying levels of geologic knowledge. The maps can help users identify and interpret geologic features which impact activities related to groundwater quality and quantity, as well as aid in locating mineral resources, land-use planning, and construction project design. Applied uses of the maps and data in this report include: 1) identifying potential new mineral resources, 2) characterizing zones of geologic hazards, 3) characterizing potential aquifer recharge, discharge, and confinement, 4) surface water, groundwater, and fate and transport modeling, 5) aiding water-management decisions on groundwater usage, 6) providing information on aquifer vulnerability to potential pollution, 7) characterizing ecosystems, and 8) recreational activities.

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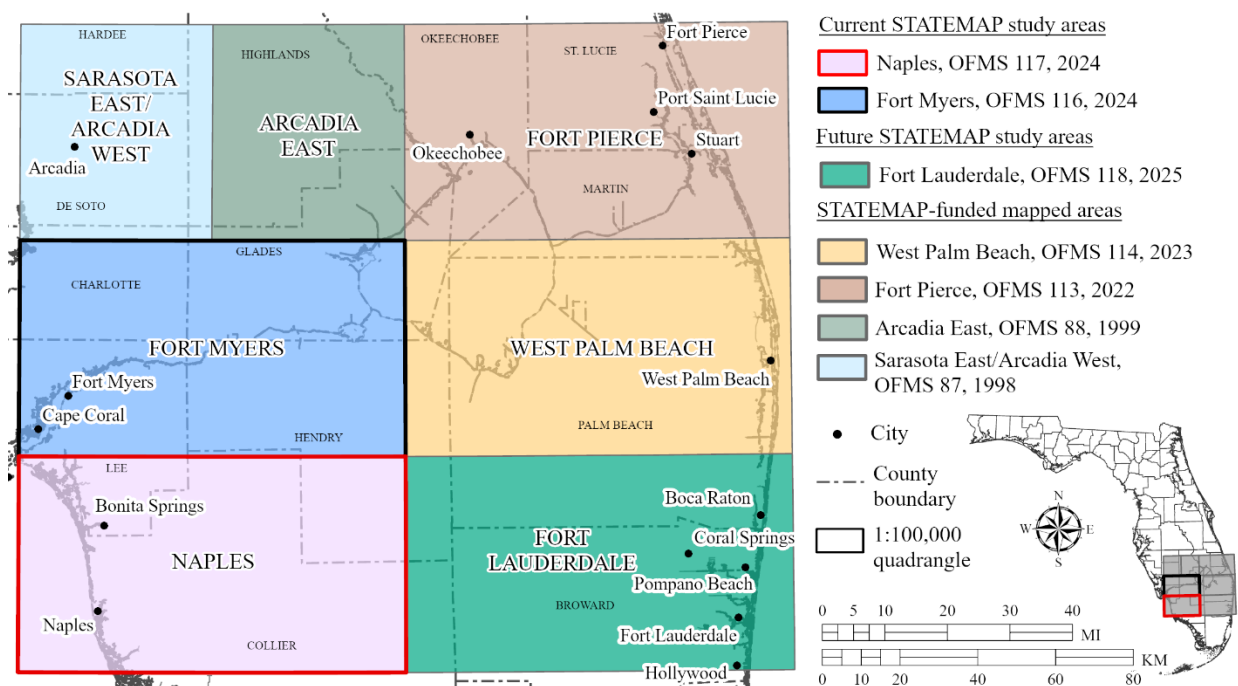


Figure 1. Nearby areas mapped under the FGS STATEMAP Program.

Methods

Mapping efforts consisted of 1) reviewing and compiling existing geologic literature and data, 2) mapping geologic units in the field at 1:24,000 scale using standard techniques, 3) analyzing existing borehole core, cuttings, and field (M-Series) samples from the FGS Sample Collections Facility, 4) drilling new cores, 5) collecting and describing outcrop samples, 6) compiling the available data in order model the surface and overburden thickness for selected units, and 7) preparing a geologic map and geologic cross-sections of the area. Fieldwork, performed during the fall of 2022 through the summer of 2024, consisted of sampling and describing outcrops, as well as samples from beach and pit exposures.

One hundred new geologic samples were added to the FGS surface-sample archives (M-Series) and four cores (548 feet [167 meters] total) were drilled. Numerous outcrops were also examined during this project. In addition to the new M-series samples collected, 17 historical M-series samples were examined. All data, including formation picks from over 200 FGS boreholes from the study area, were compiled and analyzed. Figure 2 shows the locations of FGS cores and cuttings used for geologic models. Figure 3 shows FGS M-Series samples and outcrops in the study area. Figure 4 shows borehole locations for consultant data used for models. Appendix A lists boreholes utilized within the quadrangle. Appendix B lists consultant boreholes utilized within the quadrangle. The map and accompanying plates were developed in ESRI® ArcGIS® ArcPro™ 3.2.1 software for publication as part of OFMS 117.

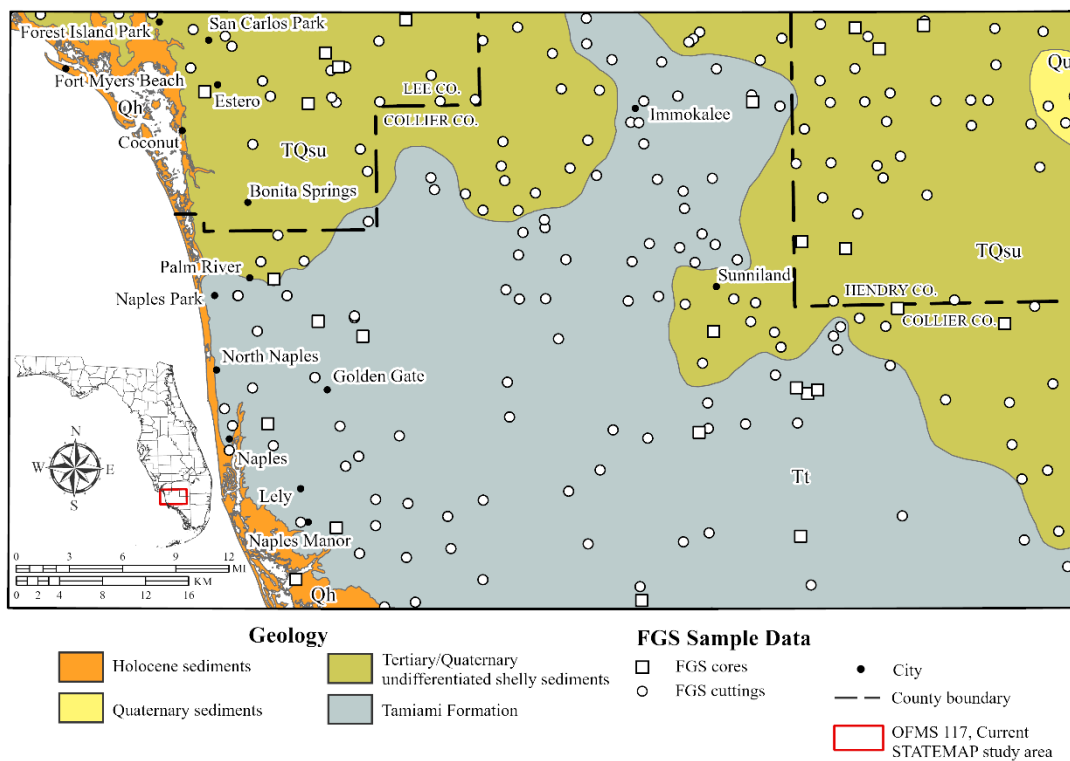


Figure 2. FGS cores and cuttings used for models.

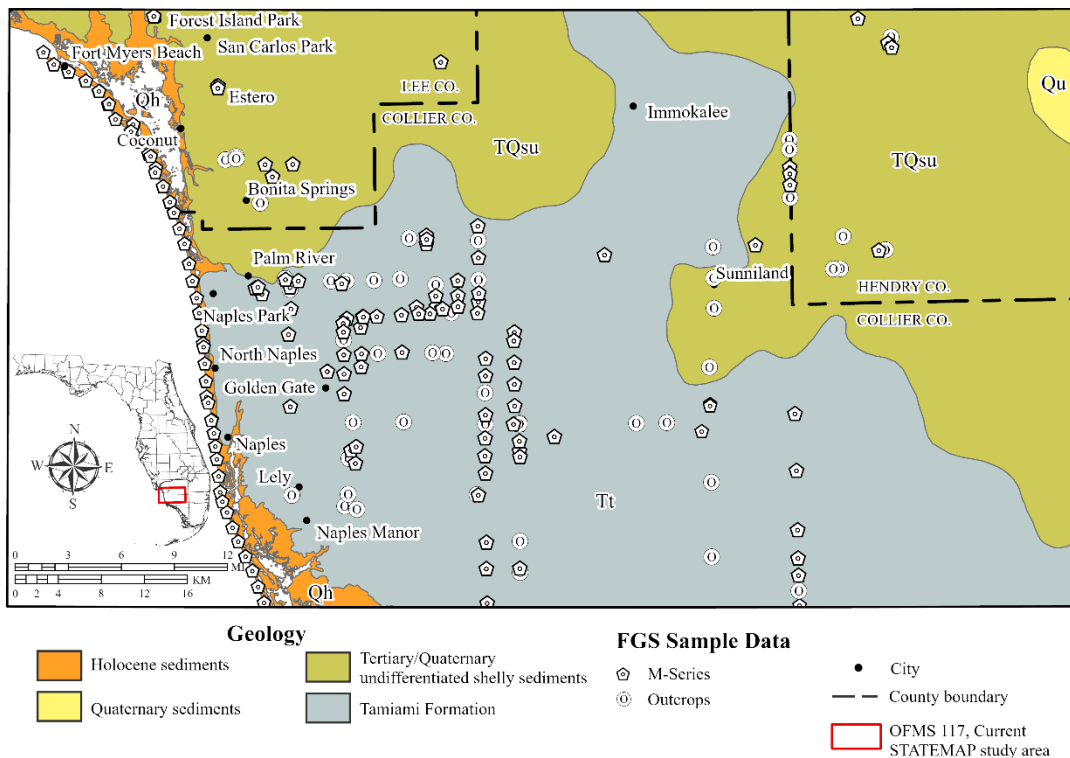


Figure 3. FGS M-series and outcrops used for models.

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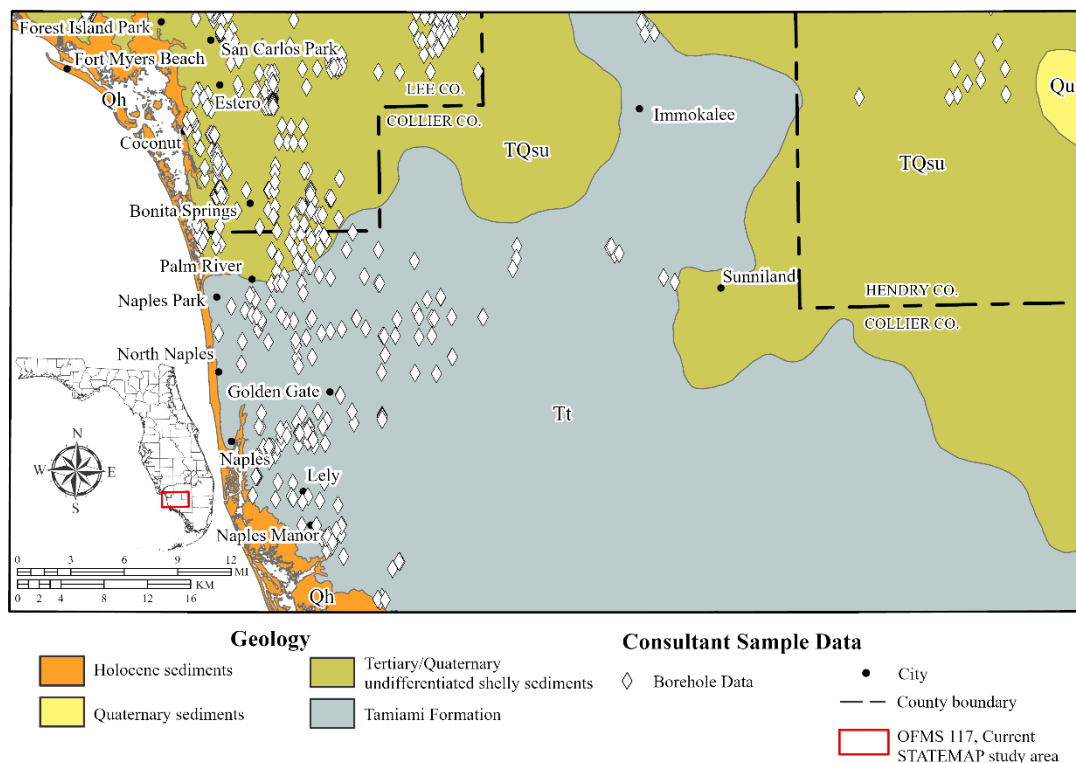


Figure 4. Borehole locations of consultant data used for models.

Five USGS tiles from the 3D Elevation Program (3DEP; U.S. Geological Survey, 2022) were mosaicked together in ArcPro 3.2.1 to create the digital elevation model for this study area. All elevation values are in meters and are referenced to the North American Vertical Datum of 1988 (NAVD 88). These data have a horizontal resolution of 1/3 arc-second (approximately 10 meters), and a vertical resolution of 1 meter.

Top-of-unit rasters were created for several geologic units within the study area using the borehole descriptions completed during this study. In order to produce interpolated top-of-unit rasters, the borehole depth for the top of each unit was first converted from depths below land surface into elevations referenced to mean sea-level. This conversion was performed by taking the elevation value of the borehole location from the digital elevation model raster and subtracting the depth below land surface value, resulting in the mean sea-level elevation for the top-of-unit for each borehole location.

The mean sea-level elevation data for each geologic top-of-unit was used to create a Natural Neighbor (NN) interpolation of the top-of-unit surface. The NN method of interpolation is a simple and exact interpolation method that relies on Voronoi tessellation (a partitioning of a plane into regions based on distances to points) to select a local subset of points and determine a weighted influence at every raster grid cell. This method produces a surface that passes through every data point in the input data set and thus does not attempt to account for errors or outliers. The NN method is particularly useful for visualizing the ‘raw’ data for problematic areas and extreme outliers prior to building and optimizing the final model.

After examining the initial models created for geologic units, it was evident that some of the predictive errors in the first model were directly attributable to either low data density, local outliers in the borehole data, or both. Outliers are a common occurrence in Florida geologic data for a variety of reasons, both human and natural, including: 1) the contact between units can be difficult to distinguish at times, and therefore some degree of uncertainty may exist in locating contacts, 2) many of the borehole samples are based on cuttings taken at intervals of 10 feet (3.1 meters), which introduces uncertainty in the elevation of

the contacts even when the contact is clearly evident and 3) dissolution in carbonate units can produce significantly different unit elevations in boreholes that are a short distance apart.

In cases where the accuracy metrics of the modeled surfaces indicated large amounts of error due to outliers, an iterative modeling process was used to reduce the average standard error of the interpolated surface and the least-accurate boreholes were removed from the dataset via cross-validation to improve predictive accuracy. After the removal of outlier data points (generally fewer than ten boreholes per unit), a new interpolated raster was generated.

Figure 5 is a boxplot used to illustrate the distribution and range of elevation values, relative to mean sea level (MSL), for each geologic unit investigated within the study area. The crossbar within the box represents the median elevation value for each geologic unit. The upper and lower borders of each box correspond to the 25th and 75th percentiles, or the first and third quartiles, respectively; this area is also called the interquartile range and represents the middle 50% of the values in each group. The whiskers that extend from each boxplot reach no further than 150% of the interquartile range. Data that fall beyond the whiskers are considered outlier points and are represented by a dot.

Once the top-of-unit models were completed, they were subtracted from the digital elevation model to produce a raster showing overburden depth between each unit and land surface. The overburden rasters were then used to assist in drawing the final surficial geologic map for the study area.

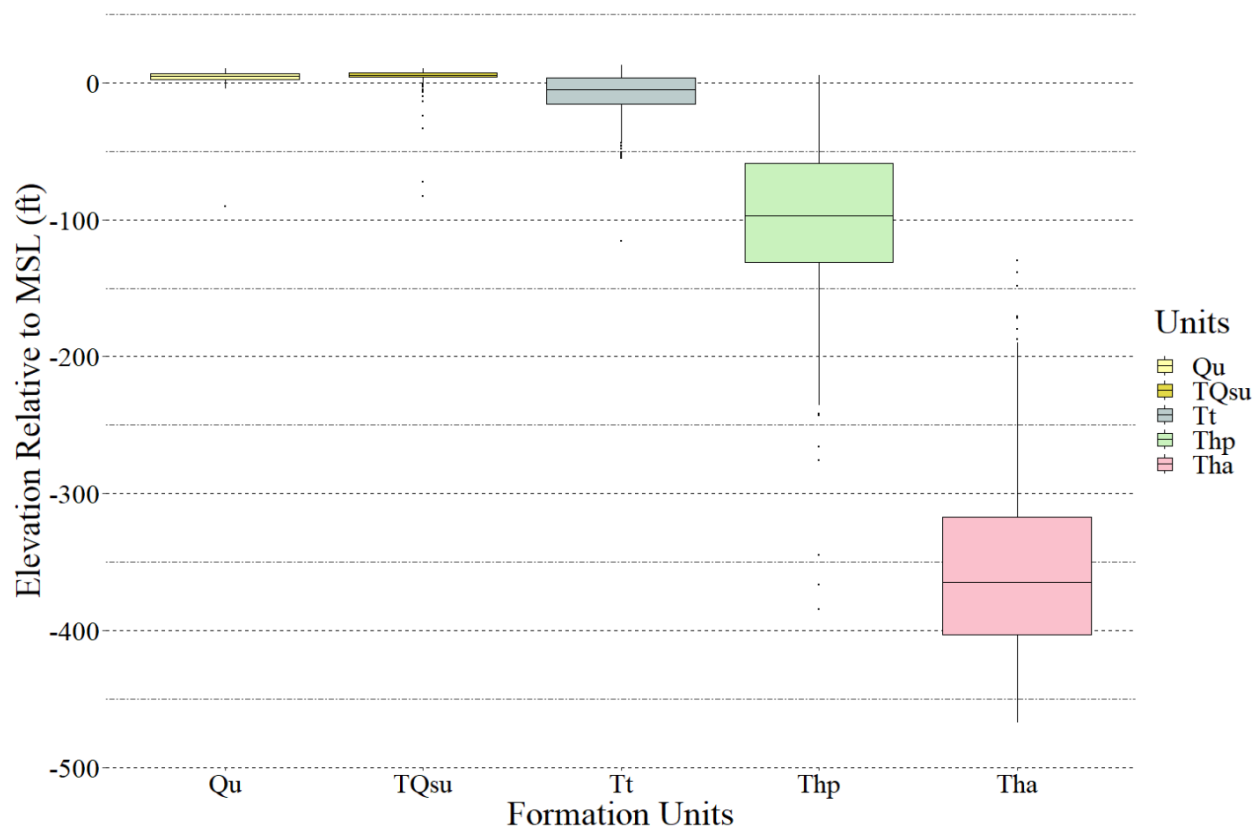


Figure 5. Boxplot of top of lithostratigraphic unit elevation ranges.

Much of the study area is blanketed by a veneer of Quaternary undifferentiated sediments. For this reason, and in keeping with geologic mapping practices developed by Scott et al. (2001), the authors have adopted the procedure of mapping the first named geologic unit within 20 feet (6.1 meters) of the surface. If Quaternary undifferentiated sediments (Qu) have a thickness greater than 20 feet (6.1 meters), they appear

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as the mapped unit. If these undifferentiated sediments are less than 20 feet (6.1 meters) thick, the underlying lithostratigraphic unit appears on the map. The geologic map (OFMS 117, Plate 1) and the geologic cross-sections (OFMS 117, Plate 2) may appear to disagree slightly when depicting the upper unit due to this convention. This is because geologic cross-section contacts are based on straight-line projection between boreholes, which may lead to apparent unit thicknesses between boreholes not supported by field evidence or other nearby boreholes.

Public access in portions of the mapped area was hindered by the presence of numerous wetlands, mines, farms, ranches, and privately-owned land. Fieldwork access was typically limited to public roads, State-owned lands, and County-owned lands. As such, large sections of the mapped area were inaccessible. In these areas, the authors had to rely on existing core, cuttings, outcrop, and M-Series sample data.

Previous Work

The current study builds on previous geologic investigations in and around the present map area. Preliminary county geologic maps for Collier (Duncan, 1993), Hendry (Scott, 1993a), and Lee (Missimer and Scott, 1993) counties were previously published at a 1:126,720 scale by the FGS. However, each of these geologic maps were constructed in an average timeframe of two weeks utilizing selected in-house geologic data with little-to-no field work. A statewide geologic map (Scott et al., 2001), published by the FGS, provided a framework for the current, more detailed mapping. Although these maps provided a starting point for the detailed geologic mapping undertaken for this project, significant refinement of prior geologic maps was possible because of this additional field work and data.

Scott (1988) published detailed descriptions, structure contour maps, and isopach maps for units of the Hawthorn Group. This study also benefited from the work performed during geologic mapping of the Sarasota, Arcadia (Green et al., 1997; Green et al., 1998; Green et al., 1999), Fort Myers (Green et al., 2024a; Green et al., 2024b) and West Palm Beach (Green et al., 2023a; Green et al., 2023b) 30 x 60 minute quadrangles. Some of the field relationships and stratigraphic problems were worked out during those projects.

Dr. Thomas Missimer, a consulting geologist with over five decades of experience in the region, generously provided data from hundreds of consulting reports that were generated during his career. Data from several hundred boreholes in Lee, Collier, and Hendry counties were compiled and analyzed by the authors in order to refine our geologic models and understanding of the regional geology for this project (Figure 4).

GEOLOGIC SUMMARY

The near-surface geology of the USGS 30 x 60 minute Naples quadrangle is composed of a complex mixture of Tertiary to Quaternary carbonate and siliciclastic sediments. A combination of factors, including fluvio-deltaic deposition, marine deposition and erosion of sediments as a result of eustatic changes in sea level, dissolution of underlying carbonates (karstification), and structural features have influenced the geology of the study area.

The oldest unit to crop out in the Naples quadrangle is the Tertiary Tamiami Formation. The unit can be seen in numerous pits and quarries throughout the map area (OFMS 117, Plate 1). The Tertiary Tamiami Formation overlies the Peace River Formation throughout the mapped area (OFMS 117, Plate 2). The oldest unit investigated for geologic cross-sections is the Oligocene-Miocene Arcadia Formation (Hawthorn Group; OFMS 117, Plate 2). Detailed descriptions of the lithology of all units investigated in the study area begin on page 12 of this publication.

The Naples quadrangle encompasses portions of the Caloosahatchee River, Everglades-West Coast, and Florida Southeast Coast hydrologic basins (Figure 6). There are no known springs within the study area.

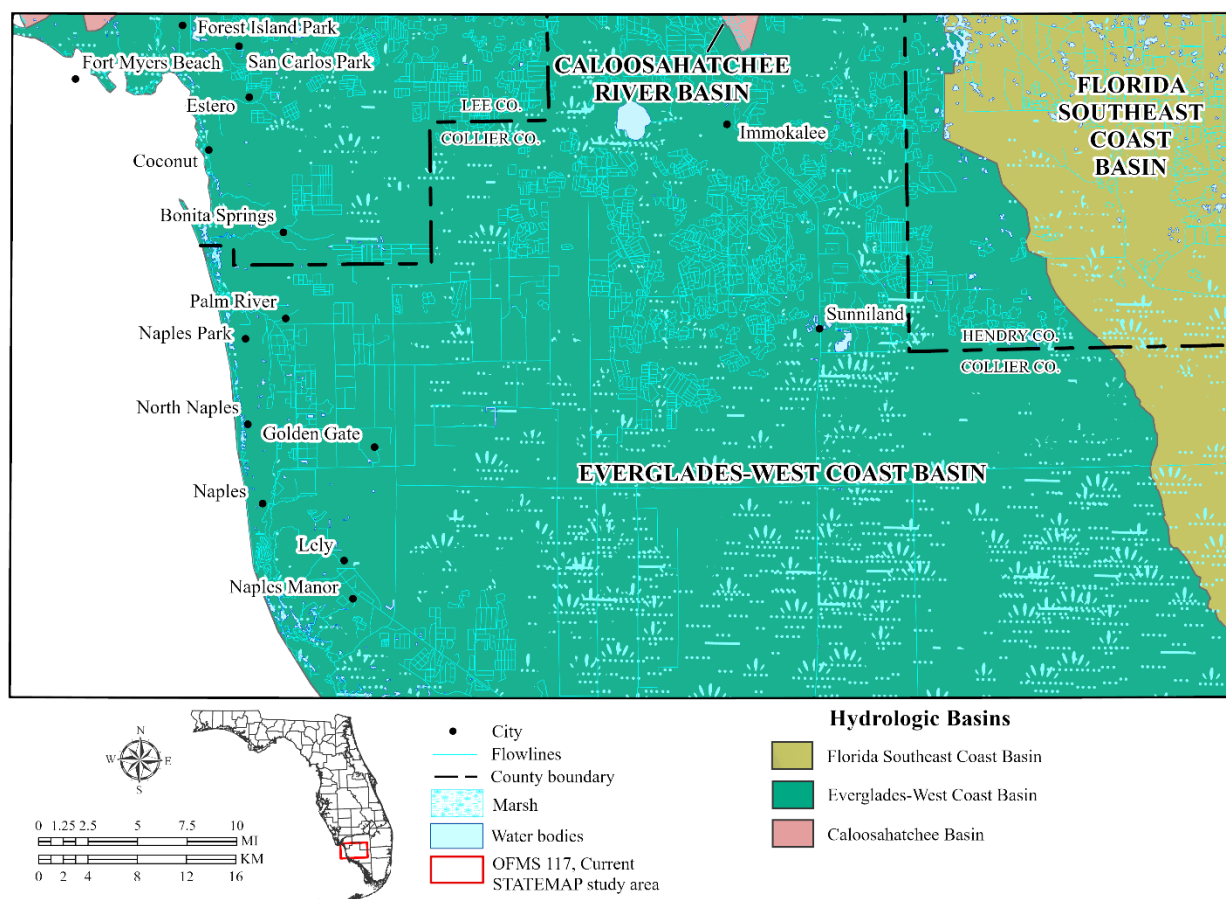


Figure 6. Location of selected river basins and other water bodies (modified from Hydrologic Unit Codes: Basins, 1993).

Structure

The South Florida Basin (Applin and Applin, 1965; Winston, 1971) is a stratigraphic basin which contributed to the thickening and deepening towards the south of Mesozoic and early Cenozoic lithostratigraphic units in the southern Florida Peninsula. The basin encompasses most of the southern Florida Peninsula and is an area where the stratigraphic units generally dip gently to the south and southeast.

The Okeechobee Basin (Riggs, 1979), which includes most of southern Florida (Figure 7), is an area where mid-Cenozoic and younger stratigraphic units gently dip south and southeast. As can be seen in the geologic cross sections (OFMS 117, Plate 2), the South Florida and Okeechobee basins have had minimal influence on the late Cenozoic units in the mapped area.

Several seismic studies have been performed in the Fort Myers quadrangle (Missimer and Gardner, 1976; Warzeski et al., 1996; Cunningham et al., 2001), indicating channels are developed in the sediments of the Arcadia Formation (Hawthorn Group) which have influenced deposition in the region. Missimer and Gardner (1976) identified folds in the “Hawthorn Formation” (the Arcadia Formation of Scott [1988]) and numerous large-scale angular beds in the “green clay unit of the Tamiami Formation” (later renamed as the Peace River Formation by Scott [1988]), which dip eastwards. Missimer and Gardner (1976) also identified numerous deeply cut paleochannels in the Caloosahatchee River. They did not note any faults in the strata. Cunningham et al. (2001) indicated that the folding discussed by Missimer and Gardner (1976) were likely created by karstic collapse.

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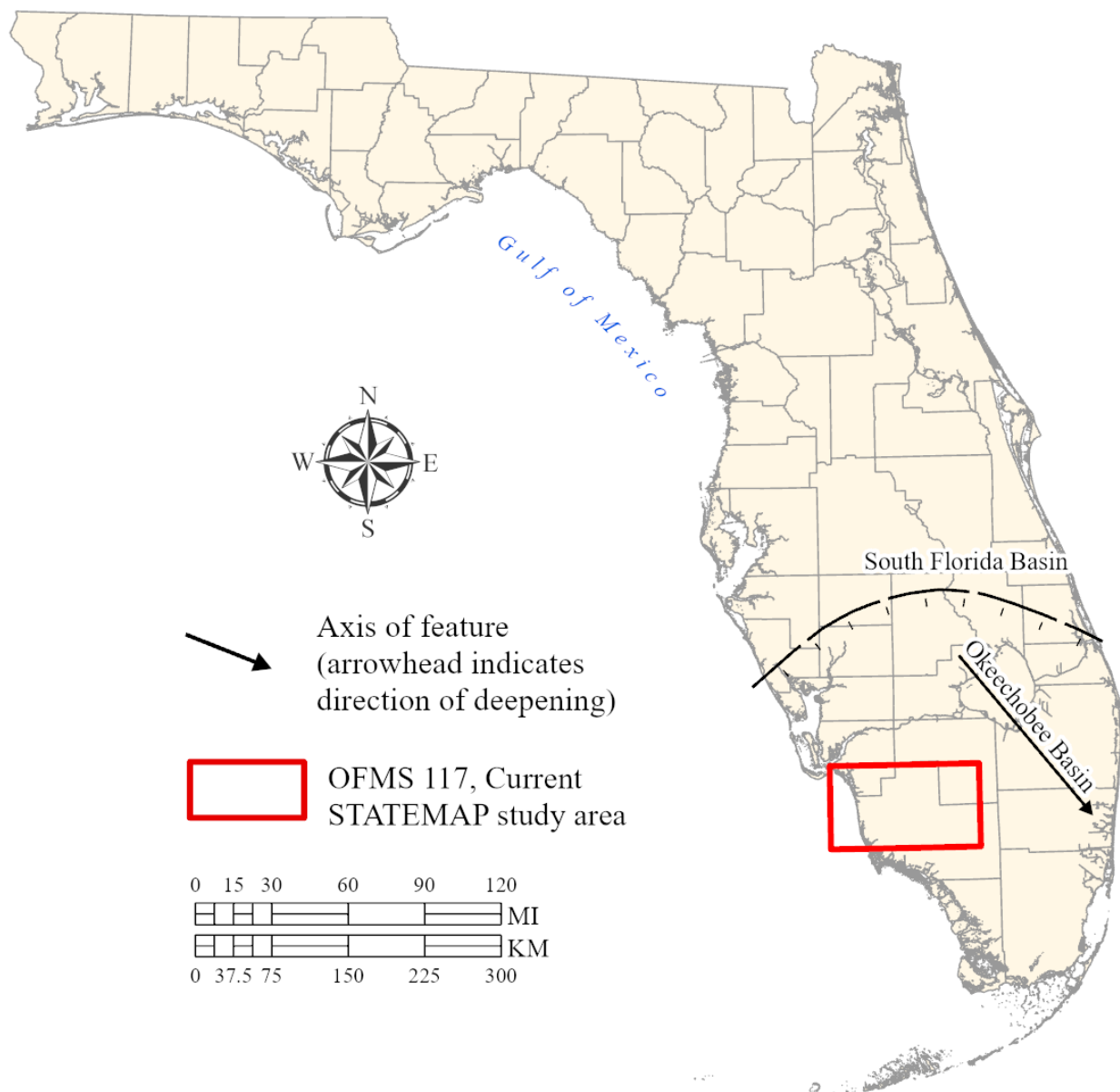


Figure 7. Principal subsurface structures of the Florida Peninsula (modified from Scott, 1988).

Geomorphology

The Florida Geological Survey recently published the Florida Geomorphology Atlas (Williams et al., 2022). The atlas synthesized over a century of geomorphic writings and maps about Florida, along with the addition of new data and interpretations of the geomorphology. These include specific regional discussions of landforms and relationships to the underlying geology and the coastal, fluvial, and karst processes that have affected the evolution of landforms. *The Geomorphology of the Florida Peninsula* (White, 1970), in addition to work by former FGS colleague, Thomas M. Scott, was central to the new statewide map. Recent data and technology, including the addition of significant LiDAR coverages and new possibilities for digital geomorphological mapping that employ spatiotemporal and geocomputational approaches to data analysis, allowed the FGS to revise nomenclature and refine geomorphic district and

province boundaries. In the following section, all geomorphic unit names and most discussions are from Williams et al., 2022.

The new atlas shows the geomorphology by regional units (districts; Figure 8) and sub-regional to local units (provinces; Figure 9). Districts are defined by regional groupings to form map polygons that have landforms which are distinct from adjacent districts. Defining the more localized provinces and their landforms is important for the characterization of the regions within districts. A brief discussion of districts and provinces within the Naples quadrangle is listed below. For more information and detail, the reader can refer to Williams et al., 2022.

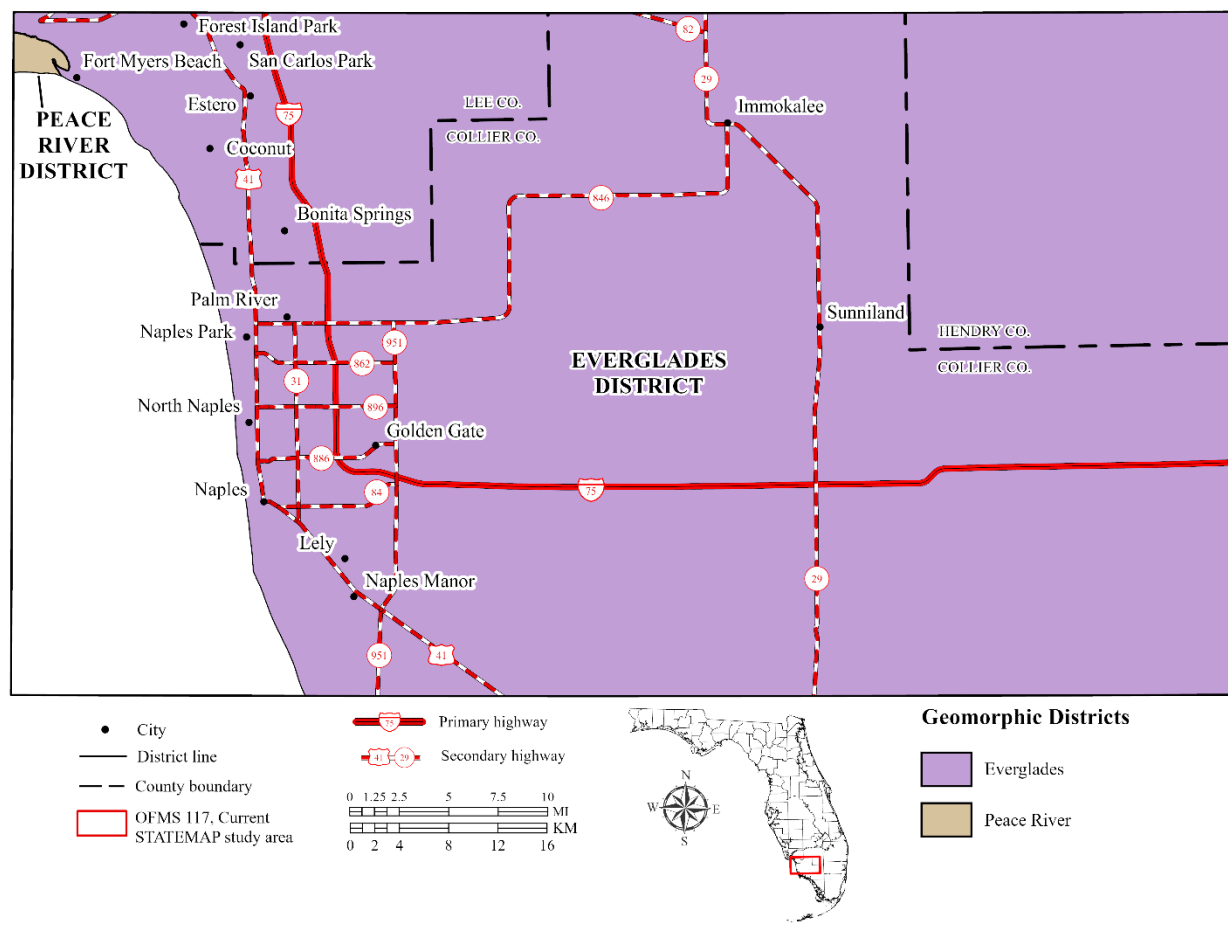


Figure 8. Geomorphic districts within the Naples quadrangle.

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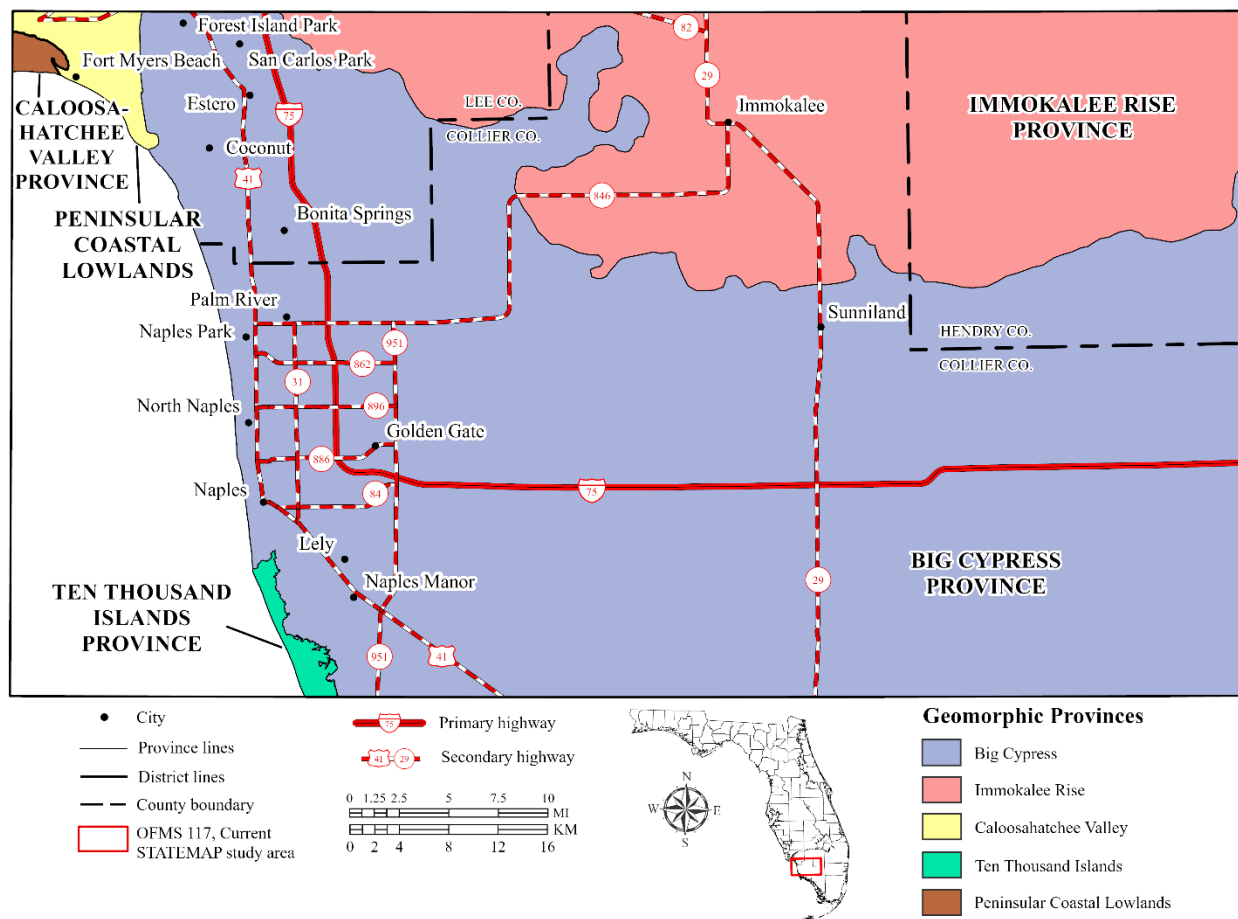


Figure 9. Geomorphic provinces within the Naples quadrangle.

Everglades District

The Everglades District includes the southern part of peninsular Florida. All the provinces within the Everglades District are related to a vast and complex drainage system that begins with the Kissimmee River and its tributaries in the Barrier Island Sequence District to the north of the mapped area (Williams et al., 2022). Many areas are characterized by wetlands, but others include Quaternary carbonate islands and coastal ridges. The dominant flow of water through the central and eastern Everglades District has historically been north to south. Drainage in much of the district is by way of sloughs, sheet flow in wetlands, and poorly defined stream systems. The dominant flow of water through the western part of the Everglades District is more complex.

In the study area, most of the drainage is to the west and southwest toward the Gulf of Mexico. All the provinces within the district have relatively flat landscapes, and elevation changes of inches or a few feet often mark the differences between provinces. With a few exceptions, pre-development drainage was as sheet flow and through sloughs (wetlands).

The Everglades District is subdivided within the mapped area into four provinces: Caloosahatchee Valley, Immokalee Rise, Big Cypress, and Ten Thousand Islands (Figure 9). The Everglades District has little topographic relief. Elevations within the district gradually decrease from north to south. Elevations of the district within the mapped area range from sea level at the Gulf of Mexico to 40 feet (12.2 meters) MSL.

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Big Cypress Province

The Big Cypress Province is primarily located within Collier County and includes areas of southern Lee and Hendry counties, and small areas of Broward, Miami-Dade, and Monroe counties. The Big Cypress Province includes the Big Cypress Swamp, Corkscrew Swamp, and the other ridge and slough regions from the Gulf of Mexico coast north of Naples and east to the marshlands of the Everglades Province. The Big Cypress Province includes an important and complex ecosystem that is dominated by shallow sloughs (locally known as strands) separated by low ridges. In the Big Cypress Province, the water table is near land surface and drainage becomes less well organized. Many cypress sloughs (strands) and the intervening ridges in the study area drain southwest toward the Gulf of Mexico. East of the study area, many drain south and southeast toward the Everglades. The boundary between the Big Cypress and Caloosahatchee Valley provinces to the northwest approximates the drainage divide between Six Mile Slough and the Caloosahatchee River and separates Lovers Key from Estero Island at Big Carlos Pass. Highest elevations in the Big Cypress Province are in the north, and the land surface slopes gently to the south, east, and west. The Big Cypress Province occurs in most of the western and southeastern parts of the study area (Figure 9). Elevations of the Big Cypress Province in the study area vary from sea level at the Gulf of Mexico to 20 feet (6.1 meters) MSL.

Caloosahatchee Valley Province

The Caloosahatchee Valley is located in central Lee, northern Hendry, and southern Glades counties. The province consists of the pre-development Caloosahatchee River valley, and the low valley between Lake Okeechobee and the Caloosahatchee River (Williams et al., 2022). Historically, excess water entering the northern Everglades from the Kissimmee River, Fisheating Creek, other smaller drainages, and Lake Okeechobee overflowed westward into the low valley of wetlands and lakes, including Lake Hicpochee and Lake Flirt. Most of these lakes were drained by 20th Century construction of the Caloosahatchee Canal which permanently connected Lake Okeechobee to the Caloosahatchee River for flood control and navigation. Where development has not occurred, there are many swampy regions along streams. The significant number of drainage canals associated with development suggest that much of the land surface was historically poorly drained. Only the southwestern most part of the Caloosahatchee Valley Province that borders the Gulf of Mexico occurs in the northwesternmost part of the study area (Figure 9). Elevations of the province within the study area range from sea level at the Gulf of Mexico to 15 feet (4.6 meters) MSL.

Immokalee Rise Province

The Immokalee Rise Province is located within much of Hendry, north-central Collier, and eastern Lee counties. The province is a region of slightly higher elevation compared to its neighboring provinces (Williams et al., 2022). Accordingly, the drainage off the Immokalee Rise can be north to the Caloosahatchee River, west and south to the Gulf of Mexico, and east into the Everglades. It is relatively flat but has abundant closed topographic depressions. It has swampy drainage with more-or-less linear marshes and cypress sloughs that discharge to adjacent provinces. Landforms that were created by the marine inundations are indistinct, but present, on the land surface. Immokalee Rise occurs in the north-central to northeastern part of the study area (Figure 9). Elevations of the province within the study area range from 15 feet (4.6 meters) to 40 feet (12.2 meters) MSL.

Ten Thousand Islands Province

The Ten Thousand Islands Province extends from Keewaydin Island to Gordon Pass near Naples in Collier County, southeast along the mainland portion of Monroe County, and into the southwestern corner of Miami-Dade County. The northern Ten Thousand Islands Province consists of a chain of islands,

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embayments, and tidal channels that lie west and southwest of the Big Cypress and Everglades provinces onto the Florida mainland (Williams et al., 2022). The province is an important estuarine ecosystem. The Ten Thousand Islands Province consists of low, coastal, mangrove islands and adjacent bays offshore of southwestern peninsular Florida. The bays are characterized by oyster banks, many of which are populated by mangroves. The oyster banks give the islands irregular outlines and often connect the islands by shallow, tombolo-like bars. Surficial sediments on the islands in the province include mangrove peat with varying amounts of siliciclastic and carbonate sediments. Islands and spits with well-developed beach ridges have shelly sand. The mangrove peat tends to develop on the sand and shell deposits underlie the peat and are exposed on the beach faces. Siliciclastic sediments (primarily quartz sand) predominate in the northwestern reaches of the province and within the study area. Siliciclastic sediments become less important and are replaced by carbonates towards the southeast. The Ten Thousand Islands Province occurs at the Gulf of Mexico coast in the southwestern part of the study area (Figure 9). Most elevations in the province within the study area range from sea level to five feet (1.5 meters) MSL but can be up to eight feet (2.4 meters) MSL.

LITHOSTRATIGRAPHIC UNITS

Tertiary System

Oligocene-Pliocene Series

Hawthorn Group

The upper Oligocene to lower Pliocene Hawthorn Group (Th) within the mapped area is composed of sediments from the Arcadia and Peace River formations. The Peace River Formation unconformably overlies the Arcadia Formation and is unconformably overlain by the Tertiary Tamiami Formation, throughout the mapped area (OFMS 117, Plate 2). The top of the Hawthorn Group ranges from approximately 20 feet (6.1 meters) below MSL in W-17941, to 275 feet (83.8 meters) below MSL in W-8979 (Appendix A). Only a few boreholes in this study were investigated to the bottom of the Hawthorn Group, therefore we did not calculate the total thickness of the unit. Scott (1988) indicated that the thickness of the Hawthorn Group in this area ranges from approximately 600 feet (182.9 meters) to 700 feet (213.4 meters).

The Hawthorn Group forms part of the intermediate aquifer system/intermediate confining unit (IAS/ICU) in the study area (Southeastern Geological Society Ad Hoc Committee on Florida Hydrostratigraphic Unit Definition, 1986).

Arcadia Formation

The upper Oligocene to middle Miocene (Covington, 1993; Brewster-Wingard et al., 1997) Arcadia Formation (Tha) is a poorly to moderately indurated, yellowish gray to white carbonate with variable amounts of quartz sand and phosphate, interbedded with siliciclastic-dominant sediments. Phosphate content can be highly variable, ranging up to 25 percent, but is more commonly in the 10 percent range (Scott, 1988). Although limestone is present, dolostone is most common, ranging in grain size from microcrystalline to medium, with the coarser material often having a sucrosic texture. Minor clay and chert beds (some composed of silicified clay) also occur (Scott, 1988). Porosity types include intergranular and moldic.

According to Scott (1988), the Arcadia Formation ranges from approximately 150 feet (45.7 meters) below MSL in the northwestern part of the quadrangle to approximately 400 feet (121.9 meters) below MSL in the eastern portion of the quadrangle. The unit ranges from approximately 400 feet (121.9 meters) thick to approximately 550 feet (167.6 meters) thick in the Naples quadrangle. The Arcadia Formation forms part of the intermediate aquifer system/intermediate confining unit (IAS/ICU) in the study

area (Southeastern Geological Society Ad Hoc Committee on Florida Hydrostratigraphic Unit Definition, 1986).

Peace River Formation

The middle Miocene to lower Pliocene (Scott, 1988; Covington, 1993) Peace River Formation (Thp) is comprised of unconsolidated to poorly indurated yellowish gray to olive-gray, interbedded quartz sands, clays, and carbonates. Siliciclastics are the predominant component of the unit (Scott, 1988). Phosphatic sand and gravel are most common in the uppermost beds, although they are generally interspersed throughout the unit. The Peace River Formation contains a diverse fossil assemblage of marine and terrestrial fauna. Porosity types in the formation are generally intergranular.

In the mapped area, the upper Peace River Formation is primarily composed of siliciclastic sediments, while the lower portion of the unit is more carbonate rich (Cunningham et al., 2001). The sediments assigned herein to the upper part of the Peace River Formation are uncharacteristically coarse for the unit as was defined by Scott (1988). This is particularly noticeable in the eastern portion of the quadrangle. These sediments may contain quartz gravel, discoid quartz pebbles, and coarse quartz sand. They may also contain feldspars, rock clasts, and mica (Missimer and Maliva, 2017). Guertin et al. (1995) suggested that these sediments were deposited during a sea-level lowstand. Proposed mechanisms for deposition of these sediments include longshore marine transport (Alt, 1974; Winker and Howard, 1977; Kane, 1984), or transport within a fluvial system (Bishop, 1956; Klein et al., 1964; Peacock, 1983) and redistribution within a nearshore marine environment (Peck et al., 1979; Ginsburg et al., 1989; Missimer and Maliva, 2006). Missimer and Maliva (2017) provide more discussion on the character of these sediments.

While these sediments are placed in the Peace River Formation in this study area, there is a possibility that they are younger than the typical Peace River Formation and that they may belong to the distal (northern) end of the Long Key Formation. Further work, which is beyond the scope of this study, would be needed to answer this question and clearly define the upper and lower boundaries, ages, and stratigraphic relationships of the Peace River and Long Key formations. High-resolution reflection profiles collected along the Caloosahatchee River (Cunningham et al., 2001) and in the Florida Keys (Warzeski et al., 1996) show the stratigraphic framework in the upper Peace River Formation and channels in the southern peninsula of Florida, where these sediments appear to have been discharged onto the Portales Terrace (Long Key Formation).

In areas where the carbonate component of the Peace River Formation is high, or the siliciclastic component of the Arcadia Formation is high, identifying the contact between these formations can be difficult. In such cases, the contact of the Peace River Formation with the Arcadia Formation is best estimated based on the occurrence of sedimentary structures such as bored hardgrounds, and where the overall lithologic sequence becomes more carbonate-dominant (Scott, 1988). In most of the study area, the contact is readily recognized at the first occurrence of a green dolosilt/sand.

The Peace River Formation ranges from approximately 20 feet (6.1 meters) below MSL in W-17941, to 275 feet (83.8 meters) below MSL in W-8979 (Appendix A). Thicknesses range from approximately 70 feet (21.3 meters) in W-19221, to 345 feet (105.2 meters) in W-9413 (Appendix A).

The Peace River Formation sediments comprise a low-permeability confining- to semi-confining facies within the IAS/ICU within the study area (Southeastern Geological Society Ad Hoc Committee on Florida Hydrostratigraphic Unit Definition, 1986).

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Tertiary/Quaternary Systems

Pliocene Series

Tamiami Formation

The “Tamiami limestone” was named by Mansfield (1939) for a series of sandy limestone outcrops that were exposed during the digging of shallow ditches to form the roadbed of the Tamiami Trail (U.S. 41) in Collier and Monroe counties. The unit was formally renamed, revised, redescribed, and redefined as the Tamiami Formation by Parker and Cooke (1944). Since then, additional work on the Tamiami Formation has been done (Hunter and Wise, 1980; Meeder, 1987; Missimer, 1984; Missimer, 1992).

The Pliocene Tamiami Formation consists of a complex mixture of limestone, fossil shell beds, quartz sand, and clay (Missimer, 1992). The top of the Tamiami Formation can be lithologically variable, ranging from limestone, sandstone, quartz sand, marl, shell, or clay (Missimer, 1992).

The Tamiami Formation is generally composed of two members (Pinecrest Sand and Ochopee Limestone) and several localized facies in the mapped area. Many of these facies are thin (in some cases less than 5 feet [1.5 meters] thick) and highly variable across short distances. Because these units are highly variable in thickness and lithologically change over short distances, they are difficult to delineate on geological maps, especially when using cuttings. Therefore, this report, accompanying maps, and cross-sections (OFMS 117, Plates 1 and 2), simply depict the Tamiami Formation. The reader is referred to Missimer (1992) for more discussion of the lithology and stratigraphic relationship of these complex units and informal facies.

The Pinecrest Sand Member, originally defined as the “Pinecrest Sand” (Olsson, 1964), is the uppermost member of the Tamiami Formation. It varies from shelly sand to sandy limestone, to marl with shell and sand, to marl. It generally consists of white to gray highly fossiliferous limestones with moldic porosity due to secondary dissolution of shell material. According to Missimer (1992), the Pinecrest Sand Member is present in relatively small, isolated areas which are commonly separated by long distances.

The Ochopee Limestone Member, named for the limestone which is present along U.S. 41 (Tamiami Trail) near the town of Ochopee (Hunter, 1968; Missimer, 1992), is a significant facies of the Tamiami Formation. The unit is typically a medium-hard to soft, light gray to white, sandy limestone with abundant mollusk molds, pectens, oysters, barnacles, and echinoids (Mansfield, 1939). It occurs beneath most of Collier and parts of Lee and Hendry counties in the mapped area (Missimer, 1992).

The Tamiami Formation unconformably overlies the Peace River Formation (Hawthorn Group) throughout the mapped area. The base of the Tamiami Formation in most of the mapped area occurs at the top of the first major green dolosilt/sand unit, which is the top of the Peace River Formation (Missimer, 1992). In southern Lee County, there is a green dolosilt unit within the Tamiami Formation, and in this area the top of the Peace River Formation occurs in a gray quartz sand unit (Missimer, 1992). The Tamiami Formation occurs at or near the land surface in parts of the mapped area (OFMS 117, Plates 1 and 2). In places where it is not exposed, it is overlain by Tertiary/Quaternary undifferentiated shelly sediments (TQsu) or undifferentiated Quaternary sediments (Qu). There were some instances noted in the field where Tertiary/Quaternary undifferentiated shelly sediments (TQsu) were present in limited outcrops, but they were too small to map at this scale.

The top of the Tamiami Formation ranges from approximately 10 Feet (3.1 meters) above MSL in W-8961, to 50 feet (15.2 meters) below MSL in W-15997. The thickness of the Tamiami Formation in the mapped area varies from approximately 20 feet (6.1 meters) in W-3879 to 250 feet (76.2 meters) in W-16884 (Appendix A).

Pliocene/Pleistocene Series

Tertiary/Quaternary undifferentiated shelly sediments

The Tertiary/Quaternary undifferentiated shelly sediments disconformably overlie the Peace River Formation in the southern portion of the map area. There are problems in mapping these sediments as separate units because their historical definitions are biostratigraphic, not lithostratigraphic (Scott and Allmon, 1990; Scott and Wingard, 1995). Scott (1993b) informally applied the name Okeechobee formation to these sediments in an effort to provide a lithostratigraphic framework for them. Since the Okeechobee formation was never formalized, and because to do so is beyond the scope of this project, we are following the convention of Scott et al. (2001) and referring to this unit as Tertiary/Quaternary undifferentiated shelly sediments (TQsu).

The Tertiary/Quaternary undifferentiated shelly sediments may include Caloosahatchee, Bermont, and Fort Thompson faunas (Scott, 1993b). Virtually all of the individual lithologies are fossiliferous, containing some of the most macrofossiliferous sediments in the Atlantic Coastal Plain.

Tertiary/Quaternary undifferentiated shelly sediments typically consist of fine-to-medium quartz sand and marine mollusk shell beds with variable amounts of micrite, silt, clay, and calcite cement. The unit occasionally contains lenses and thin beds of fresh-water limestones and laminated crusts. Colors range from light gray to light-olive gray to light orange and white. Fossil mollusk shells, which may vary from whole to fragments, are often highly weathered and abraded and regularly become the dominant lithology. Porosity is generally intergranular and moldic. Other accessory minerals may include calcite, aragonite, mica, heavy minerals, pyrite, and minor phosphate sand and gravel. In the study area, the TQsu sediments occur in the form of both unconsolidated sand with varying percentages of shell fragments and calcite-cemented sand and shell fragments, with occasional lithified carbonate beds.

The TQsu sediments are overlain by undifferentiated Quaternary sediments in parts of the mapped area (OFMS 117, Plate 2). The Tertiary/Quaternary undifferentiated shelly sediments are exposed in several quarries within the study area. Where present, the TQsu sediments disconformably overlie the Tamiami Formation throughout the Naples quadrangle.

The Tertiary/Quaternary undifferentiated shelly sediments present in the study area are generally less than 10 feet (3.1 meters) above MSL, with most of the unit being above five feet (1.5 meters) above MSL (OFMS 117, Plate 2, cross-sections). The elevation of the TQsu sediments is highest in the eastern portion of the mapped area and lowest along the Gulf Coast (OFMS 117, Plate 2). The top of the Tertiary/Quaternary undifferentiated shelly sediments ranges from approximately 10 Feet (3.1 meters) above MSL in W-13721, to 35 feet (10.7 meters) below MSL in W-9978. The thickness of the TQsu sediments range from less than a foot (0.3 meters) in field areas where the Tamiami Formation crops out, to approximately 60 feet (18.3 meters) in W-17864 (Appendix A). Permeable strata within the Tertiary/Quaternary undifferentiated shelly sediments form part of the surficial aquifer system (SAS; Southeastern Geological Society Ad Hoc Committee on Florida Hydrostratigraphic Unit Definition, 1986).

Pleistocene/Holocene Series

Quaternary undifferentiated sediments

Quaternary undifferentiated sediments (Qu) include siliciclastic sediments, organics, and freshwater carbonates. While not a formally recognized lithostratigraphic unit, following the convention of Scott et al. (2001), the Quaternary undifferentiated sediments are mapped as a discrete unit where these sediments exceed 20 feet thick above recognized lithostratigraphic units. The Quaternary undifferentiated sediments in the mapped area may be highly variable in thickness. Quaternary undifferentiated sediments in the study area lie unconformably on Tertiary/Quaternary undifferentiated shelly sediments (OFMS 117, Plate 2).

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Quaternary undifferentiated sediments generally consist of white-to-gray to orange-to-brown, fine-to coarse-grained, clean-to-clayey (usually) unfossiliferous quartz sand, sandy clays and clays, with variable admixtures of organics. Minor shell fragments are sometimes present in Quaternary undifferentiated sediments near the coast. The Quaternary undifferentiated sediments form part of the SAS (Southeastern Geological Society Ad Hoc Committee on Florida Hydrostratigraphic Unit Definition, 1986).

Holocene sediments

Sediments mapped as Holocene (Qh) may include quartz sands, marls, organics, and minor carbonate sands and mud. They occur along the western portion of the mapped area and are associated with mangroves and marshes along the coast and in some coastal lowlands (OFMS 117; Plate 1). These sediments are considered part of the SAS (Southeastern Geological Society Ad Hoc Committee on Florida Hydrostratigraphic Unit Definition, 1986).

HYDROGEOLOGY

Hydrostratigraphic units within the map area, in ascending order, consist of the FAS, the IAS/ICU, and the SAS (Southeastern Geological Society Ad Hoc Committee on Florida Hydrostratigraphic Unit Definition, 1986). A correlation chart of the hydrostratigraphic units, and their relationship to lithostratigraphic units, can be seen on OFMS 117, Plate 2, Figure 2. The sands, silts, clays, and carbonates of the Hawthorn Group comprise the IAS/ICU. The SAS is comprised of Holocene sediments, Quaternary undifferentiated sediments, Tertiary/Quaternary undifferentiated shelly sediments, and the Tamiami Formation.

DERIVATIVE PRODUCTS

Several derivative products were developed in the process of completing this project. During the mapping efforts, data from over 600 boreholes were analyzed and used (Appendices A and B). Formation picks made on these cores and cutting samples will allow creation of structure contour and isopach maps for the top of several units in the area, as well as future 3-D models. Additional derivative products anticipated to come from this mapping effort include aquifer vulnerability assessment maps, karst susceptibility and risk maps, and aquifer and confining unit maps. Data derived from prior STATEMAP products have often been used to augment other Florida Geological Survey and Florida Aquifer Vulnerability Assessment (FAVA) projects in the state (Arthur et al., 2007; Baker et al., 2007; Kromhout et al., 2017). These geologic maps will also be compiled and published as part of the Statewide Surficial Geologic Map in the next decade.

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APPENDIX A: FLORIDA GEOLOGICAL SURVEY BOREHOLES UTILIZED FOR STUDY

This table lists FGS boreholes within the boundaries of the USGS Naples 30 x 60 minute quadrangle utilized for the project. Due to graphical constraints, not all boreholes will appear on Plate 1 of OFMS 116. The first 40 boreholes in the table were utilized for geologic cross-sections and appear on Plates 1 and 2 of OFMS 116.

Map ID	Well Label	Data Source	Sample Type	Latitude	Longitude	24k Quad	Elevation (ft.)	Total Depth (ft.)
1	W-5359	FGS	Cuttings	26.155556	-81.266111	MILES CITY	12	700
2	W-8909	FGS	Cuttings	26.255278	-81.370556	SUNNILAND	15	950
3	W-8916	FGS	Cuttings	26.063611	-81.348611	DEEP LAKE	10	1220
4	W-8925	FGS	Cuttings	26.0725	-81.728333	BELLE MEADE	7	1380
5	W-8947	FGS	Cuttings	26.35	-81.372222	SUNNILAND	20	1100
6	W-8964	FGS	Cuttings	26.435833	-81.485833	IMMOKALEE	19	960
7	W-8979	FGS	Cuttings	26.259722	-81.525	CORKSCREW SE	15	1411
8	W-8980	FGS	Cuttings	26.258056	-81.423611	IMMOKALEE SW	14	1420
9	W-8987	FGS	Cuttings	26.314167	-81.354722	SUNNILAND	20	992
10	W-9321	FGS	Cuttings	26.426944	-81.566111	CORKSCREW	17	1030
11	W-9323	FGS	Cuttings	26.425	-81.655278	CORKSCREW NW	20	1200
12	W-9409	FGS	Cuttings	26.127778	-81.674444	BELLE MEADE NW	13	750
13	W-9411	FGS	Cuttings	26.088333	-81.628611	BELLE MEADE	7	1530
14	W-9413	FGS	Cuttings	26.019722	-81.253889	DEEP LAKE	9	1680
15	W-9416	FGS	Cuttings	26.429722	-81.377222	IMMOKALEE	27	1330
16	W-9591	FGS	Cuttings	26.424722	-81.202778	CROWS NEST HAMMOCK	23	340
17	W-9632	FGS	Cuttings	26.257778	-81.2325	DOCTORS HAMMOCK	16	430
18	W-9639	FGS	Cuttings	26.425833	-81.103889	ROCKY LAKE STRAND	22	390
19	W-9648	FGS	Cuttings	26.369444	-81.039722	COW BONE ISLAND	19	430
20	W-9705	FGS	Cuttings	26.091111	-81.558611	BELLE MEADE SE	7	340
21	W-9710	FGS	Cuttings	26.043056	-81.63	BELLE MEADE	4	300
22	W-9756	FGS	Cuttings	26.366667	-81.666597	CORKSCREW SW	16	340
23	W-9757	FGS	Cuttings	26.324639	-81.665768	CORKSCREW SW	18	390
24	W-9784	FGS	Cuttings	26.424444	-81.695833	CORKSCREW NW	17	400
25	W-9849	FGS	Cuttings	26.258333	-81.119722	COW BONE ISLAND	15	1230
26	W-9978	FGS	Cuttings	26.420556	-81.031667	ROCKY LAKE STRAND	21	1050
27	W-9999	FGS	Cuttings	26.034522	-81.01534	THOMPSON PINE ISLAND	11	1249
28	W-10024	FGS	Cuttings	26.187778	-81.028333	WHIDDEN LAKE	13	1130
29	W-10031	FGS	Cuttings	26.115278	-81.033611	THOMPSON PINE ISLAND	11	1110
30	W-10036	FGS	Cuttings	26.252778	-81.045	COW BONE ISLAND	15	1030
31	W-10039	FGS	Cuttings	26.064167	-81.023611	THOMPSON PINE ISLAND	11	1170
32	W-10050	FGS	Cuttings	26.475833	-81.656111	CORKSCREW NW	26	1070
33	W-10176	FGS	Cuttings	26.256389	-81.305	SUNNILAND	14	1110
34	W-10223	FGS	Cuttings	26.098611	-81.479167	DEEP LAKE SW	8	1370
35	W-13975	FGS	Cuttings	26.0775	-81.168889	AIRPLANE PRAIRIE	12	11900
36	W-16434	FGS	Continuous Core	26.424722	-81.3075	IMMOKALEE NE	25	715
37	W-18408	FGS	Cuttings	26.243889	-81.678611	BELLE MEADE NW	14	1200
38	W-18511	FGS	Continuous Core	26.060556	-81.263611	DEEP LAKE	11	365
39	W-19225	FGS	Cuttings	26.262332	-81.787342	BONITA SPRINGS	14	3250
40	W-20187	FGS	Continuous Core	26.180167	-81.256806	MILES CITY	15	398
41	W-3041	FGS	Cuttings	26.153333	-81.791944	NAPLES NORTH	5	78

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Map ID	Well Label	Data Source	Sample Type	Latitude	Longitude	24k Quad	Elevation (ft.)	Total Depth (ft.)
42	W-3043	FGS	Cuttings	26.421111	-81.281944	IMMOKALEE NE	25	54
43	W-3045	FGS	Cuttings	26.167564	-81.799408	NAPLES NORTH	10	157
44	W-3122	FGS	Cuttings	26.132672	-81.794968	NAPLES NORTH	3	68
45	W-3804	FGS	Cuttings	26.407778	-81.421111	IMMOKALEE	26	278
46	W-3858	FGS	Cuttings	26.425556	-81.408889	IMMOKALEE	33	292
47	W-3879	FGS	Cuttings	26.460278	-81.438611	IMMOKALEE	34	184
48	W-4235	FGS	Cuttings	26.4075	-81.413611	IMMOKALEE	28	167
49	W-4236	FGS	Cuttings	26.1725	-81.349722	MILES CITY	14	170
50	W-7008	FGS	Cuttings	26.290278	-81.361389	SUNNILAND	18	11650
51	W-8905	FGS	Cuttings	26.2925	-81.321944	SUNNILAND	17	1170
52	W-8917	FGS	Cuttings	26.151111	-81.349167	MILES CITY	12	1360
53	W-8923	FGS	Cuttings	26.046389	-81.673611	BELLE MEADE	5	1440
54	W-8933	FGS	Cuttings	26.389722	-81.408889	IMMOKALEE	24	1030
55	W-8939	FGS	Cuttings	26.348611	-81.51	CORKSCREW SE	23	1070
56	W-8941	FGS	Cuttings	26.363333	-81.453056	IMMOKALEE SW	20	1021
57	W-8943	FGS	Cuttings	26.306111	-81.403889	IMMOKALEE SW	19	968
58	W-8946	FGS	Cuttings	26.291111	-81.42	IMMOKALEE SW	17	1058
59	W-8953	FGS	Cuttings	26.391667	-81.540278	CORKSCREW	19	900
60	W-8954	FGS	Cuttings	26.347778	-81.575278	CORKSCREW SE	20	880
61	W-8957	FGS	Cuttings	26.361389	-81.6075	CORKSCREW SE	16	860
62	W-8961	FGS	Cuttings	26.495	-81.4625	IMMOKALEE	42	1200
63	W-8962	FGS	Cuttings	26.465556	-81.494167	IMMOKALEE	30	1070
64	W-8963	FGS	Cuttings	26.333889	-81.526111	CORKSCREW SE	23	910
65	W-8967	FGS	Cuttings	26.334167	-81.558889	CORKSCREW SE	19	980
66	W-8968	FGS	Cuttings	26.296667	-81.525833	CORKSCREW SE	13	1020
67	W-8969	FGS	Cuttings	26.319444	-81.501111	CORKSCREW SE	19	900
68	W-8975	FGS	Cuttings	26.315556	-81.521667	CORKSCREW SE	22	1370
69	W-8976	FGS	Cuttings	26.261944	-81.395278	IMMOKALEE SW	15	950
70	W-8977	FGS	Cuttings	26.326111	-81.501667	CORKSCREW SE	19	1411
71	W-8985	FGS	Cuttings	26.26	-81.500556	CORKSCREW SE	14	1230
72	W-8986	FGS	Cuttings	26.358889	-81.538611	CORKSCREW SE	16	1360
73	W-8988	FGS	Cuttings	26.305278	-81.3425	SUNNILAND	17	1330
74	W-8992	FGS	Cuttings	26.2675	-81.5375	CORKSCREW SE	17	1630
75	W-8993	FGS	Cuttings	26.024444	-81.558889	BELLE MEADE SE	5	1500
76	W-8998	FGS	Cuttings	26.476389	-81.559167	CORKSCREW	28	1350
77	W-9316	FGS	Cuttings	26.498333	-81.898889	FORT MYERS BEACH	5	1520
78	W-9317	FGS	Cuttings	26.453056	-81.831667	ESTERO	10	1317
79	W-9319	FGS	Cuttings	26.4975	-81.971944	FORT MYERS BEACH	5	1580
80	W-9322	FGS	Cuttings	26.447222	-81.607222	CORKSCREW	26	1260
81	W-9324	FGS	Cuttings	26.385278	-81.673333	CORKSCREW NW	17	1540
82	W-9356	FGS	Cuttings	26.454167	-81.686944	CORKSCREW NW	19	1330
83	W-9377	FGS	Cuttings	26.478056	-81.28	IMMOKALEE NE	28	890
84	W-9393	FGS	Cuttings	26.425556	-81.087778	ROCKY LAKE STRAND	22	1260
85	W-9395	FGS	Cuttings	26.431944	-81.179167	CROWS NEST HAMMOCK	24	1208
86	W-9400	FGS	Cuttings	26.483333	-81.356667	IMMOKALEE NE	29	1530
87	W-9419	FGS	Cuttings	26.203611	-81.179722	LITTLE MARSH	13	1620
88	W-9420	FGS	Cuttings	26.360833	-81.185833	DOCTORS HAMMOCK	22	1560
89	W-9421	FGS	Cuttings	26.4525	-81.341111	IMMOKALEE NE	27	1300
90	W-9593	FGS	Cuttings	26.373056	-81.266944	SUNNILAND	22	380
91	W-9595	FGS	Cuttings	26.401944	-81.259167	IMMOKALEE NE	24	370
92	W-9606	FGS	Cuttings	26.459722	-81.300278	IMMOKALEE NE	26	390
93	W-9608	FGS	Cuttings	26.373611	-81.234444	DOCTORS HAMMOCK	23	370

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Map ID	Well Label	Data Source	Sample Type	Latitude	Longitude	24k Quad	Elevation (ft.)	Total Depth (ft.)
94	W-9610	FGS	Cuttings	26.404444	-81.103333	ROCKY LAKE STRAND	21	370
95	W-9612	FGS	Cuttings	26.346389	-81.145	DOCTORS HAMMOCK	20	400
96	W-9613	FGS	Cuttings	26.378889	-81.169722	CROWS NEST HAMMOCK	22	340
97	W-9614	FGS	Cuttings	26.344444	-81.242222	DOCTORS HAMMOCK	22	410
98	W-9619	FGS	Cuttings	26.424167	-81.235	CROWS NEST HAMMOCK	26	360
99	W-9623	FGS	Cuttings	26.489722	-81.243889	CROWS NEST HAMMOCK	28	390
100	W-9625	FGS	Cuttings	26.430556	-81.308333	IMMOKALEE NE	26	420
101	W-9638	FGS	Cuttings	26.243333	-81.208333	LITTLE MARSH	15	390
102	W-9640	FGS	Cuttings	26.236389	-81.183889	LITTLE MARSH	13	400
103	W-9643	FGS	Cuttings	26.425278	-81.136389	CROWS NEST HAMMOCK	22	410
104	W-9645	FGS	Cuttings	26.330833	-81.209722	DOCTORS HAMMOCK	22	400
105	W-9649	FGS	Cuttings	26.428611	-81.0075	ROCKY LAKE STRAND	22	410
106	W-9652	FGS	Cuttings	26.405556	-81.047778	ROCKY LAKE STRAND	22	410
107	W-9655	FGS	Cuttings	26.406389	-81.015556	ROCKY LAKE STRAND	20	430
108	W-9658	FGS	Cuttings	26.455278	-81.080278	ROCKY LAKE STRAND	22	400
109	W-9659	FGS	Cuttings	26.483333	-81.005136	ROCKY LAKE STRAND	22	360
110	W-9660	FGS	Cuttings	26.485778	-81.08125	ROCKY LAKE STRAND	24	410
111	W-9661	FGS	Cuttings	26.492222	-81.146667	CROWS NEST HAMMOCK	28	380
112	W-9685	FGS	Cuttings	26.069722	-81.658611	BELLE MEADE	6	260
113	W-9688	FGS	Cuttings	26.001667	-81.650278	BELLE MEADE	1	110
114	W-9690	FGS	Cuttings	26.091667	-81.658611	BELLE MEADE	8	260
115	W-9697	FGS	Cuttings	26.0775	-81.591667	BELLE MEADE SE	7	160
116	W-9725	FGS	Cuttings	26.116417	-81.449856	DEEP LAKE SW	10	410
117	W-9726	FGS	Cuttings	26.143056	-81.405556	CATHERINE ISLAND	11	510
118	W-9727	FGS	Cuttings	26.056111	-81.3725	DEEP LAKE	8	360
119	W-9730	FGS	Cuttings	26.193889	-81.715278	BELLE MEADE NW	11	270
120	W-9748	FGS	Cuttings	26.262387	-81.741422	CORKSCREW SW	6	240
121	W-9749	FGS	Cuttings	26.313056	-81.75	CORKSCREW SW	16	260
122	W-9750	FGS	Cuttings	26.291389	-81.725556	CORKSCREW SW	12	290
123	W-9753	FGS	Cuttings	26.290833	-81.765833	BONITA SPRINGS	13	270
124	W-9777	FGS	Cuttings	26.425556	-81.598889	CORKSCREW	19	280
125	W-9800	FGS	Cuttings	26.498611	-81.8675	ESTERO	6	220
126	W-9893	FGS	Cuttings	26.108056	-81.0575	THOMPSON PINE ISLAND	11	1140
127	W-9895	FGS	Cuttings	26.136944	-81.066667	WHIDDEN LAKE	12	1129
128	W-9905	FGS	Cuttings	26.174722	-81.128333	LITTLE MARSH	12	1280
129	W-9911	FGS	Cuttings	26.479353	-81.199697	CROWS NEST HAMMOCK	28	1053
130	W-9972	FGS	Cuttings	26.408056	-81.1825	CROWS NEST HAMMOCK	22	1020
131	W-9975	FGS	Cuttings	26.228333	-81.2325	LITTLE MARSH	16	1354
132	W-10040	FGS	Cuttings	26.056944	-81.055556	THOMPSON PINE ISLAND	12	1197
133	W-10173	FGS	Cuttings	26.302778	-81.375556	IMMOKALEE SW	22	1560
134	W-10175	FGS	Cuttings	26.259722	-81.325278	SUNNILAND	12	1090
135	W-10188	FGS	Cuttings	26.216944	-81.228889	LITTLE MARSH	13	1120
136	W-10197	FGS	Cuttings	26.473611	-81.462222	IMMOKALEE	36	1100
137	W-10199	FGS	Cuttings	26.4875	-81.526667	CORKSCREW	20	1070
138	W-10202	FGS	Cuttings	26.018611	-81.412778	DEEP LAKE SW	6	1390
139	W-10207	FGS	Cuttings	26.483056	-81.036111	ROCKY LAKE STRAND	23	900
140	W-10220	FGS	Cuttings	26.15	-81.437778	CATHERINE ISLAND	11	1030
141	W-10222	FGS	Cuttings	26.054444	-81.461111	DEEP LAKE SW	8	1370
142	W-10224	FGS	Cuttings	26.392778	-81.461111	IMMOKALEE	24	1050
143	W-11574	FGS	Cuttings	26.485278	-81.829444	ESTERO	14	33
144	W-11865	FGS	Cuttings	26.232583	-81.769	NAPLES NORTH	12	50
145	W-11974	FGS	Cuttings	26.19	-81.536111	BELLE MEADE NE	11	114

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Map ID	Well Label	Data Source	Sample Type	Latitude	Longitude	24k Quad	Elevation (ft.)	Total Depth (ft.)
146	W-11979	FGS	Cuttings	26.160833	-81.534167	BELLE MEADE NE	11	100
147	W-12689	FGS	Cuttings	26.185	-81.773333	NAPLES NORTH	6	50
148	W-13721	FGS	Cuttings	26.434722	-81.450278	IMMOKALEE	34	195
149	W-14003	FGS	Continuous Core	26.240833	-81.7125	BELLE MEADE NW	12	180
150	W-14015	FGS	Cuttings	26.195833	-81.286667	MILES CITY	13	11897
151	W-14071	FGS	Continuous Core	26.454167	-81.693889	CORKSCREW NW	19	100
152	W-14072	FGS	Continuous Core	26.465833	-81.706111	CORKSCREW NW	27	362
153	W-14227	FGS	Cuttings	26.136667	-81.753889	NAPLES NORTH	7	60
154	W-14534	FGS	Cuttings	26.153056	-81.691944	BELLE MEADE NW	14	540
155	W-14832	FGS	Cuttings	26.451111	-81.700833	CORKSCREW NW	17	146
156	W-14919	FGS	Cuttings	26.154811	-81.314522	MILES CITY	16	1220
157	W-15034	FGS	Cuttings	26.428611	-81.7	CORKSCREW NW	16	235
158	W-15130	FGS	Cuttings	26.236111	-81.225833	LITTLE MARSH	15	11803
159	W-15131	FGS	Cuttings	26.475	-81.365833	IMMOKALEE NE	30	11543
160	W-15274	FGS	Continuous Core	26.228333	-81.670833	BELLE MEADE NW	10	180
161	W-15275	FGS	Continuous Core	26.155	-81.759167	NAPLES NORTH	8	120
162	W-15287	FGS	Continuous Core	26.493611	-81.631111	CORKSCREW NW	27	382
163	W-15291	FGS	Cuttings	26.231667	-81.2875	MILES CITY	16	11725
164	W-15371	FGS	Cuttings	26.4525	-81.211944	CROWS NEST HAMMOCK	28	2290
165	W-15411	FGS	Cuttings	26.429444	-81.757222	ESTERO	15	98
166	W-15529	FGS	Cuttings	26.351389	-81.604167	CORKSCREW SE	16	335
167	W-15530	FGS	Cuttings	26.292778	-81.481667	IMMOKALEE SW	17	380
168	W-15531	FGS	Cuttings	26.369444	-81.477778	IMMOKALEE SW	20	520
169	W-15534	FGS	Cuttings	26.145	-81.636667	BELLE MEADE NW	11	240
170	W-15535	FGS	Cuttings	26.360768	-81.345115	SUNNILAND	22	460
171	W-15747	FGS	Cuttings	26.479722	-81.799444	ESTERO	18	45
172	W-15997	FGS	Cuttings	26.475278	-81.365833	IMMOKALEE NE	30	245
173	W-16032	FGS	Cuttings	26.371111	-81.191389	DOCTORS HAMMOCK	23	400
174	W-16146	FGS	Continuous Core	26.024444	-81.732778	BELLE MEADE	1	200
175	W-16184	FGS	Cuttings	26.335556	-81.371111	SUNNILAND	20	270
176	W-16194	FGS	Cuttings	26.458333	-81.392222	IMMOKALEE	30	300
177	W-16239	FGS	Cuttings	26.205833	-81.354444	MILES CITY	16	262
178	W-16505	FGS	Continuous Core	26.147778	-81.357778	MILES CITY	12	702
179	W-16523	FGS	Continuous Core	26.433056	-81.818611	ESTERO	13	822
180	W-16884	FGS	Cuttings	26.245472	-81.678472	BELLE MEADE NW	15	3380
181	W-16925	FGS	Cuttings	26.477778	-81.3625	IMMOKALEE NE	30	615
182	W-16927	FGS	Cuttings	26.24064	-81.309517	MILES CITY	14	2270
183	W-16929	FGS	Cuttings	26.36	-81.396389	IMMOKALEE SW	22	378
184	W-17047	FGS	Continuous Core	26.2325	-81.344167	MILES CITY	14	28
185	W-17048	FGS	Cuttings	26.219167	-81.281389	MILES CITY	13	16
186	W-17051	FGS	Continuous Core	26.185	-81.267222	MILES CITY	13	33

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Map ID	Well Label	Data Source	Sample Type	Latitude	Longitude	24k Quad	Elevation (ft.)	Total Depth (ft.)
187	W-17389	FGS	Continuous Core	26.006944	-81.411389	DEEP LAKE SW	7	227
188	W-17403	FGS	Cuttings	26.226389	-81.488611	CATHERINE ISLAND	13	380
189	W-17406	FGS	Cuttings	26.475	-81.366944	IMMOKALEE NE	30	245
190	W-17454	FGS	Continuous Core	26.067778	-81.695278	BELLE MEADE	6	210
191	W-17653	FGS	Cuttings	26.005556	-81.621667	BELLE MEADE SE	3	73
192	W-17654	FGS	Cuttings	26.050556	-81.588611	BELLE MEADE SE	6	182
193	W-17746	FGS	Continuous Core	26.183142	-81.247575	LITTLE MARSH	15	201
194	W-17748	FGS	Continuous Core	26.238417	-81.073131	WHIDDEN LAKE	16	201
195	W-17750	FGS	Continuous Core	26.251389	-81.172778	DOCTORS HAMMOCK	15	179
196	W-17782	FGS	Continuous Core	26.301667	-81.221111	DOCTORS HAMMOCK	20	151
197	W-17785	FGS	Continuous Core	26.3075	-81.261944	SUNNILAND	19	181
198	W-17864	FGS	Cuttings	26.4425	-81.244444	CROWS NEST HAMMOCK	27	225
199	W-17867	FGS	Cuttings	26.172222	-81.068889	WHIDDEN LAKE	13	200
200	W-17941	FGS	Cuttings	26.389166	-81.773613	ESTERO	16	718
201	W-18079	FGS	Continuous Core	26.423333	-81.721944	CORKSCREW NW	16	19
202	W-18291	FGS	Continuous Core	26.276111	-81.753611	BONITA SPRINGS	13	300
203	W-18589	FGS	Cuttings	26.442228	-81.764632	ESTERO	15	1570
204	W-18760	FGS	Cuttings	26.119522	-81.686569	BELLE MEADE	10	442
205	W-18829	FGS	Cuttings	26.471269	-81.793268	ESTERO	19	3015
206	W-19221	FGS	Cuttings	26.262347	-81.786971	BONITA SPRINGS	14	1260
207	W-19559	FGS	Cuttings	26.371181	-81.541811	CORKSCREW SE	19	1600
208	W-20109	FGS	Continuous Core	26.468831	-81.189231	CROWS NEST HAMMOCK	29	24
209	W-20110	FGS	Continuous Core	26.486775	-81.211667	CROWS NEST HAMMOCK	28	28
210	W-20130	FGS	Continuous Core	26.488417	-81.14775	CROWS NEST HAMMOCK	27	23

FLORIDA GEOLOGICAL SURVEY

APPENDIX B: CONSULTANT BOREHOLES UTILIZED FOR STUDY

This table lists data from reports provided by Dr. Thomas M. Missimer within the boundaries of the USGS Naples 30 x 60 minute quadrangle utilized for the project. Due to graphical constraints, not all boreholes will appear on Plate 1 of OFMS 116.

Well Number	Report number	Data Source	Latitude	Longitude	24K Quad	Elevation (ft.)	Total Depth (ft.)
CO-00011	09-77	Tom Missimer	26.130792	-81.754382	NAPLES NORTH	7	110
CO-00027	09-77	Tom Missimer	26.137476	-81.765149	NAPLES NORTH	9	90
CO-00028	09-77	Tom Missimer	26.137436	-81.756863	NAPLES NORTH	7	90
CO-00029	09-77	Tom Missimer	26.137635	-81.752255	NAPLES NORTH	7	90
CO-00030	09-77	Tom Missimer	26.125939	-81.75992	NAPLES NORTH	5	85
CO-00033	340-87	Tom Missimer	26.136163	-81.759211	NAPLES NORTH	5	240
CO-00035	09-77	Tom Missimer	26.136083	-81.760098	NAPLES NORTH	6	67
CO-00092	406-88	Tom Missimer	26.225066	-81.761063	NAPLES NORTH	5	80
CO-00094	406-88	Tom Missimer	26.273684	-81.730036	CORKSCREW SW	15	105
CO-00098	200-83	Tom Missimer	26.288579	-81.721904	CORKSCREW SW	15	95
CO-00110	431-88	Tom Missimer	26.302112	-81.737274	CORKSCREW SW	13	80
CO-00151	50-80	Tom Missimer	26.064066	-81.704406	BELLE MEADE	4	105
CO-00152	50-80	Tom Missimer	26.051213	-81.706611	BELLE MEADE	3	141
CO-00153	50-80	Tom Missimer	26.061379	-81.705285	BELLE MEADE	6	75
CO-00154	50-80	Tom Missimer	26.061762	-81.711068	BELLE MEADE	3	74
CO-00155	50-80	Tom Missimer	26.061941	-81.707425	BELLE MEADE	6	75
CO-00156	50-80	Tom Missimer	26.058905	-81.700395	BELLE MEADE	5	70
CO-00157	50-80	Tom Missimer	26.055406	-81.701397	BELLE MEADE	4	70
CO-00201	50-80	Tom Missimer	26.064576	-81.693476	BELLE MEADE	5	145
CO-00220	319-87	Tom Missimer	26.28787	-81.729923	CORKSCREW SW	15	65
CO-00221	319-87	Tom Missimer	26.288378	-81.731308	CORKSCREW SW	16	260
CO-00242	406-88	Tom Missimer	26.232139	-81.807122	NAPLES NORTH	10	70
CO-00296	406-88	Tom Missimer	26.293982	-81.726011	CORKSCREW SW	14	105
CO-00448	52-80	Tom Missimer	26.298256	-81.439971	IMMOKALEE SW	21	144
CO-00449	185-83	Tom Missimer	26.298869	-81.435862	IMMOKALEE SW	19	75
CO-00450	185-83	Tom Missimer	26.304089	-81.44459	IMMOKALEE SW	23	76
CO-00468	185-83	Tom Missimer	26.304684	-81.44304	IMMOKALEE SW	20	75
CO-00485	340-87	Tom Missimer	26.140969	-81.74832	BELLE MEADE NW	5	15
CO-00486	340-87	Tom Missimer	26.146403	-81.748981	BELLE MEADE NW	2	14
CO-00487	52-80	Tom Missimer	26.151746	-81.744129	BELLE MEADE NW	2	14
CO-00488	340-87	Tom Missimer	26.146714	-81.743623	BELLE MEADE NW	10	144
CO-00489	1462-91	Tom Missimer	26.235401	-81.770255	NAPLES NORTH	7	62
CO-00503	99-81	Tom Missimer	26.31949	-81.821838	BONITA SPRINGS	11	30
CO-00505	99-81	Tom Missimer	26.313221	-81.82613	BONITA SPRINGS	11	25
CO-00506	99-81	Tom Missimer	26.322422	-81.827358	BONITA SPRINGS	2	28
CO-00507	99-81	Tom Missimer	26.30873	-81.821857	BONITA SPRINGS	9	28
CO-00523	97-82	Tom Missimer	26.319259	-81.822067	BONITA SPRINGS	11	104
CO-00524	97-82	Tom Missimer	26.312943	-81.819787	BONITA SPRINGS	10	84
CO-00525	97-82	Tom Missimer	26.305752	-81.823511	BONITA SPRINGS	11	63
CO-00526	237-84	Tom Missimer	26.319927	-81.821292	BONITA SPRINGS	12	80
CO-00544	119-82	Tom Missimer	26.062848	-81.705892	BELLE MEADE	1	45
CO-00545	119-82	Tom Missimer	26.05832	-81.701177	BELLE MEADE	4	45
CO-00546	1438-92	Tom Missimer	26.305989	-81.805201	BONITA SPRINGS	14	75
CO-00547	200-83	Tom Missimer	26.278657	-81.703508	CORKSCREW SW	14	75
CO-00549	67-82	Tom Missimer	26.274053	-81.659129	CORKSCREW SW	15	140
CO-00554	67-82	Tom Missimer	26.316416	-81.682974	CORKSCREW SW	14	80
CO-00557	1462-91	Tom Missimer	26.225578	-81.785073	NAPLES NORTH	11	59
CO-00573	340-87	Tom Missimer	26.155117	-81.723004	BELLE MEADE NW	11	170
CO-00574	340-87	Tom Missimer	26.154569	-81.710326	BELLE MEADE NW	14	80
CO-00575	340-87	Tom Missimer	26.167089	-81.714976	BELLE MEADE NW	11	80
CO-00576	406-88	Tom Missimer	26.150413	-81.72705	BELLE MEADE NW	10	74
CO-00577	340-87	Tom Missimer	26.157893	-81.734539	BELLE MEADE NW	11	80
CO-00578	340-87	Tom Missimer	26.164893	-81.729511	BELLE MEADE NW	3	80
CO-00579	283-85	Tom Missimer	26.139101	-81.718346	BELLE MEADE NW	13	80
CO-00580	GeoLOG(CO-580)	Tom Missimer	26.072211	-81.716084	BELLE MEADE	7	160
CO-00632	254-84	Tom Missimer	26.244788	-81.720535	BELLE MEADE NW	11	64

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Well Number	Report number	Data Source	Latitude	Longitude	24K Quad	Elevation (ft.)	Total Depth (ft.)
CO-00656	158-84	Tom Missimer	26.228451	-81.72586	BELLE MEADE NW	6	60
CO-00658	158-84	Tom Missimer	26.241251	-81.767402	NAPLES NORTH	7	70
CO-00659	158-84	Tom Missimer	26.212399	-81.720271	BELLE MEADE NW	13	80
CO-00660	158-84	Tom Missimer	26.212011	-81.734527	BELLE MEADE NW	14	70
CO-00695	160-83	Tom Missimer	26.159487	-81.706509	BELLE MEADE NW	10	115
CO-00700	GeoLOG(CO-700)	Tom Missimer	26.157555	-81.68152	BELLE MEADE NW	11	101
CO-00707	156-83	Tom Missimer	26.234187	-81.703489	BELLE MEADE NW	11	37
CO-00708	156-83	Tom Missimer	26.251226	-81.623705	CORKSCREW SE	13	52
CO-00709	156-83	Tom Missimer	26.199919	-81.655944	BELLE MEADE NW	4	32
CO-00714	156-83	Tom Missimer	26.229188	-81.62143	BELLE MEADE NE	12	40
CO-00723	340-87	Tom Missimer	26.112746	-81.771545	NAPLES SOUTH	5	55
CO-00724	340-87	Tom Missimer	26.112745	-81.771622	NAPLES SOUTH	5	51
CO-00725	340-87	Tom Missimer	26.112923	-81.772226	NAPLES SOUTH	5	52
CO-00728	155-83	Tom Missimer	26.112939	-81.770637	NAPLES SOUTH	6	50
CO-00729	396-87	Tom Missimer	26.316705	-81.714279	CORKSCREW SW	19	80
CO-00731	396-87	Tom Missimer	26.310593	-81.71402	CORKSCREW SW	16	90
CO-00733	396-87	Tom Missimer	26.310201	-81.721265	CORKSCREW SW	18	80
CO-00735	396-87	Tom Missimer	26.302894	-81.713116	CORKSCREW SW	13	120
CO-00741	155-83	Tom Missimer	26.301757	-81.688553	CORKSCREW SW	14	21
CO-00743	185-83	Tom Missimer	26.278816	-81.394651	IMMOKALEE SW	16	60
CO-00745	155-84	Tom Missimer	26.275066	-81.384235	IMMOKALEE SW	16	50
CO-00747	185-84	Tom Missimer	26.279692	-81.672091	CORKSCREW SW	15	40
CO-00753	194-83	Tom Missimer	26.490967	-81.413165	IMMOKALEE	35	180
CO-00754	194-83	Tom Missimer	26.491307	-81.41378	IMMOKALEE	35	183
CO-00755	194-83	Tom Missimer	26.490697	-81.412732	IMMOKALEE	35	185
CO-00756	194-83	Tom Missimer	26.491823	-81.415013	IMMOKALEE	35	195
CO-00757	194-83	Tom Missimer	26.482042	-81.411726	IMMOKALEE	35	180
CO-00758	194-83	Tom Missimer	26.48237	-81.403002	IMMOKALEE	36	180
CO-00786	194-83	Tom Missimer	26.281051	-81.713909	CORKSCREW SW	15	60
CO-00789	339-86	Tom Missimer	26.108408	-81.708937	BELLE MEADE	7	60
CO-00791	339-86	Tom Missimer	26.068452	-81.697806	BELLE MEADE	9	60
CO-00799	339-86	Tom Missimer	26.092862	-81.713137	BELLE MEADE	8	60
CO-00820	339-86	Tom Missimer	26.089111	-81.696234	BELLE MEADE	13	176
CO-00823	340-87	Tom Missimer	26.107553	-81.738083	BELLE MEADE	13	45
CO-00899	340-87	Tom Missimer	26.108344	-81.751855	NAPLES SOUTH	8	57
CO-00907	339-86	Tom Missimer	26.09373	-81.754043	NAPLES SOUTH	6	65
CO-00909	340-87	Tom Missimer	26.096526	-81.739398	BELLE MEADE	7	65
CO-00912	339-86	Tom Missimer	26.097103	-81.775253	NAPLES SOUTH	3	152
CO-00915	339-86	Tom Missimer	26.094683	-81.737814	BELLE MEADE	1	152
CO-00926	244-84	Tom Missimer	26.140407	-81.70806	BELLE MEADE NW	13	80
CO-00927	244-84	Tom Missimer	26.138894	-81.733361	BELLE MEADE NW	10	70
CO-00928	340-87	Tom Missimer	26.152237	-81.749727	BELLE MEADE NW	13	80
CO-00963	283-85	Tom Missimer	26.153516	-81.722827	BELLE MEADE NW	12	14
CO-00964	283-85	Tom Missimer	26.147364	-81.72064	BELLE MEADE NW	12	59
CO-00965	283-85	Tom Missimer	26.144851	-81.721182	BELLE MEADE NW	11	50
CO-00966	283-85	Tom Missimer	26.072476	-81.729712	BELLE MEADE	5	41
CO-00967	283-85	Tom Missimer	26.142105	-81.724159	BELLE MEADE NW	14	46
CO-00969	283-85	Tom Missimer	26.143618	-81.719385	BELLE MEADE NW	11	64
CO-00970	283-85	Tom Missimer	26.150709	-81.724955	BELLE MEADE NW	13	80
CO-01037	1462-91	Tom Missimer	26.273479	-81.748382	CORKSCREW SW	14	64
CO-01053	406-88	Tom Missimer	26.235652	-81.692972	BELLE MEADE NW	12	25
CO-01073	406-88	Tom Missimer	26.230356	-81.643235	BELLE MEADE NW	14	45
CO-01075	406-88	Tom Missimer	26.205054	-81.732843	BELLE MEADE NW	10	40
CO-01167	406-88	Tom Missimer	26.236247	-81.670635	BELLE MEADE NW	12	30
CO-01168	406-88	Tom Missimer	26.23242	-81.711747	BELLE MEADE NW	11	50
CO-01169	406-88	Tom Missimer	26.265695	-81.728724	CORKSCREW SW	12	56
CO-01301	299-86	Tom Missimer	26.230255	-81.609445	BELLE MEADE NE	11	134
CO-01302	299-86	Tom Missimer	26.245002	-81.609488	BELLE MEADE NE	12	140
CO-01303	299-86	Tom Missimer	26.244031	-81.641587	BELLE MEADE NW	12	120
CO-01304	299-86	Tom Missimer	26.246006	-81.562187	BELLE MEADE NE	15	140
CO-01305	299-86	Tom Missimer	26.20661	-81.785854	NAPLES NORTH	8	120
CO-01306	299-86	Tom Missimer	26.245949	-81.591073	BELLE MEADE NE	12	150

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Well Number	Report number	Data Source	Latitude	Longitude	24K Quad	Elevation (ft.)	Total Depth (ft.)
CO-01307	299-86	Tom Missimer	26.212915	-81.5906	BELLE MEADE NE	12	145
CO-01308	299-86	Tom Missimer	26.262332	-81.601314	CORKSCREW SE	13	150
CO-01309	299-86	Tom Missimer	26.260365	-81.613848	CORKSCREW SE	12	140
CO-01310	299-86	Tom Missimer	26.245902	-81.621337	BELLE MEADE NE	11	130
CO-01311	299-86	Tom Missimer	26.214511	-81.652749	BELLE MEADE NW	6	125
CO-01312	406-88	Tom Missimer	26.230383	-81.654659	BELLE MEADE NW	12	125
CO-01313	299-86	Tom Missimer	26.199307	-81.625	BELLE MEADE NE	15	125
CO-01351	312-86	Tom Missimer	26.16411	-81.65551	BELLE MEADE NW	50	255
CO-01354	312-86	Tom Missimer	26.163896	-81.655375	BELLE MEADE NW	42	43
CO-01355	312-86	Tom Missimer	26.163687	-81.655403	BELLE MEADE NW	43	27
CO-01356	312-86	Tom Missimer	26.162719	-81.655306	BELLE MEADE NW	35	27
CO-01357	312-86	Tom Missimer	26.160515	-81.655493	BELLE MEADE NW	80	27
CO-01362	299-86	Tom Missimer	26.244782	-81.60726	BELLE MEADE NE	13	150
CO-01373	331-87	Tom Missimer	26.137846	-81.759062	NAPLES NORTH	6	100
CO-01374	331-87	Tom Missimer	26.137846	-81.760393	NAPLES NORTH	6	60
CO-01560	406-88	Tom Missimer	26.222091	-81.735039	BELLE MEADE NW	14	80
CO-01561	406-88	Tom Missimer	26.226446	-81.735657	BELLE MEADE NW	6	70
CO-01604	451-88	Tom Missimer	26.154279	-81.767729	NAPLES NORTH	7	65
CO-01624	406-88	Tom Missimer	26.180485	-81.694107	BELLE MEADE NW	12	20
CO-01628	400-87	Tom Missimer	26.180952	-81.694354	BELLE MEADE NW	13	60
CO-01643	372-88	Tom Missimer	26.273974	-81.657762	CORKSCREW SW	8	101
CO-01650	425-88	Tom Missimer	26.149822	-81.732822	BELLE MEADE NW	4	52
CO-01651	425-88	Tom Missimer	26.149195	-81.732783	BELLE MEADE NW	4	50
CO-01652	425-88	Tom Missimer	26.14916	-81.731774	BELLE MEADE NW	10	50
CO-01653	1462-91	Tom Missimer	26.263793	-81.778099	BONITA SPRINGS	4	45
CO-01654	408-88	Tom Missimer	26.260259	-81.773053	BONITA SPRINGS	10	49
CO-01690	408-88	Tom Missimer	26.263774	-81.775549	BONITA SPRINGS	4	50
CO-01699	1163-91	Tom Missimer	26.036118	-81.645727	BELLE MEADE	4	120
CO-01700	1163-91	Tom Missimer	26.042121	-81.638826	BELLE MEADE	5	100
CO-01977	1163-91	Tom Missimer	26.042352	-81.639724	BELLE MEADE	2	45
CO-01984	717-90	Tom Missimer	26.229831	-81.653607	BELLE MEADE NW	14	35
CO-01986	717-90	Tom Missimer	26.212707	-81.590407	BELLE MEADE NE	5	45
CO-01988	717-90	Tom Missimer	26.245851	-81.561985	BELLE MEADE NE	14	68
CO-01990	717-90	Tom Missimer	26.198766	-81.605092	BELLE MEADE NE	11	110
CO-01992	717-90	Tom Missimer	26.262743	-81.601362	CORKSCREW SE	13	150
CO-01993	717-90	Tom Missimer	26.292727	-81.62564	CORKSCREW SW	14	90
CO-02003	711-90	Tom Missimer	26.012447	-81.655342	BELLE MEADE	-1	45
CO-02006	711-90	Tom Missimer	26.010861	-81.659295	BELLE MEADE	6	17
CO-02012	734-90	Tom Missimer	26.010236	-81.652409	BELLE MEADE	2	8
CO-02029	773-90	Tom Missimer	26.304859	-81.530635	CORKSCREW SE	17	32
CO-02030	773-90	Tom Missimer	26.294761	-81.531137	CORKSCREW SE	15	36
CO-02031	773-90	Tom Missimer	26.286207	-81.534437	CORKSCREW SE	16	27
CO-02064	801-90	Tom Missimer	26.31639	-81.73759	CORKSCREW SW	16	101
CO-02066	801-90	Tom Missimer	26.314458	-81.730724	CORKSCREW SW	14	101
CO-02068	801-90	Tom Missimer	26.307845	-81.741535	CORKSCREW SW	14	100
CO-02070	801-90	Tom Missimer	26.303229	-81.729957	CORKSCREW SW	13	101
CO-02072	781-90	Tom Missimer	26.242718	-81.744643	BELLE MEADE NW	13	<Null>
CO-02080	976-91	Tom Missimer	26.04629	-81.690997	BELLE MEADE	4	1608
CO-02081	975-91	Tom Missimer	26.167083	-81.683307	BELLE MEADE NW	12	1600
CO-02115	1462-91	Tom Missimer	26.250988	-81.782576	BONITA SPRINGS	12	132
CO-02117	1095-91	Tom Missimer	26.247581	-81.776075	NAPLES NORTH	13	80
CO-02119	1462-91	Tom Missimer	26.243384	-81.767498	NAPLES NORTH	13	65
CO-02130	982-91	Tom Missimer	26.128879	-81.771181	NAPLES NORTH	5	30
CO-02270	1095-91	Tom Missimer	26.246537	-81.771685	NAPLES NORTH	12	80
CO-02279	1462-91	Tom Missimer	26.254541	-81.795359	BONITA SPRINGS	12	65
CO-02292	1276-91	Tom Missimer	26.072718	-81.692669	BELLE MEADE	8	16
CO-02293	1276-91	Tom Missimer	26.072032	-81.693135	BELLE MEADE	8	16
CO-02317	1700-93b	Tom Missimer	26.244761	-81.679438	BELLE MEADE NW	11	3380
CO-02318	1700-93b	Tom Missimer	26.24463	-81.679183	BELLE MEADE NW	12	1930
CO-03280	801-90	Tom Missimer	26.323526	-81.736166	CORKSCREW SW	17	101
CO-03281	801-90	Tom Missimer	26.323559	-81.728022	CORKSCREW SW	15	101
CO-99191	991-91	Tom Missimer	26.165728	-81.767272	NAPLES NORTH	7	15

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Well Number	Report number	Data Source	Latitude	Longitude	24K Quad	Elevation (ft.)	Total Depth (ft.)
HM-00271	310-86	Tom Missimer	26.474149	-81.084112	ROCKY LAKE STRAND	24	146
HM-00272	310-86	Tom Missimer	26.442871	-81.100096	ROCKY LAKE STRAND	23	137
HM-00273	310-86	Tom Missimer	26.430903	-81.07652	ROCKY LAKE STRAND	22	138
HM-00274	310-86	Tom Missimer	26.451968	-81.077297	ROCKY LAKE STRAND	22	138
HM-00275	310-86	Tom Missimer	26.45904	-81.100952	ROCKY LAKE STRAND	22	138
HM-00276	310-86	Tom Missimer	26.451852	-81.123743	ROCKY LAKE STRAND	24	138
HM-00290	311-87	Tom Missimer	26.429975	-81.121671	ROCKY LAKE STRAND	22	125
HM-00310	311-87	Tom Missimer	26.43967	-81.112304	ROCKY LAKE STRAND	22	140
HM-00901	310-86	Tom Missimer	26.42884	-81.212935	CROWS NEST HAMMOCK	28	300
HM-00908	310-86	Tom Missimer	26.428226	-81.129061	CROWS NEST HAMMOCK	22	165
LM-00224	403-87	Tom Missimer	26.288417	-81.723683	CORKSCREW SW	15	40
LM-00607	254-84	Tom Missimer	26.487662	-81.935593	FORT MYERS BEACH	3	300
LM-00610	25-78	Tom Missimer	26.492272	-81.804687	ESTERO	17	248
LM-00614	254-84	Tom Missimer	26.493309	-81.737847	CORKSCREW NW	23	300
LM-00619	254-84	Tom Missimer	26.431437	-81.817574	ESTERO	14	235
LM-00621	254-84	Tom Missimer	26.435095	-81.788335	ESTERO	15	261
LM-00622	254-84	Tom Missimer	26.434345	-81.773841	ESTERO	18	184
LM-00623	183-84	Tom Missimer	26.448954	-81.758225	ESTERO	19	1405
LM-00624	183-84	Tom Missimer	26.452342	-81.729842	CORKSCREW NW	25	210
LM-00625	183-84	Tom Missimer	26.452952	-81.716066	CORKSCREW NW	19	513
LM-00628	183-84	Tom Missimer	26.449937	-81.659376	CORKSCREW NW	26	340
LM-00629	183-84	Tom Missimer	26.449835	-81.639735	CORKSCREW NW	27	180
LM-00630	183-84	Tom Missimer	26.450343	-81.610935	CORKSCREW	27	380
LM-00632	254-84	Tom Missimer	26.4507	-81.566602	CORKSCREW	24	390
LM-00633	72-81	Tom Missimer	26.387417	-81.826349	ESTERO	17	300
LM-00636	7-77	Tom Missimer	26.36107	-81.695173	CORKSCREW SW	16	460
LM-00638	72-81	Tom Missimer	26.346377	-81.802191	BONITA SPRINGS	4	345
LM-00640	254-84	Tom Missimer	26.330873	-81.737838	CORKSCREW SW	18	525
LM-00652	254-84	Tom Missimer	26.333573	-81.723158	CORKSCREW SW	13	136
LM-00660	431-88	Tom Missimer	26.327617	-81.695925	CORKSCREW SW	17	660
LM-00681	305-86	Tom Missimer	26.471794	-81.74128	CORKSCREW NW	18	230
LM-00685	305-86	Tom Missimer	26.470687	-81.766913	ESTERO	23	345
LM-00788	24-78	Tom Missimer	26.479971	-81.806023	ESTERO	15	45
LM-00789	24-78	Tom Missimer	26.480938	-81.805879	ESTERO	17	47
LM-00790	24-78	Tom Missimer	26.482405	-81.805879	ESTERO	15	43
LM-00791	24-78	Tom Missimer	26.48318	-81.805865	ESTERO	16	36
LM-00883	242-84	Tom Missimer	26.418454	-81.814539	ESTERO	15	320
LM-00922	7-77	Tom Missimer	26.458107	-81.704685	CORKSCREW NW	22	304
LM-00923	7-77	Tom Missimer	26.453016	-81.698627	CORKSCREW NW	17	324
LM-00924	7-77	Tom Missimer	26.453753	-81.695412	CORKSCREW NW	17	164
LM-00926	7-77	Tom Missimer	26.462018	-81.704273	CORKSCREW NW	22	195
LM-00928	7-77	Tom Missimer	26.453938	-81.703449	CORKSCREW NW	19	264
LM-00929	7-77	Tom Missimer	26.457849	-81.699657	CORKSCREW NW	19	284
LM-00931	7-77	Tom Missimer	26.454713	-81.693022	CORKSCREW NW	19	290
LM-00933	7-77	Tom Missimer	26.459288	-81.69261	CORKSCREW NW	19	305
LM-00934	7-77	Tom Missimer	26.454565	-81.694836	CORKSCREW NW	18	305
LM-00936	7-77	Tom Missimer	26.464182	-81.693458	CORKSCREW NW	22	284
LM-00938	7-77	Tom Missimer	26.45154	-81.703078	CORKSCREW NW	18	285
LM-00940	7-77	Tom Missimer	26.451503	-81.697432	CORKSCREW NW	17	284
LM-01228	23-78	Tom Missimer	26.495588	-81.930288	FORT MYERS BEACH	8	17
LM-01230	23-78	Tom Missimer	26.494579	-81.930236	FORT MYERS BEACH	6	16
LM-01235	23-78	Tom Missimer	26.496391	-81.927018	FORT MYERS BEACH	4	98
LM-01238	23-78	Tom Missimer	26.49819	-81.925693	FORT MYERS BEACH	2	18
LM-01240	23-78	Tom Missimer	26.49865	-81.925706	FORT MYERS BEACH	2	18

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Well Number	Report number	Data Source	Latitude	Longitude	24K Quad	Elevation (ft.)	Total Depth (ft.)
LM-01256	23-78	Tom Missimer	26.498179	-81.930708	FORT MYERS BEACH	3	16
LM-01316	25-78	Tom Missimer	26.485192	-81.794934	ESTERO	20	32
LM-01317	25-78	Tom Missimer	26.475553	-81.792825	ESTERO	18	41
LM-01318	25-78	Tom Missimer	26.459893	-81.788838	ESTERO	17	60
LM-01319	25-78	Tom Missimer	26.457156	-81.796379	ESTERO	18	33
LM-01520	47-80	Tom Missimer	26.435113	-81.772054	ESTERO	17	35
LM-01521	47-80	Tom Missimer	26.441118	-81.760509	ESTERO	20	28
LM-01522	47-80	Tom Missimer	26.449226	-81.761843	ESTERO	18	50
LM-01523	47-80	Tom Missimer	26.449205	-81.770025	ESTERO	19	45
LM-01524	47-80	Tom Missimer	26.449394	-81.755943	ESTERO	17	28
LM-01525	47-80	Tom Missimer	26.443329	-81.7556	ESTERO	22	45
LM-01536	GeoLogs(1)	Tom Missimer	26.442504	-81.757795	ESTERO	18	107
LM-01538	47-80	Tom Missimer	26.435016	-81.756579	ESTERO	16	25
LM-01539	47-80	Tom Missimer	26.427896	-81.756404	ESTERO	16	35
LM-01540	47-80	Tom Missimer	26.428209	-81.763472	ESTERO	18	40
LM-01541	47-80	Tom Missimer	26.420869	-81.764677	ESTERO	15	31
LM-01543	47-80	Tom Missimer	26.420772	-81.756008	ESTERO	15	110
LM-01638	72-81	Tom Missimer	26.370178	-81.820329	BONITA SPRINGS	14	100
LM-01644	72-81	Tom Missimer	26.360607	-81.808733	BONITA SPRINGS	10	88
LM-01646	72-81	Tom Missimer	26.361052	-81.820091	BONITA SPRINGS	9	133
LM-01649	83-81	Tom Missimer	26.346987	-81.804486	BONITA SPRINGS	10	100
LM-01676	72-81	Tom Missimer	26.352558	-81.807395	BONITA SPRINGS	12	120
LM-01677	72-81	Tom Missimer	26.352603	-81.806366	BONITA SPRINGS	12	125
LM-01679	72-81	Tom Missimer	26.352301	-81.805876	BONITA SPRINGS	9	120
LM-01680	72-81	Tom Missimer	26.351521	-81.804151	BONITA SPRINGS	7	127
LM-01682	204-84	Tom Missimer	26.35073	-81.804429	BONITA SPRINGS	10	127
LM-01683	72-81	Tom Missimer	26.351892	-81.804661	BONITA SPRINGS	11	30
LM-01684	204-84	Tom Missimer	26.350652	-81.804544	BONITA SPRINGS	11	33
LM-01685	72-81	Tom Missimer	26.350471	-81.804813	BONITA SPRINGS	11	34
LM-01687	83-81	Tom Missimer	26.334408	-81.790445	BONITA SPRINGS	15	80
LM-01688	83-81	Tom Missimer	26.351228	-81.781667	BONITA SPRINGS	9	70
LM-01689	83-81	Tom Missimer	26.334896	-81.761234	BONITA SPRINGS	9	100
LM-01690	72-81	Tom Missimer	26.350743	-81.806498	BONITA SPRINGS	11	33
LM-01713	1046-91	Tom Missimer	26.330714	-81.826903	BONITA SPRINGS	6	255
LM-01718	72-81	Tom Missimer	26.352588	-81.807142	BONITA SPRINGS	13	238
LM-01719	72-81	Tom Missimer	26.352649	-81.806602	BONITA SPRINGS	12	248
LM-01720	72-81	Tom Missimer	26.352634	-81.805724	BONITA SPRINGS	11	255
LM-01821	99-81	Tom Missimer	26.321365	-81.806338	BONITA SPRINGS	13	21
LM-01879	431-88	Tom Missimer	26.367476	-81.724721	CORKSCREW SW	14	63
LM-01881	431-88	Tom Missimer	26.342101	-81.721747	CORKSCREW SW	13	39
LM-01883	431-88	Tom Missimer	26.345031	-81.704765	CORKSCREW SW	13	54
LM-01884	431-88	Tom Missimer	26.343893	-81.703163	CORKSCREW SW	13	32
LM-01885	431-88	Tom Missimer	26.344794	-81.703004	CORKSCREW SW	13	62
LM-01886	431-88	Tom Missimer	26.343469	-81.721842	CORKSCREW SW	13	22
LM-01887	431-88	Tom Missimer	26.344821	-81.721941	CORKSCREW SW	14	32
LM-01888	431-88	Tom Missimer	26.34274	-81.71938	CORKSCREW SW	13	18
LM-01889	431-88	Tom Missimer	26.349244	-81.722108	CORKSCREW SW	14	60
LM-01969	83-81	Tom Missimer	26.338274	-81.731311	CORKSCREW SW	15	<Null>
LM-01971	83-81	Tom Missimer	26.337944	-81.754914	BONITA SPRINGS	11	80
LM-01981	83-81	Tom Missimer	26.365974	-81.755269	BONITA SPRINGS	13	90
LM-01982	83-81	Tom Missimer	26.358463	-81.755111	BONITA SPRINGS	13	97
LM-01983	83-81	Tom Missimer	26.246922	-81.748973	BELLE MEADE NW	16	97
LM-01984	352-87	Tom Missimer	26.497601	-81.798904	ESTERO	18	79
LM-01989	352-87	Tom Missimer	26.494328	-81.828836	ESTERO	13	21
LM-02036	183-84	Tom Missimer	26.437448	-81.72591	CORKSCREW NW	21	150
LM-02130	180-83	Tom Missimer	26.397735	-81.815537	ESTERO	16	120
LM-02132	180-83	Tom Missimer	26.397134	-81.827681	ESTERO	16	120
LM-02164	396-87	Tom Missimer	26.330761	-81.713616	CORKSCREW SW	14	80
LM-02171	988-91	Tom Missimer	26.434008	-81.758032	ESTERO	19	97
LM-02179	183-84	Tom Missimer	26.433333	-81.764179	ESTERO	18	105
LM-02200	199-83	Tom Missimer	26.351377	-81.761097	BONITA SPRINGS	14	14
LM-02201	199-83	Tom Missimer	26.351728	-81.761016	BONITA SPRINGS	13	14
LM-02202	199-83	Tom Missimer	26.350848	-81.755683	BONITA SPRINGS	12	67

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Well Number	Report number	Data Source	Latitude	Longitude	24K Quad	Elevation (ft.)	Total Depth (ft.)
LM-02203	199-83	Tom Missimer	26.351412	-81.760532	BONITA SPRINGS	14	75
LM-02241	204-84	Tom Missimer	26.350134	-81.804228	BONITA SPRINGS	9	30
LM-02242	204-84	Tom Missimer	26.349317	-81.804096	BONITA SPRINGS	8	120
LM-02243	204-84	Tom Missimer	26.348833	-81.804074	BONITA SPRINGS	10	28
LM-02244	204-84	Tom Missimer	26.34776	-81.803942	BONITA SPRINGS	11	120
LM-02248	208-84	Tom Missimer	26.346472	-81.808105	BONITA SPRINGS	6	36
LM-02249	208-84	Tom Missimer	26.346073	-81.807966	BONITA SPRINGS	9	30
LM-02251	208-84	Tom Missimer	26.346582	-81.810314	BONITA SPRINGS	9	30
LM-02252	208-84	Tom Missimer	26.347178	-81.810839	BONITA SPRINGS	8	30
LM-02253	208-84	Tom Missimer	26.34777	-81.809943	BONITA SPRINGS	2	26
LM-02255	208-84	Tom Missimer	26.347207	-81.808606	BONITA SPRINGS	12	36
LM-02258	208-84	Tom Missimer	26.345894	-81.809147	BONITA SPRINGS	9	25
LM-02289	431-88	Tom Missimer	26.3379	-81.729633	CORKSCREW SW	14	112
LM-02328	177-84	Tom Missimer	26.480111	-81.79823	ESTERO	17	45
LM-02450	233-85	Tom Missimer	26.329697	-81.755915	BONITA SPRINGS	13	100
LM-02454	233-85	Tom Missimer	26.320506	-81.769305	BONITA SPRINGS	13	80
LM-02459	431-88	Tom Missimer	26.352096	-81.721725	CORKSCREW SW	14	145
LM-02460	431-88	Tom Missimer	26.352076	-81.722663	CORKSCREW SW	14	125
LM-02461	431-88	Tom Missimer	26.350916	-81.722081	CORKSCREW SW	14	125
LM-02462	431-88	Tom Missimer	26.35039	-81.721923	CORKSCREW SW	14	125
LM-02463	431-88	Tom Missimer	26.34788	-81.722194	CORKSCREW SW	15	112
LM-02763	318-86	Tom Missimer	26.371897	-81.754618	BONITA SPRINGS	13	100
LM-02834	351-87	Tom Missimer	26.49316	-81.812349	ESTERO	13	30
LM-02835	351-87	Tom Missimer	26.497266	-81.811407	ESTERO	18	25
LM-02836	351-87	Tom Missimer	26.498557	-81.813643	ESTERO	15	20
LM-02837	351-87	Tom Missimer	26.499645	-81.81136	ESTERO	16	20
LM-02842	386-87	Tom Missimer	26.439639	-81.789796	ESTERO	14	30
LM-02968	434-88	Tom Missimer	26.421091	-81.7633	ESTERO	15	40
LM-02970	434-88	Tom Missimer	26.421127	-81.761698	ESTERO	15	40
LM-02971	434-88	Tom Missimer	26.421085	-81.760179	ESTERO	15	43
LM-02972	434-88	Tom Missimer	26.42109	-81.758922	ESTERO	15	43
LM-02973	434-88	Tom Missimer	26.42107	-81.757747	ESTERO	15	46
LM-02976	901-9	Tom Missimer	26.421111	-81.763301	ESTERO	15	40
LM-02978	901-91	Tom Missimer	26.421097	-81.76018	ESTERO	15	43
LM-02982	434-88	Tom Missimer	26.427638	-81.757121	ESTERO	16	40
LM-02983	901-91	Tom Missimer	26.427636	-81.757198	ESTERO	16	40
LM-02984	434-88	Tom Missimer	26.426269	-81.757069	ESTERO	15	45
LM-02986	434-88	Tom Missimer	26.425257	-81.757069	ESTERO	16	40
LM-02988	434-88	Tom Missimer	26.424172	-81.757063	ESTERO	15	45
LM-02989	901-91	Tom Missimer	26.424172	-81.757122	ESTERO	15	45
LM-02990	434-88	Tom Missimer	26.422563	-81.757036	ESTERO	15	45
LM-02997	434-88	Tom Missimer	26.420988	-81.756839	ESTERO	15	45
LM-02998	901-91	Tom Missimer	26.420928	-81.756839	ESTERO	15	45
LM-03274	746-90	Tom Missimer	26.433789	-81.827142	ESTERO	10	135
LM-03275	746-90	Tom Missimer	26.432005	-81.824037	ESTERO	16	260
LM-03276	746-90	Tom Missimer	26.434155	-81.825334	ESTERO	12	26
LM-03277	746-90	Tom Missimer	26.434048	-81.828132	ESTERO	10	25
LM-03278	746-90	Tom Missimer	26.427088	-81.828428	ESTERO	13	27
LM-03279	746-90	Tom Missimer	26.428024	-81.821297	ESTERO	16	27
LM-03410	902-91	Tom Missimer	26.385122	-81.812982	ESTERO	15	31
LM-03459	722-90	Tom Missimer	26.372946	-81.803525	BONITA SPRINGS	12	25
LM-03461	722-90	Tom Missimer	26.366227	-81.799582	BONITA SPRINGS	9	22
LM-03476	819-90	Tom Missimer	26.396346	-81.811239	ESTERO	17	35
LM-03477	819-90	Tom Missimer	26.397656	-81.814462	ESTERO	14	35
LM-03478	819-90	Tom Missimer	26.397728	-81.812122	ESTERO	16	35
LM-03494	745-90	Tom Missimer	26.406432	-81.829357	ESTERO	4	40
LM-03495	745-90	Tom Missimer	26.408517	-81.831061	ESTERO	12	150
LM-03496	745-90	Tom Missimer	26.410415	-81.831684	ESTERO	11	36
LM-03497	745-90	Tom Missimer	26.40219	-81.836338	ESTERO	6	21
LM-03498	745-90	Tom Missimer	26.409226	-81.836773	ESTERO	6	25
LM-03499	745-90	Tom Missimer	26.412162	-81.832307	ESTERO	10	29
LM-03500	901-91	Tom Missimer	26.397127	-81.811076	ESTERO	15	30
LM-03558	901-91	Tom Missimer	26.440255	-81.757045	ESTERO	18	123

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Well Number	Report number	Data Source	Latitude	Longitude	24K Quad	Elevation (ft.)	Total Depth (ft.)
LM-03611	1040-91	Tom Missimer	26.383441	-81.808748	ESTERO	16	30
LM-03612	1040-91	Tom Missimer	26.380788	-81.808688	ESTERO	15	30
LM-03613	1040-91	Tom Missimer	26.384314	-81.812824	ESTERO	15	30
LM-03614	1040-91	Tom Missimer	26.383846	-81.812764	ESTERO	14	30
LM-03649	1067-91	Tom Missimer	26.497327	-81.60695	CORKSCREW	28	48
LM-03650	1067-91	Tom Missimer	26.490211	-81.60485	CORKSCREW	28	82
LM-03651	1067-91	Tom Missimer	26.494635	-81.596261	CORKSCREW	28	64
LM-03652	1067-91	Tom Missimer	26.48738	-81.602071	CORKSCREW	28	62
LM-03653	1067-91	Tom Missimer	26.486039	-81.59544	CORKSCREW	27	39
LM-03654	1067-91	Tom Missimer	26.486167	-81.589626	CORKSCREW	28	43
LM-03655	1067-91	Tom Missimer	26.482862	-81.607378	CORKSCREW	28	63
LM-03656	1067-91	Tom Missimer	26.482454	-81.601451	CORKSCREW	28	43
LM-03657	1067-91	Tom Missimer	26.481914	-81.595096	CORKSCREW	28	44
LM-03658	1067-91	Tom Missimer	26.476946	-81.598105	CORKSCREW	28	80
LM-03660	1067-91	Tom Missimer	26.473511	-81.607625	CORKSCREW	29	43
LM-03662	1067-91	Tom Missimer	26.469159	-81.603542	CORKSCREW	27	75
LM-03678	1040-91	Tom Missimer	26.383882	-81.813828	ESTERO	14	30
LM-03679	1040-91	Tom Missimer	26.38208	-81.810453	ESTERO	15	29
LM-03791	1439-92	Tom Missimer	26.494627	-81.604782	CORKSCREW	27	242
LM-03792	1439-92	Tom Missimer	26.495673	-81.591553	CORKSCREW	28	183
LM-03856	1439-92	Tom Missimer	26.499219	-81.61121	CORKSCREW	28	190
LM-03857	1439-92	Tom Missimer	26.49957	-81.601473	CORKSCREW	27	45
LM-03859	1439-92	Tom Missimer	26.492248	-81.589165	CORKSCREW	28	42
LM-03860	1439-92	Tom Missimer	26.477636	-81.609983	CORKSCREW	27	60
LM-03862	1439-92	Tom Missimer	26.496498	-81.611188	CORKSCREW	27	224
LM-03869	1552-92	Tom Missimer	26.375899	-81.810381	ESTERO	11	20
LM-03916	1654-93	Tom Missimer	26.368205	-81.808413	BONITA SPRINGS	18	34
LM-03917	1654-93	Tom Missimer	26.370738	-81.80834	BONITA SPRINGS	18	32
LM-03920	1654-93	Tom Missimer	26.375289	-81.808288	ESTERO	11	5
LM-131492	1314-92	Tom Missimer	26.453697	-81.700432	CORKSCREW NW	18	31
LS-06187	GeoLogs(10)	Tom Missimer	26.464686	-81.617003	CORKSCREW	28	296
LS-06190	GeoLogs(10)	Tom Missimer	26.476963	-81.622221	CORKSCREW	31	176
LS-06191	GeoLogs(10)	Tom Missimer	26.487096	-81.626529	CORKSCREW NW	29	146
LS-06192	GeoLogs(10)	Tom Missimer	26.499611	-81.623944	CORKSCREW	29	176
LS-06194	GeoLogs(10)	Tom Missimer	26.498659	-81.61615	CORKSCREW	28	136
LS-06205	GeoLOG(12)	Tom Missimer	26.404592	-81.728777	CORKSCREW NW	16	96
LS-06207	GeoLOG(12)	Tom Missimer	26.404132	-81.74019	CORKSCREW NW	16	66
LS-06208	GeoLOG(12)	Tom Missimer	26.405256	-81.748693	CORKSCREW NW	15	46
LS-06210	GeoLOG(12)	Tom Missimer	26.391404	-81.743728	CORKSCREW NW	15	56
LS-06211	GeoLOG(12)	Tom Missimer	26.39212	-81.751489	ESTERO	15	56
LS-06212	GeoLOG(12)	Tom Missimer	26.390739	-81.737736	CORKSCREW NW	17	66
LS-06213	GeoLOG(12)	Tom Missimer	26.390382	-81.729405	CORKSCREW NW	16	76
LS-06229	GeoLogs(10)	Tom Missimer	26.495964	-81.616247	CORKSCREW	29	200
LS-06231	GeoLogs(10)	Tom Missimer	26.475874	-81.618345	CORKSCREW	27	110
MC-05019	101-97	Tom Missimer	26.091789	-81.729089	BELLE MEADE	6	3400
ML-05010	GeoLOGS 10+	Tom Missimer	26.420545	-81.818184	ESTERO	25	230

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APPENDIX C: M-SERIES SAMPLES UTILIZED FOR STUDY

This table lists data from FGS M-Series samples within the boundaries of the USGS Naples 30 x 60 minute quadrangle utilized for the project. NOTE: Symbols are present on Plate 1 of OFMS 116 but are not labeled in order to keep the plate from becoming too crowded with labels.

M-Number	Sample Type	Formation	Data Source	24k Quad	Latitude	Longitude	Elevation (Feet)
M-9566	M-Series	TQsu	FGS	Estero	26.494648	-81.865012	3
M-9633	M-Series	Tt	FGS	Immokalee SW	26.295314	-81.443819	18
M-9634	M-Series	TQsu	FGS	Corkscrew	26.456681	-81.596719	21
M-9635	M-Series	TQsu	FGS	Crows Nest Hammock	26.492821	-81.206878	24
M-9636	M-Series	TQsu	FGS	Crows Nest Hammock	26.472160	-81.178851	22
M-9637	M-Series	TQsu	FGS	Crows Nest Hammock	26.468530	-81.175388	29
M-9655	M-Series	TQsu	FGS	Estero	26.434594	-81.805021	11
M-9656	M-Series	TQsu	FGS	Estero	26.436565	-81.804860	10
M-9657	M-Series	Tt	FGS	Deep Lake	26.041180	-81.263906	10
M-9658	M-Series	Tt	FGS	Deep Lake	26.064848	-81.264219	8
M-9659	M-Series	Tt	FGS	Deep Lake	26.114582	-81.265177	12
M-9660	M-Series	Tt	FGS	Miles City	26.162151	-81.266500	14
M-9661	M-Series	Tt	FGS	Deep Lake	26.026865	-81.263450	10
M-9662	M-Series	TQsu	FGS	Bonita Springs	26.360626	-81.753849	14
M-9663	M-Series	TQsu	FGS	Bonita Springs	26.370851	-81.760697	11
M-9664	M-Series	TQsu	FGS	Corkscrew SW	26.371065	-81.734912	41
M-9665	M-Series	Tt	FGS	Belle Meade NW	26.197660	-81.702365	2
M-9666	M-Series	Tt	FGS	Belle Meade NW	26.211690	-81.686993	12
M-9667	M-Series	Tt	FGS	Belle Meade NW	26.195571	-81.686746	9
M-9668	M-Series	Tt	FGS	Belle Meade NW	26.178905	-81.686658	8
M-9669	M-Series	Tt	FGS	Belle Meade NW	26.201629	-81.670849	8
M-9670	M-Series	Tt	FGS	Belle Meade NW	26.212475	-81.670457	10
M-9671	M-Series	Tt	FGS	Belle Meade NW	26.213721	-81.632696	10
M-9672	M-Series	Tt	FGS	Belle Meade NW	26.245074	-81.633253	9
M-9673	M-Series	Tt	FGS	Belle Meade NE	26.246117	-81.606671	14
M-9674	M-Series	Tt	FGS	Corkscrew SE	26.260947	-81.601270	13
M-9675	M-Series	Tt	FGS	Corkscrew SE	26.304442	-81.610023	9
M-9676	M-Series	Tt	FGS	Corkscrew SE	26.311535	-81.610075	8
M-9677	M-Series	Tt	FGS	Corkscrew SE	26.308344	-81.609769	11
M-9678	M-Series	Tt	FGS	Corkscrew SE	26.292922	-81.561553	16
M-9679	M-Series	Tt	FGS	Belle Meade NE	26.246048	-81.617193	12
M-9680	M-Series	Tt	FGS	Belle Meade NW	26.243581	-81.669318	12
M-9681	M-Series	TQsu	FGS	Bonita Springs	26.262458	-81.763479	8
M-9682	M-Series	Tt	FGS	Bonita Springs	26.268145	-81.767169	8
M-9683	M-Series	Tt	FGS	Bonita Springs	26.267282	-81.769596	9

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M-Number	Sample Type	Formation	Data Source	24k Quad	Latitude	Longitude	Elevation (Feet)
M-9684	M-Series	Tt	FGS	Belle Meade NW	26.228615	-81.738579	7
M-9685	M-Series	Tt	FGS	Corkscrew SW	26.250094	-81.736362	11
M-9686	M-Series	Tt	FGS	Corkscrew SW	26.271601	-81.737390	8
M-9687	M-Series	Tt	FGS	Corkscrew SW	26.267992	-81.737238	9
M-9688	M-Series	Tt	FGS	Corkscrew SW	26.273480	-81.729474	15
M-9689	M-Series	Tt	FGS	Corkscrew SW	26.271167	-81.689000	12
M-9690	M-Series	Tt	FGS	Belle Meade NW	26.243669	-81.656276	9
M-9691	M-Series	Tt	FGS	Belle Meade NW	26.241935	-81.684192	10
M-9692	M-Series	Tt	FGS	Belle Meade NW	26.237962	-81.687571	10
M-9693	M-Series	Tt	FGS	Belle Meade NW	26.230710	-81.687341	9
M-9694	M-Series	Tt	FGS	Belle Meade NW	26.243354	-81.668749	10
M-9695	M-Series	Tt	FGS	Belle Meade NW	26.243354	-81.668749	8
M-9696	M-Series	Tt	FGS	Corkscrew SE	26.250095	-81.594958	10
M-9697	M-Series	Tt	FGS	Belle Meade NE	26.230695	-81.527990	12
M-9698	M-Series	Tt	FGS	Belle Meade NW	26.234579	-81.671361	11
M-9699	M-Series	Tt	FGS	Corkscrew SE	26.251907	-81.600653	11
M-9700	M-Series	Tt	FGS	Corkscrew SE	26.251463	-81.619221	5
M-9701	M-Series	Tt	FGS	Corkscrew SE	26.273872	-81.580815	11
M-9702	M-Series	Tt	FGS	Corkscrew SE	26.261187	-81.580637	11
M-9703	M-Series	Tt	FGS	Corkscrew SE	26.252121	-81.580527	10
M-9704	M-Series	Tt	FGS	Corkscrew SE	26.255980	-81.561472	5
M-9705	M-Series	Tt	FGS	Corkscrew SE	26.263253	-81.561111	13
M-9706	M-Series	Tt	FGS	Corkscrew SE	26.319544	-81.562076	16
M-9707	M-Series	Tt	FGS	Belle Meade	26.120819	-81.676076	6
M-9708	M-Series	Tt	FGS	Belle Meade NW	26.131666	-81.680225	10
M-9709	M-Series	Tt	FGS	Belle Meade NW	26.134732	-81.675383	6
M-9710	M-Series	Tt	FGS	Belle Meade NW	26.168211	-81.736812	8
M-9711	M-Series	Tt	FGS	Belle Meade NE	26.246641	-81.562328	8
M-9712	M-Series	Tt	FGS	Belle Meade NE	26.208577	-81.554756	10
M-9713	M-Series	Tt	FGS	Belle Meade NE	26.194123	-81.554903	11
M-9714	M-Series	Tt	FGS	Belle Meade NE	26.161402	-81.554881	8
M-9715	M-Series	Tt	FGS	Belle Meade NE	26.141937	-81.555287	11
M-9716	M-Series	Tt	FGS	Belle Meade NE	26.127083	-81.555408	4
M-9717	M-Series	Tt	FGS	Belle Meade SE	26.094334	-81.561517	9
M-9718	M-Series	Tt	FGS	Belle Meade SE	26.054687	-81.554004	7
M-9719	M-Series	Tt	FGS	Belle Meade SE	26.032614	-81.554070	4
M-9720	M-Series	Tt	FGS	Belle Meade SE	26.003823	-81.553266	4
M-9721	M-Series	Tt	FGS	Belle Meade SE	26.032975	-81.522863	5
M-9722	M-Series	Tt	FGS	Belle Meade SE	26.112478	-81.554893	7
M-9723	M-Series	Tt	FGS	Belle Meade NE	26.131145	-81.523194	4

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M-Number	Sample Type	Formation	Data Source	24k Quad	Latitude	Longitude	Elevation (Feet)
M-9724	M-Series	Tt	FGS	Belle Meade NE	26.139444	-81.523269	5
M-9725	M-Series	Tt	FGS	Catherine Island	26.143165	-81.490726	7
M-9726	M-Series	Tt	FGS	Belle Meade NE	26.126281	-81.522746	8
M-9727	M-Series	Tt	FGS	Belle Meade NE	26.153685	-81.528789	10
M-9728	M-Series	Tt	FGS	Belle Meade NE	26.169012	-81.527685	3
M-9729	M-Series	Tt	FGS	Belle Meade NE	26.187148	-81.527918	5
M-9730	M-Series	Tt	FGS	Belle Meade NE	26.205317	-81.528132	4
M-9731	M-Series	Tt	FGS	Belle Meade NE	26.223422	-81.528394	5
M-9740	M-Series	Tt	FGS	Corkscrew SW	26.274519	-81.741463	11
M-9765	M-Series	TQsu	FGS	Sunniland	26.368393	-81.270856	22
M-9766	M-Series	TQsu	FGS	Sunniland	26.362966	-81.270708	18
M-9767	M-Series	TQsu	FGS	Sunniland	26.353674	-81.270650	22
M-9768	M-Series	TQsu	FGS	Doctors Hammock	26.298704	-81.187870	16
M-9769	M-Series	TQsu	FGS	Sunniland	26.303412	-81.303024	16
M-9779	M-Series	TQsu	FGS	Immokalee NE	26.391294	-81.271142	21
M-9780	M-Series	TQsu	FGS	Doctors Hammock	26.310179	-81.221182	17
M-9781	M-Series	TQsu	FGS	Doctors Hammock	26.283194	-81.223683	14
M-9782	M-Series	Tt	FGS	Sunniland	26.301690	-81.342569	11
M-9783	M-Series	TQsu	FGS	Sunniland	26.275548	-81.342086	9
M-9784	M-Series	TQsu	FGS	Sunniland	26.250316	-81.341635	12
M-9785	M-Series	Tt	FGS	Belle Meade NW	26.154773	-81.678278	5
M-9786	M-Series	Tt	FGS	Belle Meade	26.084627	-81.685908	4
M-9787	M-Series	Tt	FGS	Belle Meade	26.081984	-81.674608	9
M-9788	M-Series	Tt	FGS	Belle Meade	26.094518	-81.682762	6
M-9789	M-Series	Tt	FGS	Belle Meade	26.093650	-81.735273	-1
M-3001	Historical M-Series	TQsu	FGS	Miles City	26.147500	-81.353333	10
M-3169	Historical M-Series	TQsu	FGS	Belle Meade NE	26.152778	-81.523333	5
M-3170	Historical M-Series	TQsu	FGS	Belle Meade NE	26.152778	-81.523333	5
M-3171	Historical M-Series	Qu	FGS	Belle Meade NE	26.152778	-81.523333	5
M-3172	Historical M-Series	Qu	FGS	Belle Meade NE	26.152778	-81.523333	5
M-4464	Historical M-Series	Tt	FGS	Miles City	26.168889	-81.345556	18
M-4465	Historical M-Series	Tt	FGS	Miles City	26.168889	-81.345556	18
M-4466	Historical M-Series	Tt	FGS	Miles City	26.168889	-81.345556	18
M-4467	Historical M-Series	Tt	FGS	Miles City	26.168889	-81.345556	18
M-4468	Historical M-Series	Qu	FGS	Miles City	26.168889	-81.345556	18
M-4472	Historical M-Series	Tt	FGS	Miles City	26.170278	-81.345556	17
M-4473	Historical M-Series	Tt	FGS	Miles City	26.170278	-81.345556	17

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M-Number	Sample Type	Formation	Data Source	24k Quad	Latitude	Longitude	Elevation (Feet)
M-4474	Historical M-Series	Tt	FGS	Miles City	26.170278	-81.345556	17
M-4475	Historical M-Series	Tt	FGS	Miles City	26.170278	-81.345556	17
M-4476	Historical M-Series	Tt	FGS	Miles City	26.170278	-81.345556	17
M-4506	Historical M-Series	Tt	FGS	Deep Lake	26.001714	-81.262500	8
M-4507	Historical M-Series	Tt	FGS	Deep Lake	26.001714	-81.262500	8