

Ent D (FMSF only)



Survey Log Sheet

Florida Master Site File
Version 4.1 1/07

Survey # (FMSF only)

17840

Consult *Guide to the Survey Log Sheet* for detailed instructions.

Identification and Bibliographic Information

Survey Project (name and project phase) Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Report Title (exactly as on title page) Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Report Author(s) (as on title page— individual or corporate; last names first) Collins, Ph.D., Lori, Doering, Ph.D., Travis, Fernandez, MS, Steven

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Supervisor(s) of Fieldwork (whether or not the same as author(s); last name first) Collins, Ph.D., Lori

Affiliation of Fieldworkers (organization, city) Alliance for Integrated Spatial Technologies (University of South Florida, College of Arts/Sciences)

Key Words/Phrases (Don't use the county, or common words like *archaeology*, *structure*, *survey*, *architecture*. Limit each word or phrase to 25 characters.) District 3 State Parks, Archaeological Sensitivity Modeling, sub-meter GPS, LiDAR

Survey Sponsors (corporation, government unit, or person who is directly paying for fieldwork)

Name Florida Park Service, Bureau of Natural and Cultural Resources

Address/Phone 3900 Commonwealth Boulevard, Tallahassee, Florida 32399

Recorder of Log Sheet Lori Collins

Date Log Sheet Completed 10 / 2010 /

Is this survey or project a continuation of a previous project? ☒ No ☐ Yes: Previous survey # (s) (FMSF only)

Mapping

Counties (List each one in which field survey was done - do not abbreviate; use supplement sheet if necessary) Volusia, Orange, Flagler, Indian River, Lake, Marion, St. Johns, Polk, Brevard, Putnam, Seminole, Okeechobee

USGS 1:24,000 Map(s) : Map Name/Date of Latest Revision (use supplement sheet if necessary): St. Augustine (1994), St. Augustine Beach (1996), Seville (1993), Lake Dias (1993),

Matanzas Inlet (1992), Dinner Island NE (1992), Palatka (1992), Beverly Beach (1992), San Mateo (1980), Satsuma (1980), Flagler Beach East (1993), Flagler Beach West (1993), St. Johns Park (1993), Ormond Beach (1993), Favonetta (1993), Pearson (1997), Lynne (1970), Sebastian (1970),

Ocala East (1991), Lake Woodruff (1993), Orange City (1980), Pine Lakes (1968), Sanford (1988), Sanford SW (1970), Boreno (1980), Leesburg West (1980), Forest City (1960), Apoka (1980), Lake Louisa (1980), Branchborough (1987), Lake Hatchineha (1987), Hesperides (1972), Lake Wales (1993)

Fellsmere (1992), Fort Drum NW, SW (1972), Fort Kissimmee NE, SE, NW (1972)

Description of Survey Area

Dates for Fieldwork: Start 9/29/09 End 6/1/10 Total Area Surveyed (fill in one) _____ hectares 72,918.52 acres

Number of Distinct Tracts or Areas Surveyed _____

If Corridor (fill in one for each): Width _____ meters _____ feet Length _____ kilometers _____ miles

Research and Field MethodsTypes of Survey (check all that apply): ☒ archaeological ☒ architectural ☒ historical/archival ☐ underwater ☐ other: _____

Scope/Intensity/Procedures Collected sub-meter GPS data; no subsurface testing completed; no archaeological materials collected; utilized aerial LIDAR in conjunction with

GPS ground truthing

Preliminary Methods (✓ Check as many as apply to the project as a whole.)

- | | | | |
|--|---|---|---|
| ☐ Florida Archives (Gray Building) | ☒ library research- <i>local public</i> | ☒ local property or tax records | ☒ other historic maps |
| ☒ Florida Photo Archives (Gray Building) | ☐ library-special collection - <i>nonlocal</i> | ☐ newspaper files | ☒ soils maps or data |
| ☐ Site File property search | ☒ Public Lands Survey (maps at DEP) | ☒ literature search | ☒ windshield survey |
| ☒ Site File survey search | ☒ local informant(s) | ☐ Sanborn Insurance maps | ☒ aerial photography |
| ☒ other (describe): LIDAR | | | |

Archaeological Methods (✓ Check as many as apply to the project as a whole.)

- ☐ Check here if **NO** archaeological methods were used.
- | | | |
|--|---|--|
| ☐ surface collection, controlled | ☐ other screen shovel test (size: _____) | ☐ block excavation (at least 2x2 M) |
| ☐ surface collection, <u>un</u> controlled | ☐ water screen (finest size: _____) | ☐ soil resistivity |
| ☐ shovel test-1/4" screen | ☐ posthole tests | ☐ magnetometer |
| ☐ shovel test-1/8" screen | ☐ auger (size: _____) | ☐ side scan sonar |
| ☐ shovel test 1/16" screen | ☐ coring | ☒ pedestrian survey |
| ☐ shovel test-unscreened | ☐ test excavation (at least 1x2 M) | ☐ unknown |
| ☒ other (describe): Collection of sub-meter GPS data | | |

Historical/Architectural Methods (✓ Check as many as apply to the project as a whole.)

- ☐ Check here if **NO** historical/architectural methods were used.
- | | | | |
|--|--|---|---|
| ☐ building permits | ☐ demolition permits | ☐ neighbor interview | ☐ subdivision maps |
| ☐ commercial permits | ☐ exposed ground inspected | ☐ occupant interview | ☒ tax records |
| ☐ interior documentation | ☒ local property records | ☐ occupation permits | ☐ unknown |
| ☐ other (describe): _____ | | | |

Survey Results (cultural resources recorded)Site Significance Evaluated? ☐ Yes ☒ No If Yes, circle NR-eligible/significant site numbers below.Site Counts: Previously Recorded Sites 19 Newly Recorded Sites 4

Previously Recorded Site #'s with Site File Update Forms (List site #'s without "8." Attach supplementary pages if necessary) VO193, VO7496, SJ3483,

SJ69, SJ3536, VO244, FL7C, VO5277, VO5279, FL263, LA2366, VO7315, ~~OR448~~ OR3230, BR1694, IR26, IR42, MR532, MR1878

Newly Recorded Site #'s (Are you sure all are originals and not updates? Identify methods used to check for updates, i.e., researched Site File records.

List site #'s without "8." Attach supplementary pages if necessary.) FL897, LA4238, FL896, OR9987

Site Form Used: ☐ Site File Paper Form ☒ SmartForm II Electronic Recording Form**REQUIRED: ATTACH PLOT OF SURVEY AREA ON PHOTOCOPY OF USGS 1:24,000 MAP(S)****DO NOT USE****SITE FILE USE ONLY****DO NOT USE****BAR Related**☐ 872☐ CARL☒ 1A32 #☐ UW0910.006**BHP Related**☐ State Historic Preservation Grant☐ Compliance Review: CRAT # _____

17840

UNIVERSITY OF SOUTH FLORIDA
ALLIANCE FOR INTEGRATED SPATIAL TECHNOLOGIES



UNIVERSITY OF
SOUTH FLORIDA

COLLEGE OF ARTS & SCIENCES

DEP Contract No. RP700

*Archaeological Resource Sensitivity Modeling in Florida State Parks District 3:
the East and Central Florida Region*

Lori D. Collins, Ph.D., Travis F. Doering, Ph.D., Steven Fernandez, M.S., CCM

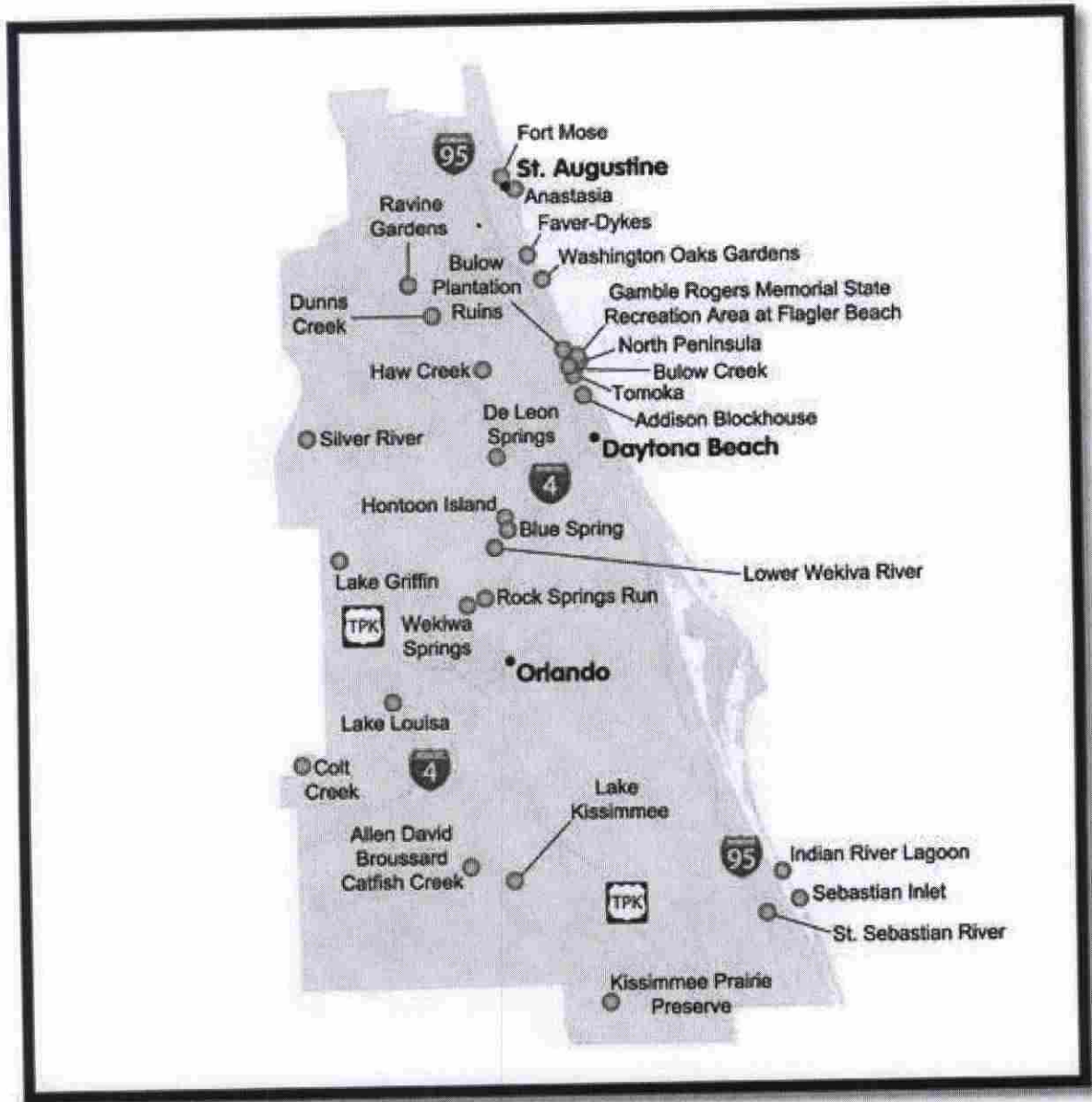
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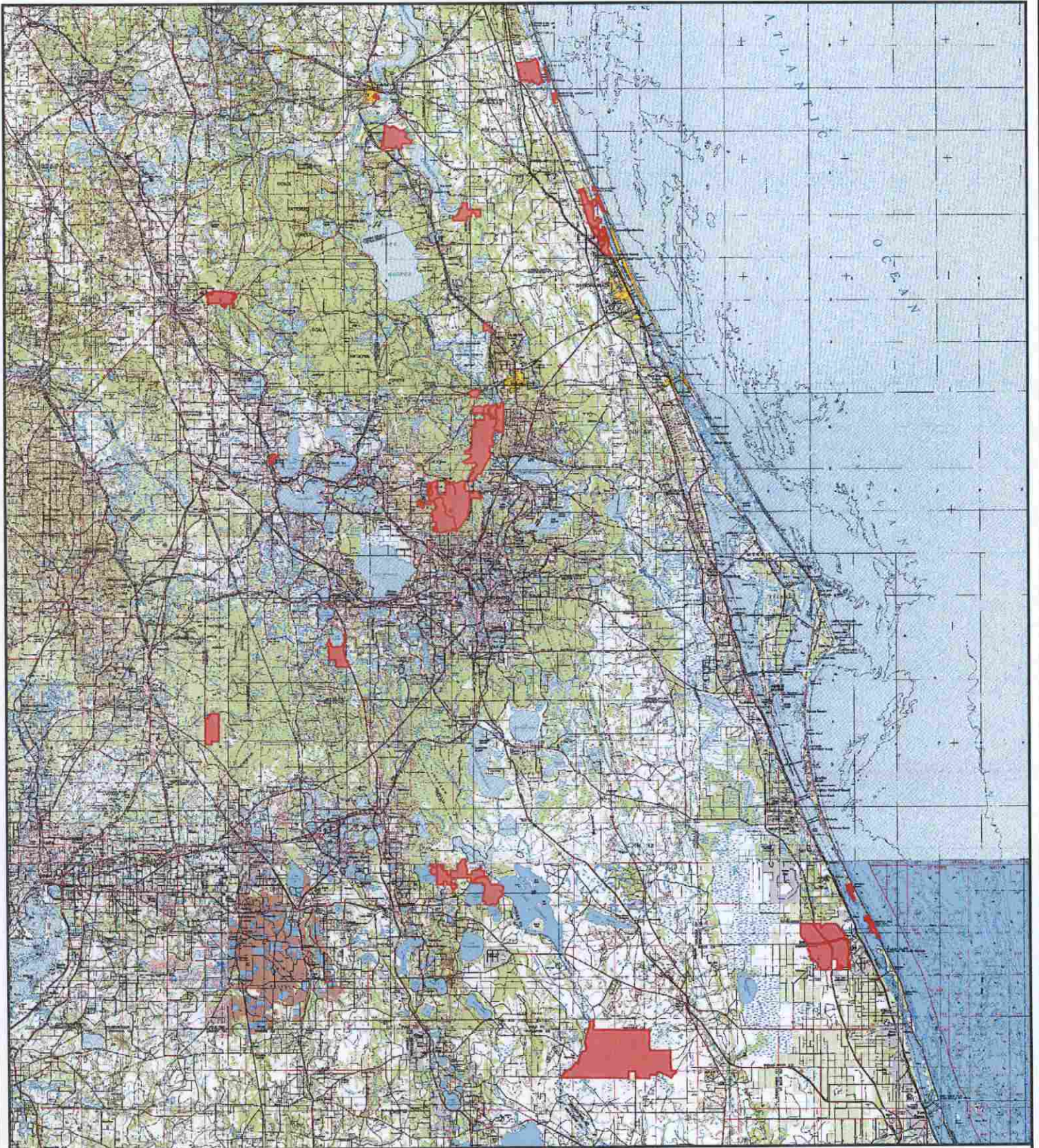
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<http://www.aist.usf.edu/>

10/2010



Florida State Parks included in survey



Survey Log

Map Legend

 Florida State Parks - District 3



0 10 20
Miles

Date: October 2010
Sources: State of Florida, DEP
USGS 250K Topographic Map
Map Projection: UTM Zone 17N
Map Scale: 1:1,200,000

Acknowledgements

The project, Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region, was made possible through a grant with the Florida Park Service, Bureau of Natural and Cultural Resources. We wish to express our gratitude to all the park managers, rangers, and volunteers, who worked with us to answer questions, point out sources of information, and share with us the information about the resources in their parks. Everywhere we went we were always greeted with excitement and enthusiasm that was contagious. In particular we would like to thank John Kunzer, the biologist for the Tomoka Basin State Parks, who was extremely generous with his time, data, and knowledge, and was a big help with GPS and field reconnaissance. Park personnel truly love their jobs, and it made our jobs easier and enjoyable. We would also like to acknowledge the assistance and support we received from Assistant Chief and Historic Resources Administrator, Phil Werndli. Phil's vision and direction for resource management was integral to this project conception and development. Archaeologist Bill Stanton provided thoughts, feedback, and sources for information that were valuable to our work, as did Brady Harrison the GIS Supervisor who provided us with GIS data collections for all of the parks. Jason DePue served as the project manager and also helped with coordination and field reconnaissance at Sebastian Inlet. Finally, we would like to acknowledge the students and researchers who helped with this project. USF MA graduate student James 'Bart' McLeod conducted many of the park visits and was a great help with the GPS survey portion of the project. Ruth 'Chris' Turple provided research and technical assistance for the GLO and historic map work, and provided support and help throughout the project. Ph.D. candidate Jeffrey Du Vernay provided assistance with Site File forms and completion of new spatial plots from our GPS surveys. MA graduate student Rebecca O'Sullivan, who is focusing her thesis work on the Bulow Historic Plantation Ruins State Park, helped with survey and mapping of the extant ruins and slave quarters on numerous trips, helped by her fellow students MA students Elizabeth McCoy, Rachel Nostrom, Seth Boots, and Bart McLeod. Becky's historic research and interest in spatial landscapes were of value to the project. Thanks to all!

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Executive Summary

This report presents the results of the Archaeological Sensitivity Modeling Project completed for District 3 of the Florida State Parks and made possible through a grant with the Florida Park Service, Bureau of Natural and Cultural Resources. Accurate estimates of archaeological sensitivity, or archaeological site potential, are an important first step in land use management and planning, allowing managers and planners to avoid potentially significant cultural resources and helping them to minimize the extant costs entailed with future archaeological compliance surveys. With this project, GIS-based archaeological sensitivity models were generated for each District 3 Florida State Park. Model development centered on building customized geodatabases for each park that incorporated relevant cultural and environmental variables, digital elevation models created from best available data such as LiDAR topographic data, georeferenced and digitized historic maps, records, aerial imagery, and features and relevant information obtained during park visits using a sub-meter GPS. A matrix of variables was used in model development utilizing environmental and archaeological background literature for each park and factors that have been considered relevant in previous predictability studies for archaeological resources in Florida. Nine categories and 34 factors within these categories were developed as matrix evaluation measures, and each factor in the matrix was assigned a weighted value based on known predictive variables from previously conducted regional surveys. Summed values in the matrix resulted in the demarking of locations of low, medium, and high sensitivity for each park, expressed as polygonal areas in ArcGIS. The analyses of these models demonstrated they have a strong predictive value, with previously recorded cultural resources listed in the FMSF falling within medium and high sensitivity areas. While these models provide a synthetic and operational approach for management planning that considers cultural sensitivity, they are not designed to substitute field-based archaeological assessments. Instead, they are an effective planning tool that can be used with more traditional archaeological approaches to better target and survey areas.

As a result of this survey, 19 site locations as listed on the Florida Master Site File were re-plotted with corrected spatial locales and sub-meter GPS data on these updated locations were provided to the FMSF. Additionally, four new archaeological sites were recorded. See Appendix A for a listing of these sites and FMSF record forms. This survey examined over 72,918.52 acres of state park lands (excluding the state preserve models for D3 – although these models are included as part of this report), and defined D3 in terms of high and medium sensitivity lands for cultural resources. These designations combined for a total of 15,078 acres, with the remaining 57,841 acres associated with areas of low cultural resource sensitivity. We find that our model totals for D3 State Parks correctly indicated 53.49% of known sites (as recorded on the FMSF) in an area that covers less than 7.33% of the total D3 model area.

Introduction

The District 3 Archaeological Sensitivity Modeling project involves important research into the effective management of cultural and natural resources by examining the relative potential for archaeological site occurrence within specific geographic locations. Reliable estimates of the sensitivity, or archaeological potential, are a critical first step in land use management and planning. These models will be used as effective spatial planning tools to evaluate and assess relative archaeological potential, allowing managers and planners to avoid potentially significant cultural resources and to minimize future costs associated with compliance and survey sampling strategies (ESRI 2006). These modeling methods have been shown to be effective across larger spatial scales, such as counties or states, but with this project in Florida, are now refined to smaller spatial scale applications, namely park-level models, which will allow a finer-grained analysis and site-level resource management.

Five parks were initially selected by the Florida State Park Service (FPS) officials to be modeled with priority, with the completion of models for the remaining parks in District 3 to follow. These first five parks included Anastasia, Sebastian Inlet, Colt Creek, Faver-Dykes, and North Peninsula State Parks. Feedback received from the FPS was used in the refinement and development of the district models to be prepared for the remaining units (Figure 1). Archaeological background and literature providing prehistoric and historical context for each park, although used in the model development, is not reiterated as part of this report.



Figure 1. Parks in the Central District 3 of the Florida State Parks

Instead, this project's focus is given to the development and application of GIS modeling for

cultural resources on park lands. The analyses of these models show strong predictive value, however we emphasize that these models are not a substitute for field-based archaeological assessments. These models are designed to be utilized as planning tools, allowing for the understanding and visualization of archaeological sensitivity. These models offer an operational approach for management planning that considers cultural sensitivity, and can be used with traditional archaeological approaches to more effectively target and survey areas.

The GIS Sensitivity Models

The first step in our model development was the data mining and background literature review and synthesis for the development of custom geodatabases for each of the first five parks, and then followed up with similar research and methodologies for the remaining parks in the district. Geodatabases have a primary advantage over individual file-based data storage, because they allow us to build a GIS that is relational, has the same coordinate system, and contains all relevant spatial characteristics and compliant metadata. This is a powerful step in model development, allowing for complex geospatial and multiple queries as well as supporting multiple users. Geodatabases provide a uniform repository for geographic data. All geographic data is centrally stored and managed in one database (Gillgrass 2007). These geodatabases contain the previously outlined data layers (see Collins and Doering task 1, 2, and 3 summary reports), including relevant cultural and environmental variables, digital elevation models created from best available data such as LiDAR topographic data, historic maps, records, and aerial imagery. Historic maps, containing relevant environmental and cultural information, are georeferenced and included in each of the geodatabases. Pertinent information from these maps has been digitized as layers in the geodatabases, and contains historic landform and/or cultural site locations. An external hard drive containing organized sets of information for each of the parks are created using this format, with a geodatabase file containing all of the model variables, the data layers, up-to-date (as possible) metadata that can be explored in the ArcCatalog function, and are all in the same Florida Albers projection. These park-specific geodatabases can be added to, amended when needed, and maintained as a management tool for the Park Service. The external hard drive also contains PDF documents showing the final map layouts of the park model, the matrix parameters used in the model development, and a spreadsheet showing the availability of layers and metadata summary information contained in the model. In this way, GIS and non-GIS end-users can still benefit from the information contained in the materials.

Methods

During the park visits, ground-truthed features and relevant information and materials were collected with sub-meter GPS. These field-collected features were incorporated into the models where applicable, and data were used to digitize new features such as historic trails and rails, waterways, modern features, and archaeological site locations. These data were combined in the geodatabase format structure to refine and develop the sensitivity model for each park location. A matrix of variables to be utilized in the model development was produced using environmental and archaeological background literature for each area, in combination with known factors and established distances to resources that have been considered in previous predictability studies for archaeological resources in Florida (see ACI 2005; Ashley 1996; Austin 1987 2001; Austin, Carlson, et al. 2001; Austin and Collins 2003; Collins and Weisman 2005; Deming, et al. 1999; East 1999; Horvath 1986; Sassaman 2006). The extent of these available previous surveys and predictability factors were utilized to create a synthetic approach, allowing for the resources of this project to be effectively applied to the GIS model development by using data known for this region as a foundation referent for the development of our GIS matrix.

For parks within District 3, nine categories (A-I) and 34 factors within these categories were developed as matrix evaluation measures for consideration in our GIS Sensitivity Models. The overall matrix is used for each park model, with aggregated values assigned for each evident criterion. If categories or factors were not present in a particular park, the weighted value assigned is 0, indicating not present. Each factor in the matrix is assigned a score that is weighted based on established predictive variables from the aforementioned previously conducted regional surveys. These scores are assigned based on the range in variables and are all divisible by 6. These numerical values were based on statistical breaks determined in the variables present, and allow for an optimal range or spread in the values. Similar spreads in weighted ranges have been successfully applied to other archaeological sensitivity models (ESRI 2009). Weighted scores ranging from negative 30 to positive 30 are assigned to each variable in the Environmental and Cultural Criteria Matrix. Our GPS and field verification work was then utilized to refine this matrix list and make the matrix adaptable and specific for each park's resources and potential for resources. Each park's geodatabase folder contains all the cultural and natural systems data layers in both vector and raster format. Also included are the map algebra calculations performed for each park model. The Model analysis comes from the overall geodatabase, which includes some 50-60 data layers for each park. Each model layer has a letter and a number designation relating to the matrix variables considered (Figure 2). Each

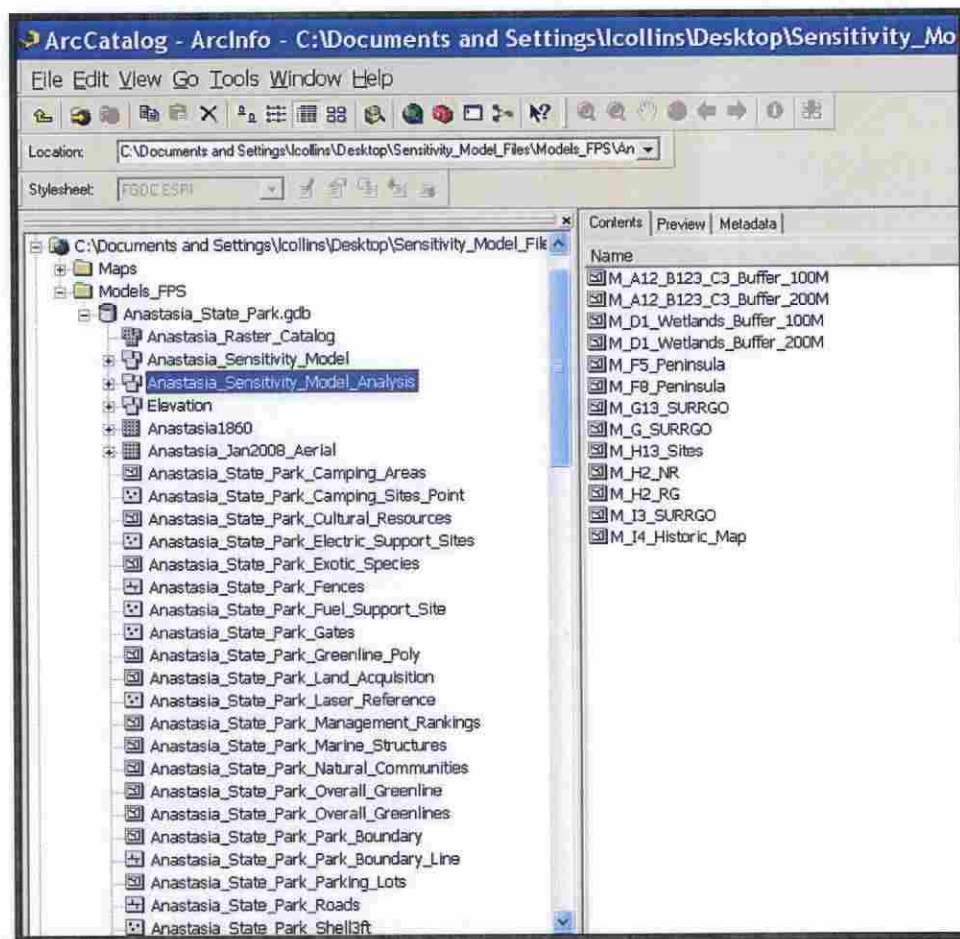


Figure 2. Anastasia State Park Archaeological Sensitivity Model Geodatabase structure, including factors considered in the model analysis, designated by corresponding matrix letter and numerical numbers and processes. On the right M is the matrix calculation for the designated letter and corresponding numbers that relate to the matrix (see Appendices 1-5). For example, M_F5 means that matrix variable F number 5 was used in the model development. Each matrix calculation can be demonstrated in this way.

analysis layer receives a score that is then added to the attribute table and summed using the ArcInfo field calculator for each layer in the model (Figure 3). When the matrix is implemented in this way in the GIS, the resulting model values reflect polygonal areas with low sensitivity demonstrated where summed value numbers equal 12 or below. Medium sensitivity is assigned to areas with a range of 13-29 summed values, and high cultural resource sensitivity is associated with areas scoring 30 and above in summed values.

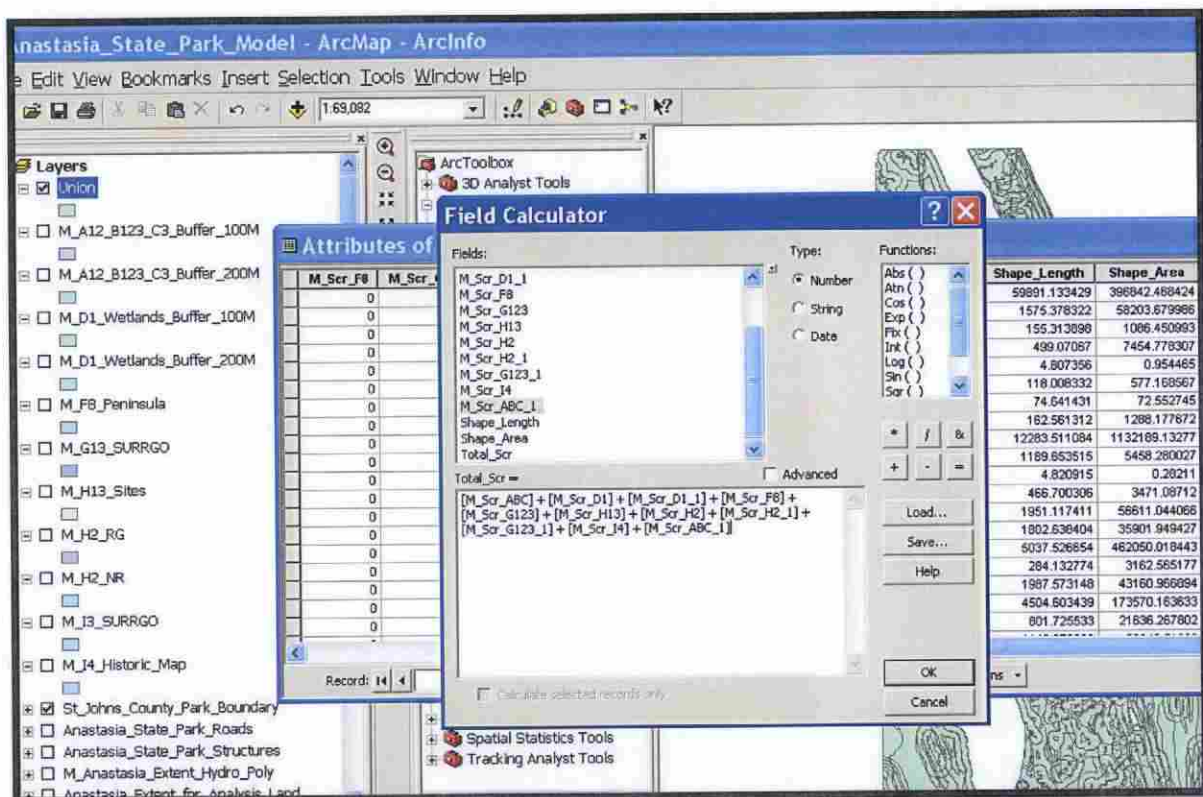


Figure 3. Each analysis layer receives a score calculated and added to the attribute table and then is summed using the ArcInfo field calculator for each layer in the model.

Using this matrix in the GIS, models for each park were produced by:

- 1) Utilizing the categories A, B, and C in the matrix, relating to water and distance to water features, we then used combinations to create the first layers in the GIS model. There are polygon layers for all water bodies, including: oceans, bays, lakes, ponds, and rivers. There is one line layer that represents streams and creeks. Each feature was buffered 100M and 200M using the Buffer Tool. The zones, or area between 0-100M, are assigned a weighted score of 12. The same procedure was completed for areas within 100M-200M and assigned a weighted score of 6. We have attempted to consider the type of water sources rather than strictly hydrological line features, looking at issues of ephemeral vs. permanent, and distinguishing between wetland types and water body categories, as these distinctions have impact on how humans utilize natural landscapes (Dore 2006:79).
- 2) Category D includes wetlands mapped by the National Wetland Inventory Program. These areas were buffered by 100M to identify areas within 0-100M of a wetland. This area is assigned a weighted score of 12. The wetlands buffered were at least 1 acre in size or a combination of adjacent wetlands that total 1 acre or more. A second buffer

was created to include areas within 100M-200M from the wetlands and assigned a weighted score of 6.

- 3) Features identified as being included in Group E (topography) have been digitized or extracted from various sources included in the individual Park Geodatabases that were constructed and compiled earlier. Sources vary and include High Resolution LiDAR data, Digital Elevation Models created from LiDAR Model Points, and USGS 24K topographical maps. These areas are given a weighted score of 12.
- 4) Features identified as being included in Group F (geomorphology and other special geological/environmental features) have been digitized or extracted from various sources included in the individual Park Geodatabases that were constructed and compiled earlier. The digitized areas of the features included in this group are given a weighted score of either 12 or 30.
- 5) Group G consists of soil feature classes generated from the SSURGO soil drainage classification data. These soil classifications were collapsed to examine characteristics found from previous regional surveys and predictability modeling to be associated with cultural resource locations. For G-1, areas that are “moderately well-drained” and “excessively drained” soils were assigned a weighted score of 12. For G-2, areas that are “somewhat poorly drained” were assigned a weighted score of 6.
- 6) Group H is generated from cultural feature spatial data from the Florida Master Site File. In order for the sites to be given a weighted score, certain criteria must be met. An attribute query of the FMSF identified sites with at least one of the following: Human remains are present, the site is “Eligible for NRHP” or the site is “Likely NRHP Eligible,” or Preservation is recommended. These areas are given a weighted score of 30. This category also includes presence of National Register designated areas and/or Resource Groups (those areas score 30), historic land use activities (12), trails and travel corridors (30). This group H category is designed in response to criticisms of other GIS models that omit cultural landscape or non-environmental considerations, and instead focus solely on natural features (Dore 2006:82).
- 7) Features identified as being included in Group I are negative factors for cultural resource location and have been digitized or extracted from various sources included in the individual Park Geodatabases constructed and compiled earlier. These areas are given a weight score of -12 or -30. These factors include excessive slope (>15%) steep erosional slope (>20); poor drainage/flood zone; previously disturbed land as evaluated by a qualified archeological, professional, or engineer based on coring, earlier as-built plans, or obvious surface evidence; soils with an organic pan, underlying marl or clays, and soils with slow to moderate internal drainage.

The matrix values assigned to each feature were combined spatially using map algebra functions in ArcGIS. Map algebra allows for the spatial aggregation of the matrix values by overlaying their geometric shapes to produce the final model features and score values. The preliminary results indicate that the models are fine scale enough to provide substantial improvements over more regionally scale-based models, which show much more limited categories and values (Madry, et al. 2001). Review of the models show that the FMSF recorded cultural resources fall within medium and high sensitivity areas, with percentages and site types to be discussed in the model explanation. Each matrix listing by park is provided in Appendix B of this document.

The Park Models:

Anastasia State Park

Anastasia State Park was most recently surveyed in 1999 (Stokes 1999), and there are 11 recorded archaeological sites within the park boundary, including a National Register site (8SJ69), a potentially eligible for the NR site (8SJ3532), and two special resource group locations (8SJ3483, 8SJ3531). These resource groups consist of two linear trolley track lines that historically went from the site area to St. Augustine in the late 19th and 20th Century. No rails are present, but field GPS control points were taken on portions of the features during the AIST visit to the site in September 2009. These ground control points were used to verify the linear signatures indicated in the aerial LiDAR data used in the GIS model development for this park (Figure 4). All recorded sites in the FMSF were locationally verified with sub-meter GPS. Ground control points were also taken in the area of the historic channel on the island, again to assist with the georeferencing of historic maps utilized, and in the use of LiDAR data in our model.

The original land configuration at Anastasia State Park and the accretion and erosion environmental deposits are an important factor in the archaeological modeling. Data layers such as the National Wetlands Inventory used in the model creation reflect the extents of wetlands that are now eroded and adjoining the coast itself. Thus, the GPS field-truthing and ground control points were also useful in the verification of these environmental GIS data layers. Other data layers of importance to the model development were those relating to hydrology, elevation (NOAA 1-ft. contour LiDAR data), previously recorded archaeological data, and soils. Land modification and flood zone/drainage data were also evaluated for their negative scoring potentials. Historical landform data was digitized using an 1860 US Coast Survey of St. Augustine and the Vicinity. This map was georeferenced and the original landform surfaces were digitized and used in the model matrix. Much of the present-day land area in this park did not exist in 1860, and the ability to verify the location of historic land surface

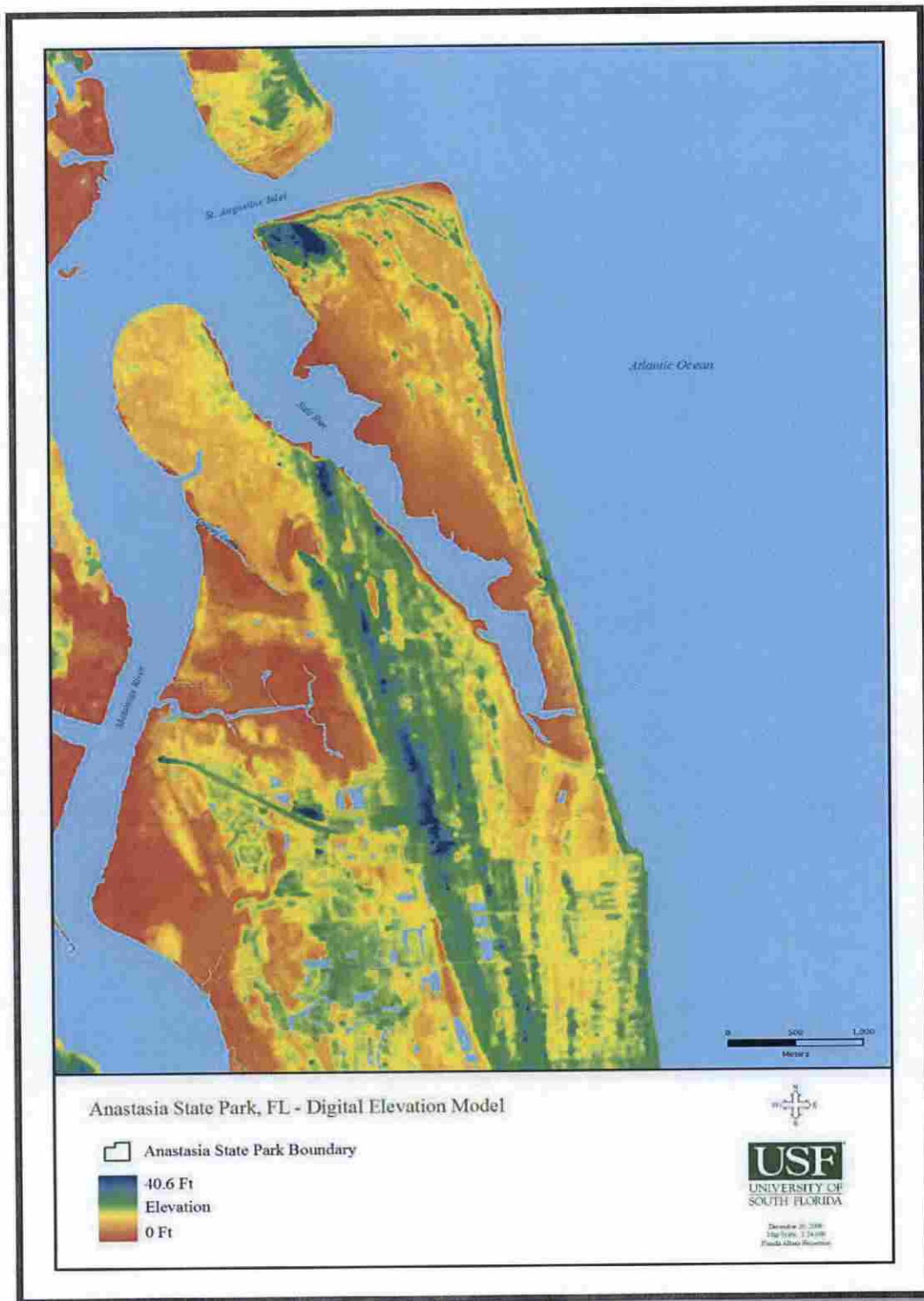


Figure 4. Example of LiDAR data that was converted to a Digital Elevation Model for the Anastasia State Park area

strengthens the cultural resource sensitivity model for Anastasia State Park (Figure 5). Historical aerals and shoreline data indicate it was not until the mid 1900s that the park took on its present land surface form. These aerals and data also proved useful in the understanding of land formation changes through time. Historical peninsular areas were thus defined and scored according to the matrix.

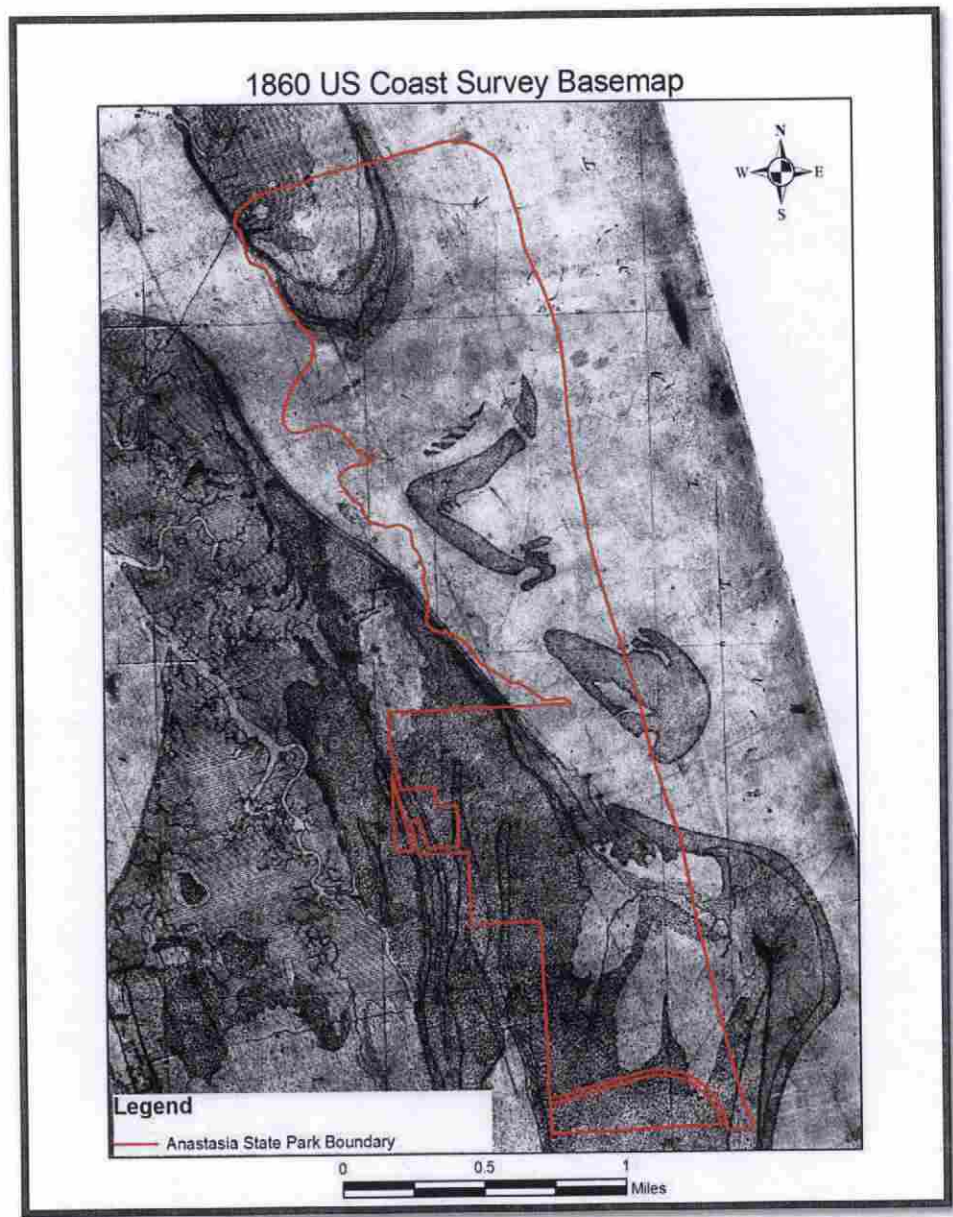


Figure 5. The 1860 Coastal Survey Map of St. Augustine and Vicinity were used to digitize historical land surface areas at Anastasia State Park.

Also of noted importance was the presence of sensitive known cultural resource locations. These locations correspond to Resource Groups and to National Register site locations as recorded on the FMSF. One National Register site is The Coquina Quarry Site, 8SJ69 (Figure 6), a major Spanish quarry producing coquina used in the construction of the Castillo de San Marcos and St. Augustine (Florida Department of Environmental Protection 2004). A large portion of



Figure 6. GPS was used to verify location and extent of quarry sites at Anastasia State Park.

the Anastasia State Park is designated as part of or contributing to this site area, and receives an accordingly high rank in the matrix evaluation. Specially designated Resource Group locations within the park boundary also include two remnants of the St. Johns Electric Railway Line. Sites 8SJ3483 (northern line) and 9SJ3531 (southern line), are still visible and were noted in the last professional survey (Stokes 1999) (Figure 7). Field-truthing with GPS revealed some discrepancies in the FMSF recording of the northern rail site location. It was determined that the original boundary of

8SJ3483 only captured the roughly east-west oriented linear feature. Using GPS ground-truthing, along with georeferenced 1960 historic aerials, we were able to add an additional portion of this railway line that curves off and serves as a connector to the linear resource group to the southeast (Figure 8). Updates for purposes of the model and for the FMSF will be submitted as part of this current project. Additionally, site extents and locations for the coquina quarry (8SJ69) and for the historic groin (8SJ3536) also revealed spatial discrepancies with the FMSF GIS data layers, and updates for these locations are included with our model development (Figure 8).

Results and Discussions

The archaeological sensitivity model development for Anastasia State Park included factors that took in a variety of environmental and cultural variables that account for the presence of sites through time and space and account for the variability of site types known to occur within the park as demonstrated through previous survey. A primary factor for cultural site locations in this park included the need for an understanding of the original land form configuration. Coastal Survey and other historical maps, early aerials, and data on shoreline erosion were of benefit to the present study, as was the use of LiDAR data that was available and used as part of the geodatabase development for a detailed understanding of elevation changes and

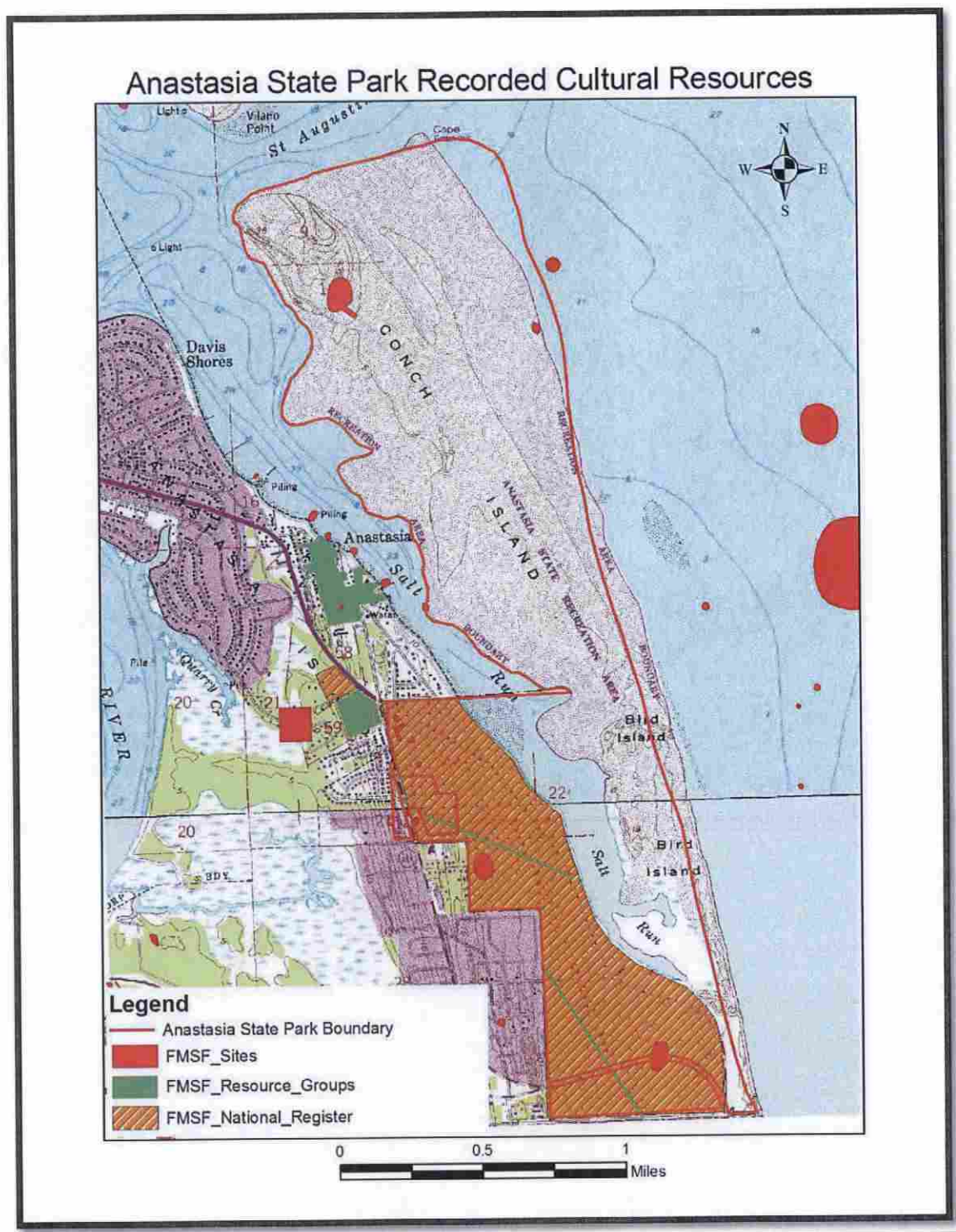


Figure 7. Florida Master Site File data show 11 archaeological sites within the Anastasia State Park including a large National Register area associated with Spanish coquina quarries and two special Resource Group areas relating to historic rail lines.

differences across the location. The present model was created for terrestrial site sensitivity only, although off-shore and near-shore modeling for the occurrence of historic shipwrecks is similarly possibly with different developed matrix values and corresponding data such as bathymetry and other remote sensing data. One area from the current model development that does potentially relate to non-terrestrial site potential is in the northern section of the park where historic maps and aerials indicate only a small extent of present land relates to the historical peninsula. At this northern section of the park, two known sites relating to historic shipwrecks occur, and directly correspond to where the inlet pass area historically was located. This region should be considered to hold potential for both terrestrial and submerged off-shore sites relating to historic shipwrecks (Figure 9).

Our terrestrial site model (Figure 10), when verified using the FMSF site location data, captures 10 of the 11 recorded sites in the designated high sensitivity areas. The only site that the model does not capture is a submerged historic shipwreck site location, which is located in an area that the model rules out due to land form modification. Using the aforementioned shipwreck sensitivity area, however, the site does fall within noted sensitivity allowances. Separate models for this park would be necessary to understand the potential for off-shore and near-shore sites relating to historic shipwrecks.

Again, these models are designed to be utilized as planning tools, for the understanding and visualization of archaeological sensitivity. These models offer an operational approach for management planning that considers cultural sensitivity, and can and should be used along with traditional archaeological approaches to more effectively target and survey areas. Additionally, these models can be used for land planning activities, noting potential conflict areas between resource planning and culturally sensitive areas.

Model Performance

Model performance testing is an important part of the development and refinement of archaeological sensitivity dynamics in GIS (Kvamme 2006:26). The model performance is relational to whether or not a site is likely to be present. To examine this question, an independent sample from those used to develop the model is the best choice. We are using the polygonal FMSF recorded archaeological site GIS layer as our sample to examine performance. The polygonal layer for sites is chosen because these data offer some understanding for the area occupied by archaeological features. Many GIS models rely on centroid point location to examine performance, however this has been found to not be the best choice, because there is no area assigned to point data and this provides an often inaccurate view of the model (Mink 2006:236). The FMSF maintains a polygonal data layer that provides digitized site boundary

Anastasia State Park Historic Shipwreck Potential Sensitivity Area

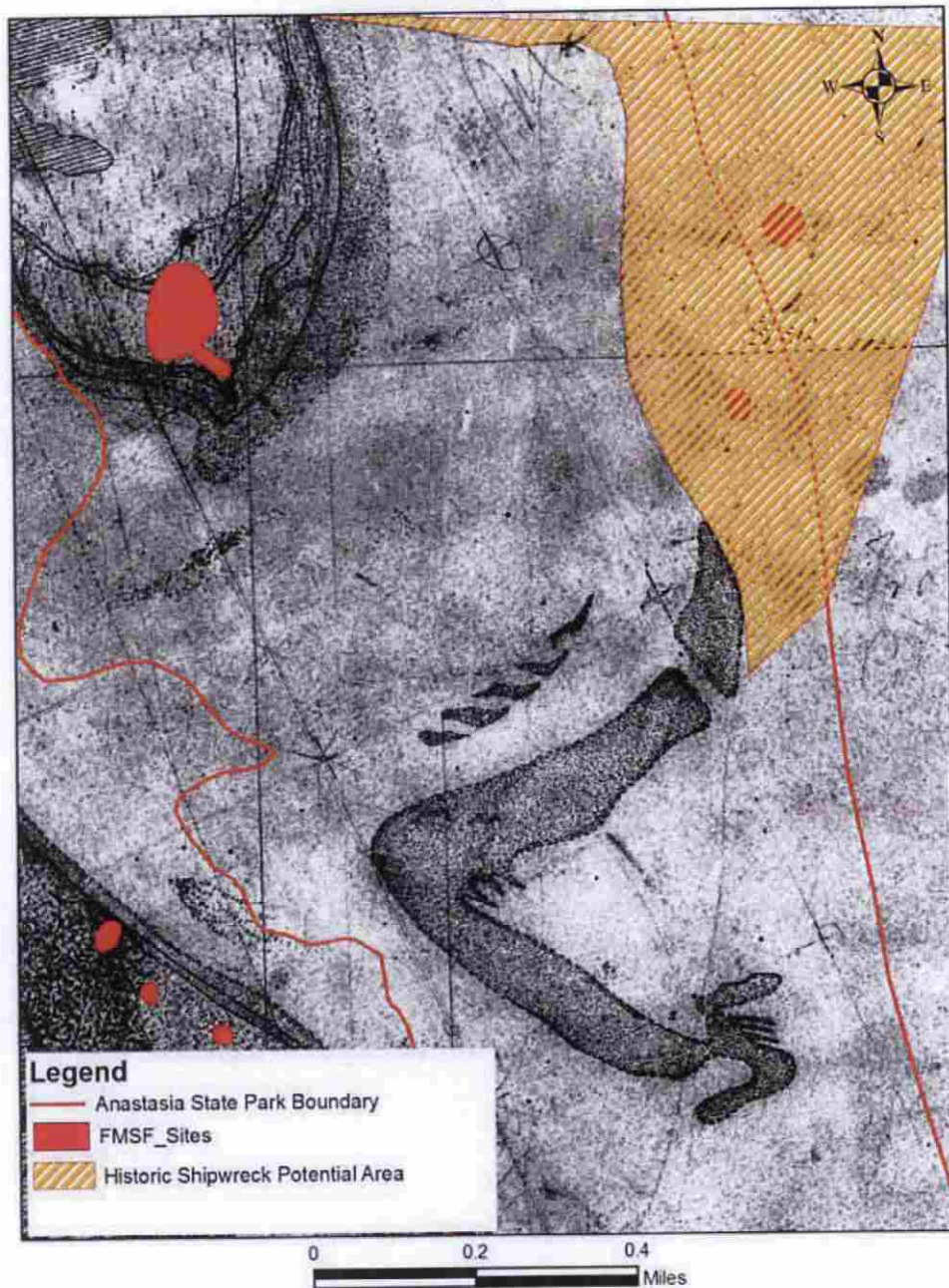


Figure 9. Digitized area showing historic inlet pass in relation to present day park boundary and near-shore area.

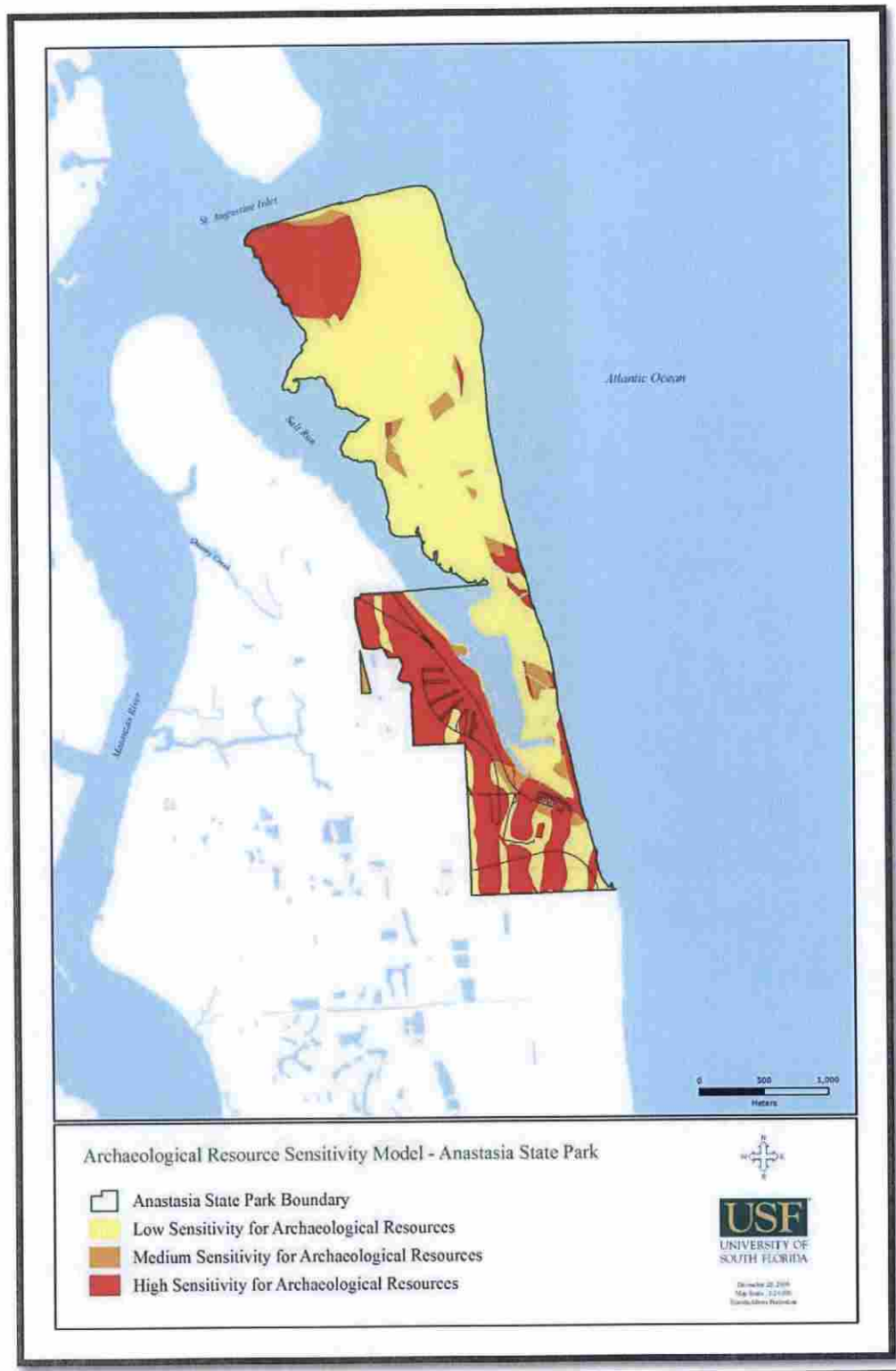


Figure 10. Map showing the archaeological resource sensitivity model developed for Anastasia State Park.

information as plotted from 1:24,000 scale topographic map data. These data provide a measure of surface area for archaeological phenomena across space, although there are limitations to the accuracy standards for these data. To test our model performance, we examined model area calculations in the GIS, and determined the total acreage covered by the model. Next, we determined the acreage associated with model factors of High, Moderate, and Low Archaeological Sensitivity. Once these calculations were made, we are able to consider the percentages of total model acreage associated with the High, Moderate, and Low categories. The same percentage of acreage attributed to phenomena was developed for archaeological site locations using the FMSF polygonal recorded site layer. These values were reported as a percentage of archaeological sites by acreage for the model (Table 1). In performing these calculations, we are able to examine percent correct statistics for archaeological occurrence within a model area, or the probability that a model specifies a site when one is known to actually be present given the area of its mapping (Kvamme 2006:27). Taking this a step further, we can look at the performance of the model as an improvement over chance occurrence in mapped areas for high sensitivity. For example, our model for Anastasia State Park correctly indicated 99.9% of known sites in a mapping that covers 33% of the model area. Therefore, using statistics ($p[MIS]-p[M]=.66$), our model represents a 66% improvement over chance of locating archaeological sites within our designated high probability area (Kvamme 2006:28). The need to not only apply a model, but to test its performance as we do here is a critical process that reduces self-fulfilling model confirmation (Dore 2006). For example, if we only look for sites in areas designated as high probability areas, we will only find sites in high probability areas. These developed models should be viewed as iterative processes, with the need to continue testing and refinement as we continue to learn more about regional archaeological dynamics, site locations, and archaeological survey strategies (both ground-based and remote sensing applications included).

Table 1. GIS model performance calculations for Anastasia State Park

Anastasia Sensitivity Model	Acres	Percent		FMSF Site Acres	Percent
High Sensitivity Area	431.38	33.08%		21.54	99.99%
Medium Sensitivity Area	63.57	4.87%			
Low Sensitivity Area	809.22	62.05%		0.01	0.01%
	1304.17	100.00%			

Faver-Dykes State Park

Environmentally, Faver-Dykes State Park falls within the St. Augustine Ridge Sets division, consisting of relic barrier island with beach ridges, and flatwoods and sandhills are present along these ridges (Myers and Ewel 1990). Primary hydrographic features include Pellicer Creek and the Matanzas River, associated stream, creek, swamp and tidal marsh areas. Faver-Dykes was last visited by professional archaeologists for assessment in 2003 (Newman 2003) and was surveyed in 2000 (Griffin 2000). FMSF data for location information were all normally plotted. A previous survey identified and corrected locations of sites in the northeast portion of the park (Johnson 1998), as part of a right-of-way study project. During this present work, ground control points were taken by AIST with GPS to establish baseline reference for use in comparison to FMSF data for accuracy and for georeferencing of other data. Because this site was surveyed with GPS more recently and the spatial data in the FMSF was all normally plotted, this verification was sufficient.

The FMSF lists seven recorded sites within the park boundary for Faver-Dykes State Park (Figure 11). The project area falls with the East and Central Archaeological Regions (Milanich 1994; Milanich and Payne 1993). This region had occupations ranging through the entire sequence of cultural periods for Precolumbian periods and extending into Seminole and historic occupations. Site locations within the park include the Pellicer Mound site (8SJ35), now known as the Rootan Branch site. This burial mound site was visited by Andrew E. Douglas in 1885 and recorded in the FMSF by John Goggin in 1952, but not accurately plotted. In 1990, Henry Baker visited the site and secured the location with the FMSF, however he broke the site into two components and A and B section inclusive of a 3-meter high mound and a smaller 1-meter high mound, with human remains noted (Florida Master Site File: 8SJ35). The survey in 2000 included metal detection, targeted and systematic excavation, and re-plotting, leading to a better understanding for the bounded extent of the site and historical contexts. The historical features are relating to the c.1817 Jose Mariano Hernandez land grant with a plantation known as Buena Suerte (Griffin 2000). Today, this two-part mound complex is listed as one site file number (8SJ35). The assessment of the location indicates previous issues with looting, largely relational to the public accessibility to the site, with the site now largely stabilized (Newman 2003).

Other sites within the park boundary include midden sites and surface artifact scatters such as 8SJ3133, that are multi-component sites showing Precolumbian and later historic colonial occupation, attributed to the presence of slave quarters associated with the Carter Plantation (c. 1792-1803) that is today interpreted along the trail to Hemmings Point near Pellicer Creek (Griffin 2000). Two other sites were found in the southern section of the park during the 2000

Faver-Dykes State Park Recorded Archaeological Sites

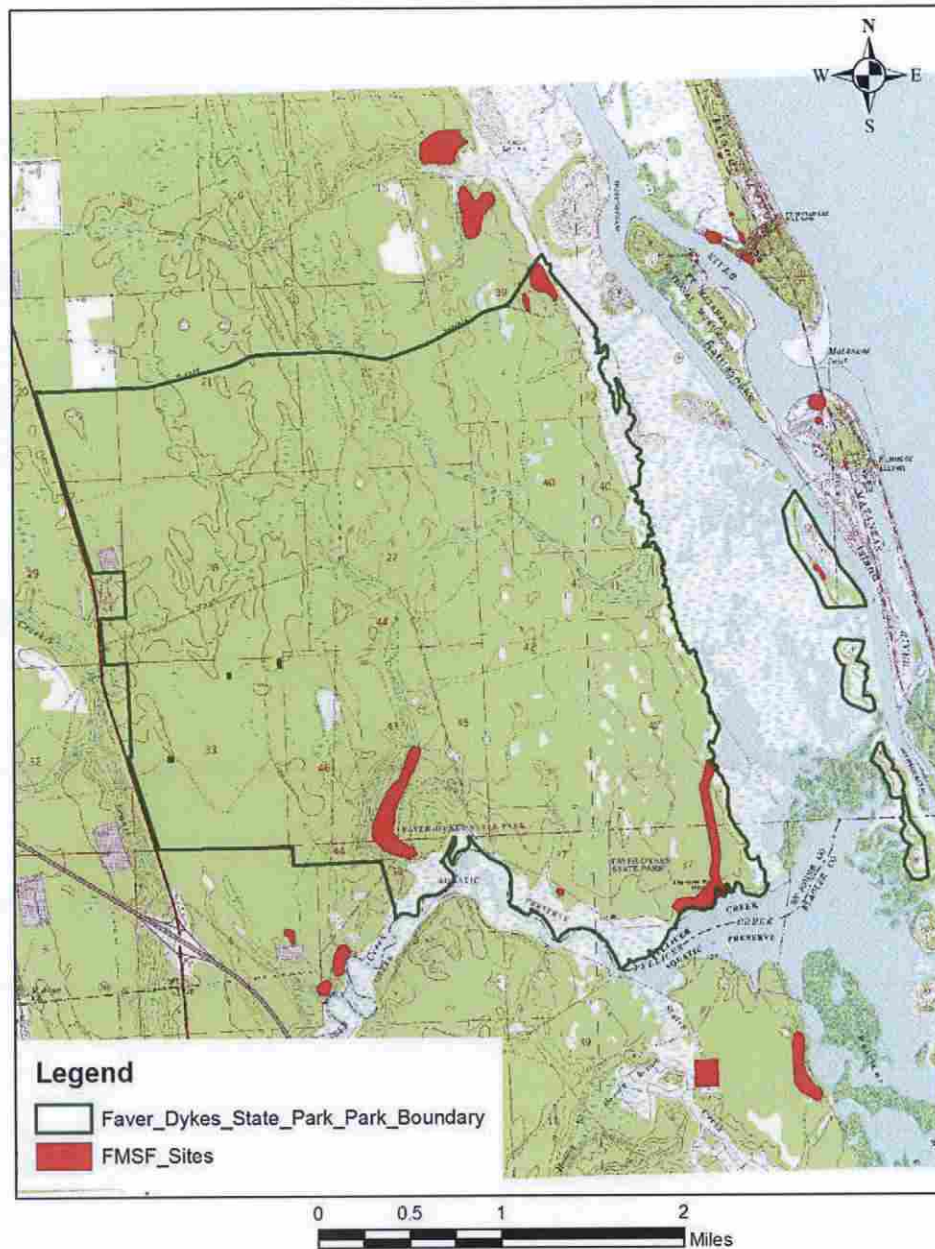


Figure 11. Florida Master Site File data show 7 archaeological sites within the Faver-Dykes State Park

survey, 8SJ3742 and SJ4990. 8SJ3742 is a surface scatter of ceramic materials identified as St. Johns Plain. This site is located on higher elevation near the north bank of Pellicer Creek (Griffin 2000:66). The SJ4990 site was recorded with the FMSF in 2002 during a walking reconnaissance to establish a trail at the park. The metal and brick scatter was thought to relate to British or Spanish period (Florida Master Site File: 8SJ4990). Two northern extent sites within the park boundary include 8SJ3152 and SJ3153, both located on slight elevation rises bordering tidal marsh associated with the Matanzas River. These locations are found to be in poorly drained soil areas, and contain dense shell midden materials. The SJ3152 was re-plotted from an incorrect location description from a local informant who had previously recorded the site. The site yielded ceramic artifacts indicating St. Johns II affiliation, but the site had been heavily damaged by fire-lane plow lines and erosion (Johnson 1998). The SJ3153 site is also a shell midden with a recorded occurrence of St. Johns checked pottery. This site was also heavily impacted by fire line plowing and pine plantation activities (Johnson 1998). One recorded island site, the Hernandez Island Site (8SJ3740), is recorded and is associated with an upland elevated area on an island adjacent to the Matanzas River and the Intracoastal water way. The site location is based on exposed midden materials on the ground surface.

Results and Discussions

The archaeological sensitivity model development for Faver-Dykes State Park included factors that took in a variety of environmental and cultural variables that account for the presence of sites through time and space and account for the variability of site types known to occur within the park as demonstrated through previous surveys. A primary factor for cultural site locations in this park included the presence of hydrographic features including Pellicer Creek and Matanzas River and the tidal marshes and fresh water swamps associated with these features. Early General Land Survey Office maps and other historical maps were of benefit in checking landform configurations and reviewing land use and modification through time. Professional surveys that included investigation into the historical contexts of sites within the park boundary were also useful.

Our archaeological resource sensitivity model for the park is shown at a 1:24,000 scale and is depicted in two separate maps showing the main inland park area and the island land holdings (Figures 12 and 13). When these models are verified using the FMSF polygonal site location data, the model captures six of seven recorded sites in the designated high and medium sensitivity areas. The model misses one midden site (8SJ3152) in the northern extent of the property boundary, due to the poor drainage characteristics of the soil noted in the SSURGO data layer (Table 2). Other sites also partially fall in medium and low probability areas, due to their polygonal extents (some of which are not thoroughly verified spatially).

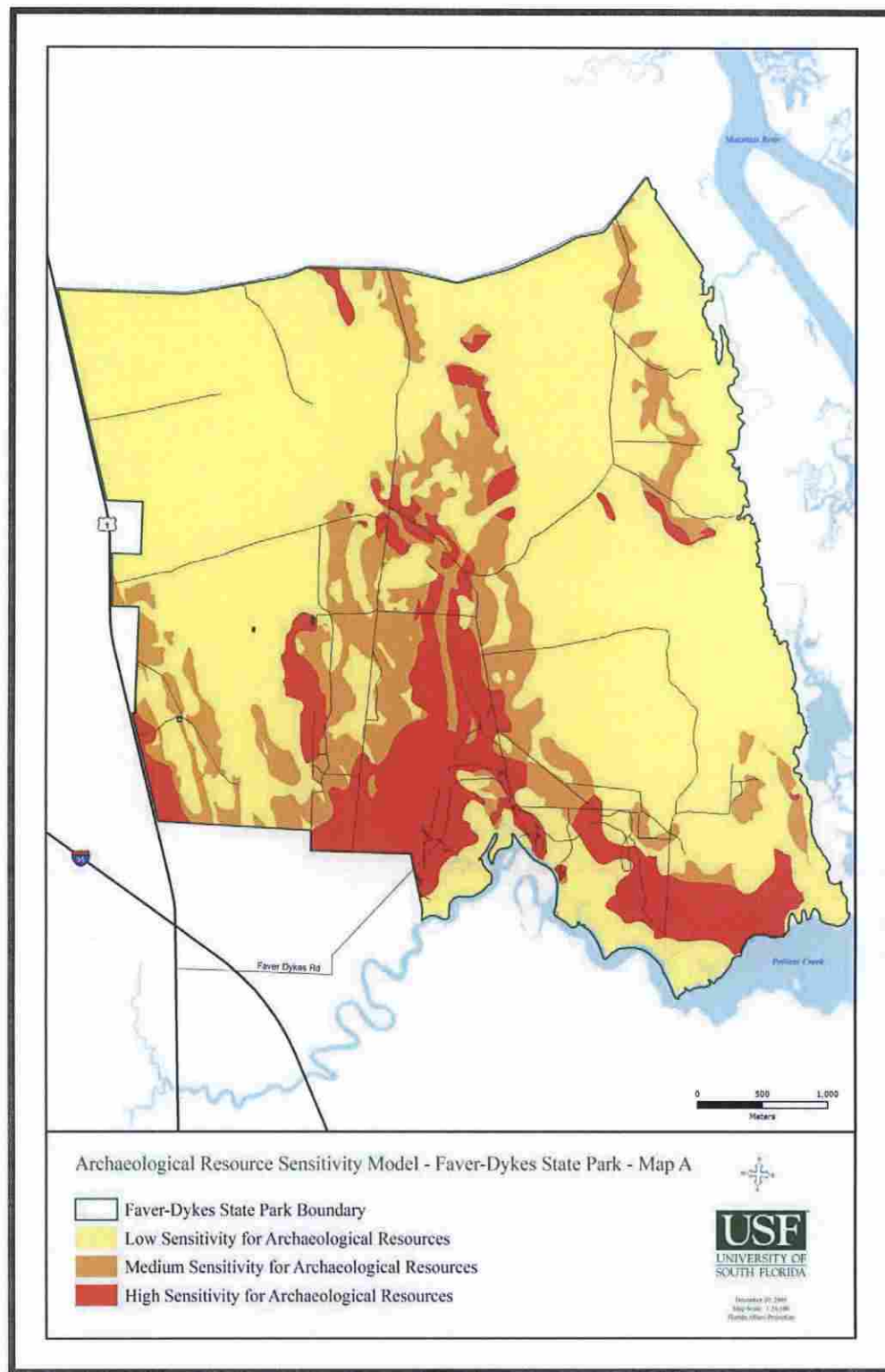


Figure 12. Map showing the archaeological resource sensitivity model developed for mainland area of Faver-Dykes State Park

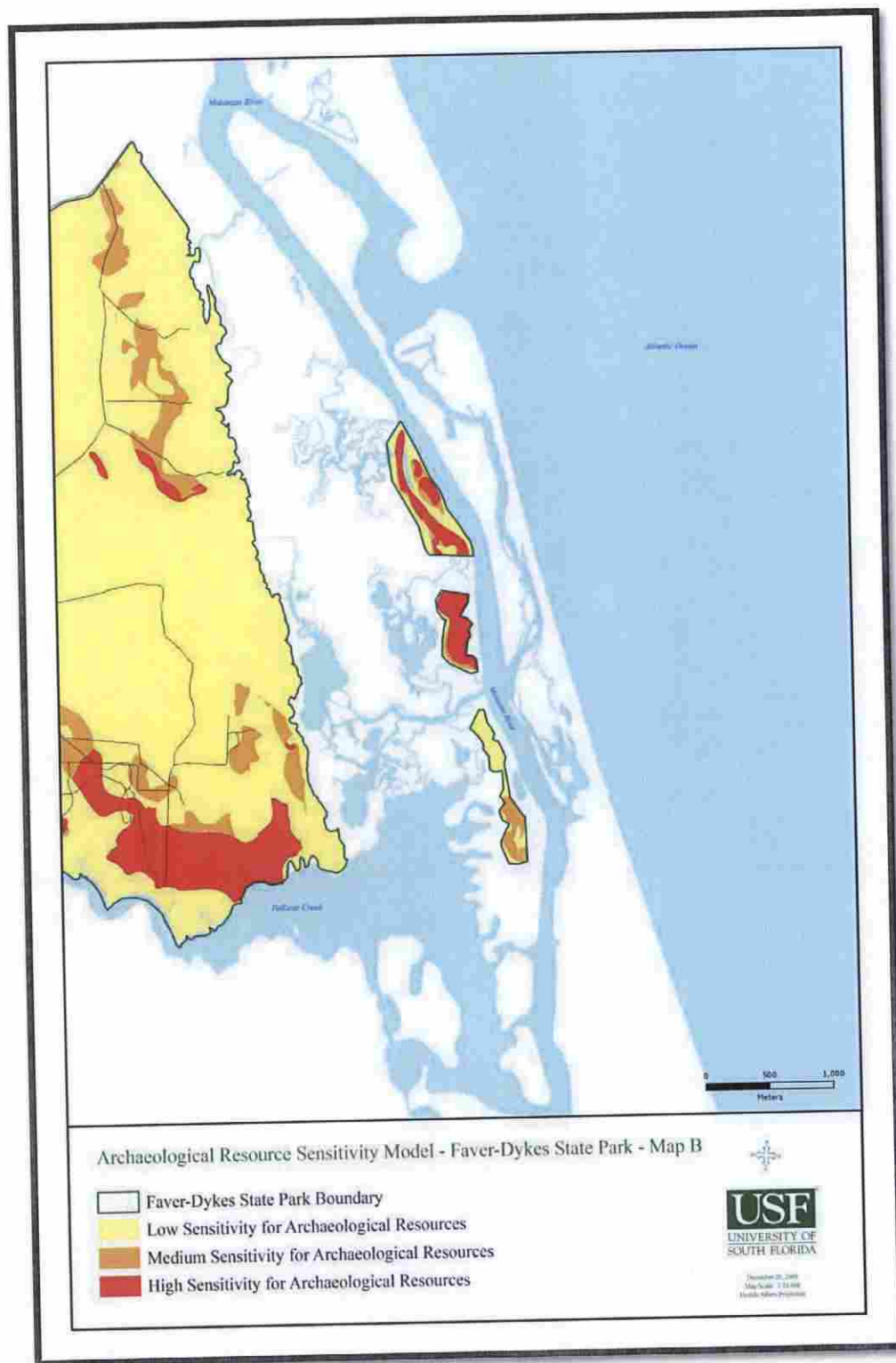


Figure 13. Map showing the archaeological resource sensitivity model developed for island areas that are part of Faver-Dykes State Park

Model Performance

Using the same approach for model performance testing at Faver-Dykes State Park as previously applied to Anastasia, we examined model area calculations in the GIS, and determined the total acreage covered by the model to be 6,025.3 acres. Next, we determined the acreage associated with model factors of High, Moderate, and Low Archaeological Sensitivity. Once these calculations were made, we are able to consider the percentages of total model acreage associated with the High, Moderate, and Low categories. The same percentage of acreage attributed to phenomena was developed for archaeological site locations using the FMSF polygonal recorded site layer. These values were reported as a percentage of archaeological sites by acreage for the model (see Table 2). In performing these calculations we are able to examine percent correct statistics for archaeological occurrence within a model area, or the probability that a model specifies a site when one is known to actually be present given the area of its mapping (Kvamme 2006:27). Taking this a step further, we can look at the performance of the model as an improvement over chance occurrence in mapped areas for high sensitivity. For example, our model for Faver-Dykes State Park correctly indicated 64.32% of known sites in a mapping that covers 13.5% of the model area. Therefore, using statistics ($p[MIS]-p[M]=.51$), our model represents a 51% improvement over chance of locating archaeological sites within our designated high probability area (Kvamme 2006:28).

Table 2. GIS model performance calculations for Faver-Dykes State Park

Faver-Dykes Sensitivity Model	Acres	Percent		FMSF Site Acres	Percent
High Sensitivity Area	812.74	13.49%		57.17	64.32%
Medium Sensitivity Area	913.22	15.16%		6.87	7.73%
Low Sensitivity Area	4,299.34	71.35%		24.85	27.95%
	6025.3	100.00%		88.89	100.00%

Sebastian Inlet State Park

There are currently 14 known cultural resource site locations within the boundary of this park that range from the prehistoric period to the mid-20th century, with an additional 8 sites located off shore outside the purview of this current model. Ten of the 14 terrestrial sites are located in the dune line along the shore ecotone that consists of the dune/strand/maritime hammock communities (Florida_Department_of_Environmental_Protection 2008). Many of the sites relate to the influence of the Spanish and Spanish Plate Fleet in the region, and there are artifacts from this period on display at the adjacent McLarty Museum. Three professional published surveys (two of which were maritime interest surveys and another which was a

modeling or pre-GIS synthesis project for areas inclusive of the northern Brevard County portion of this region) have been conducted, along with Irving Rouse's pivotal work in the region that recorded nine sites within the present day park boundary (Abt, et al. 2003; Bense and Phillips 1990; Mistovich 1986; Rouse 1951). No professional, modern archaeological ground survey has been conducted at Sebastian State Park. Several amateur excavations led to garnering the interest of Rouse and other archaeologists who worked in the area including Charles S. Allen who conducted excavations in 1893 of the mound site of 8BR124 that was last examined by John Goggin in 1946. Our GPS work included bounding 8BR125, a prehistoric midden said to contain human burials. This site showed indication of previous looting, but no fresh suggestions of such activities were noted. Sites 8IR26 and 8IR42 at the southern most end of the park were also recorded, and had slightly different spatial locations as provided in the FMSF (Figure 14). Sites 8IR35, 8IR36, and 8IR37 and 8BR124 were not relocated by the PI's and park staff, with the possibility that these sites were lost to historic land alteration and road construction. In the vicinity of site 8BR1694, a small ceramic scatter, a historic well head location was found and recorded with GPS with information to be provided to the FMSF. Location data for archaeological resources were last updated by park officials in 1997 and provided to the FMSF as part of their unit management planning process.

Historical landform data was digitized using a USGS Coast Survey 1880-81 of the Shores of Indian River. This map was georeferenced and the original landform surfaces were digitized and used in the model matrix. The ability to verify the location of historic land surfaces strengthens the cultural resource sensitivity model for Sebastian Inlet State Park. Historical modification of the inlet area has also created extensive changes to the land surface configuration in this area (Figure 15). Historical land surface modifications were thus defined and scored according to the matrix.

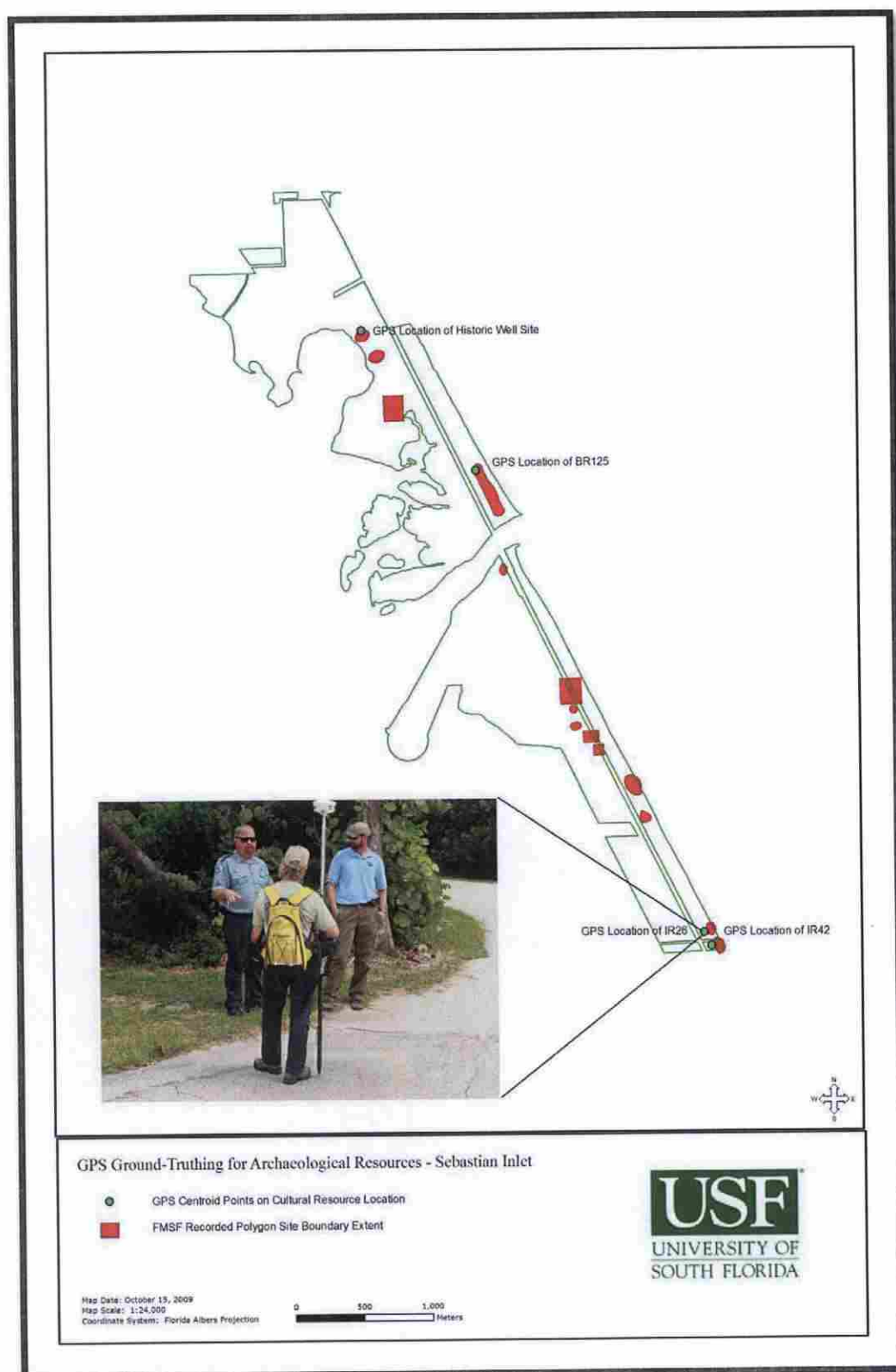


Figure 14. GPS Location Survey Map for Sebastian Inlet State Park



Figure 15. 1965 bridge opening showing the modification of the inlet area at Sebastian Inlet State Park

Results and Discussions

The archaeological sensitivity model development for Sebastian Inlet State Park included factors that took in a variety of environmental and cultural variables that account for the presence of sites through time and space and account for the variability of site types known to occur within the park as demonstrated through previous surveys. A primary factor for cultural site locations in this park included the original land configuration, and land modification changes through time, such as occurred with the inlet area of the park. Data layers, such as the National Wetlands Inventory used in the model creation reflect the extents of wetlands that are now eroded and adjoining the coast itself. The GPS field truthing and ground control points

were useful not only in the verification of environmental phenomena, but assisted in the verification of FMSF spatial data. The NOAA 1-ft. LiDAR data available for this park area was of importance to the model development in the examination of land modification, showing areas of present modification where there is FMSF data on previously noted archaeological occurrence.

Historical landform data was digitized using an 1880-81 US Coast Survey of the Shores of Indian River from Sebastian Creek to the Narrows. This map was georeferenced and the original landform surfaces were digitized and used in the model matrix. Much of the present-day land area in this park has been modified since 1880, and the ability to verify the location of historic land surface strengthens the cultural resource sensitivity model for Anastasia State Park (Figure 16).

Model Performance

Our archaeological resource sensitivity model for the park is shown at a 1:24,000 scale (Figure 17). When this model is verified using the FMSF polygonal site location data, the model captures 11 out of 14 recorded sites at least partially, in the designated high and medium sensitivity areas. The model misses sites primarily due to their recording on the FMSF as general vicinity and having large vaguely defined spatial extents. These problems with the accuracy of site boundaries also show up with several sites occurring in more than one sensitivity zone. Expressed as spatial percentages, the high archaeological resource sensitivity area at Sebastian only accounts for 10.25% of the land surface area (Table 3), however, more than 37% of the recorded archaeological spatial extents are found to correlate with these modeled areas, representing a 27% improvement over chance of locating archaeological sites within our designated high sensitivity area (see Kvamme 2006:28). Other sites also partially fall in medium and low probability areas, due to their polygonal extents (some of which are not thoroughly verified spatially), and two recorded sites are associated with land that has been historically modified, and therefore ranks lower in the matrix evaluation using present-day conditions.

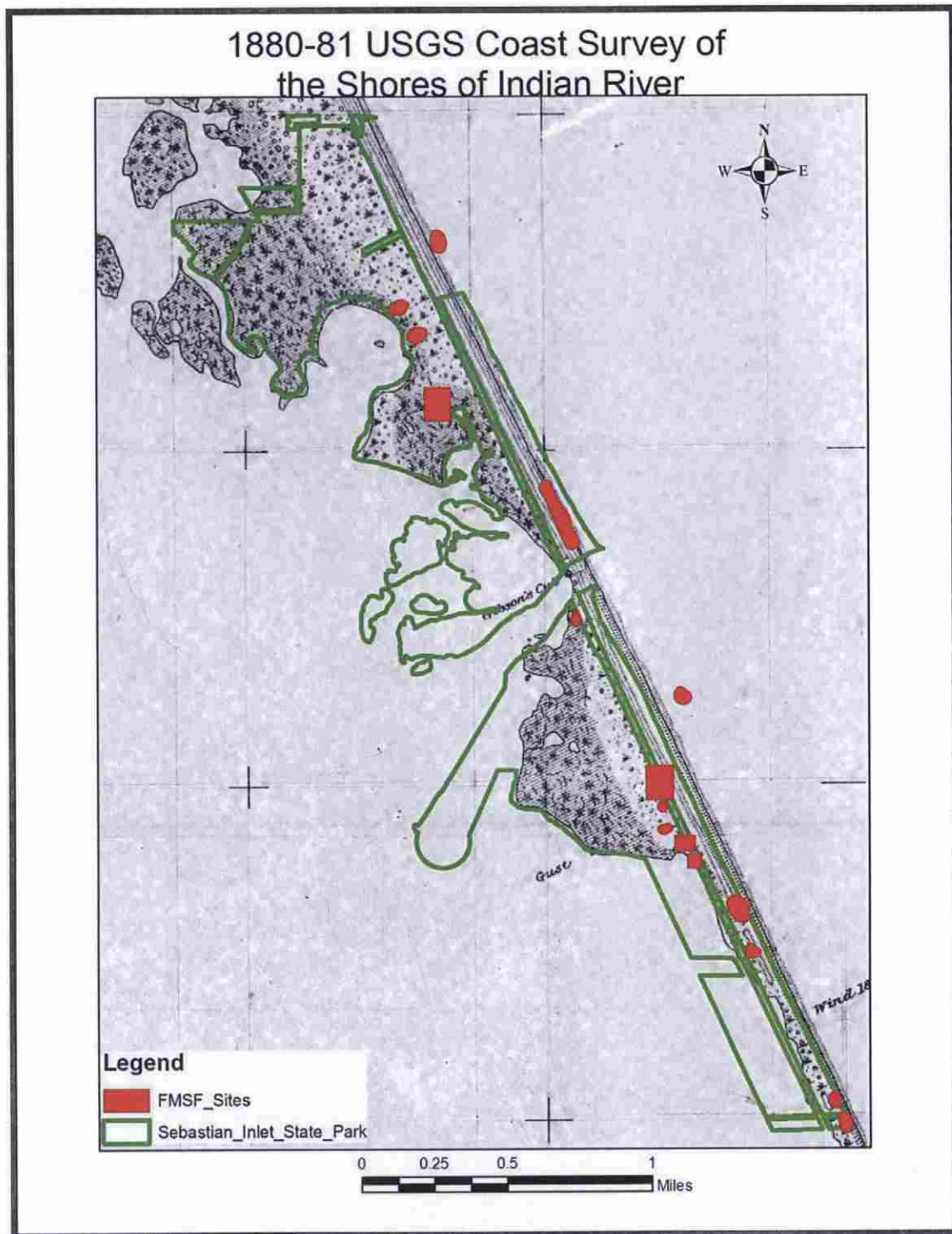


Figure 16. USGS Coast Survey Map from 1880-81 georeferenced to show Sebastian State Park and the FMSF recorded archaeological site locations

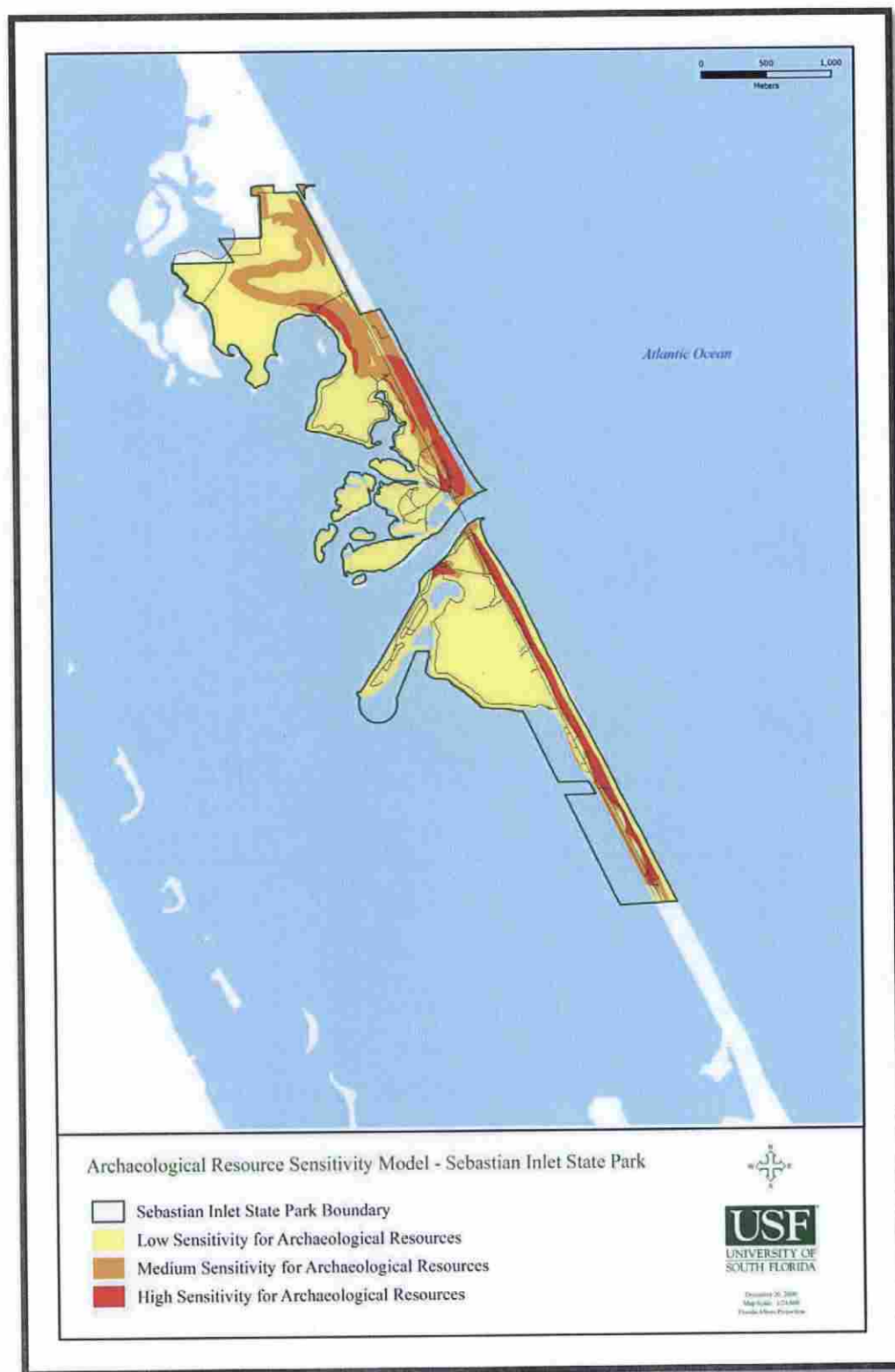


Figure 17. Map showing the archaeological resource sensitivity model developed for Sebastian State Park

Table 3. GIS model performance calculations for Sebastian State Park

Sebastian Inlet Sensitivity Model	Acres	Percent		FMSF Site Acres	Percent
High Sensitivity Area	87.07	10.25%		15.18	37.29%
Medium Sensitivity Area	143.74	16.92%		2.55	6.26%
Low Sensitivity Area	618.83	72.83%		22.98	56.45%
	849.64	100.00%		40.71	100.00%

North Peninsula State Park

Although no professional published survey for archaeological resources has been conducted within the North Peninsula State Park, Christine Newman with the CARL program performed a site visit and verified archaeological resources in the park in 2005. Her notes from those visits are the basis for the FMSF designation and number assignments and copies of her field notes provided to the park were also shared with us for our present location assessment. Eight prehistoric and historic feature locations were collected with GPS. The FMSF shows 10 archaeological sites defined within the park boundaries, however this is because they have records of two midden sites (8VO65 and 8VO66 – Halifax Midden 2 and 3) that were assigned a single FMSF number of 8VO256 (Halifax Creek Midden). The 8VO256 polygon extent for the site is more accurate. Our field data collection included site boundaries and scatter extents that had not previously been documented. A brick pile area noted during the CARL survey as 8VO7452 falls within the polygonal location for another historic debris listed site boundary (8VO7182). The brick piles appear to relate to brick manufacture and perhaps kiln workings, with CARL notes indicating that a local informant says the bricks were related to a failed development on the site in the 1920s. Again, errors noted in site locations were documented. The largest discrepancy appears to relate to the 8VO7315 (Gamble Boiler) site, which is plotted incorrectly in the FMSF and will be submitted for location correction (Figure 18).

Results and Discussions

Historical landform data was digitized using an 1873 USGS Coast Survey that was conducted for the head of the Halifax River and vicinity. This map was georeferenced and the original landform surfaces were digitized and used in the model matrix. The interior Halifax River border to the park has experienced alteration historically and is reflected in the sensitivity modeling (Figure 19). This park features higher elevated dune and ridge systems that are conducive to settlement areas for prehistoric and historic peoples. Extractive coquina resources and clays used in the production of historic bricks are also favorable in particular on the north end of the

property. Riverine resources combined with coastal proximity in the southern portion of the park have settlement including large shell midden deposits. Systematic, professional survey in this park could assist with further refining the high sensitivity portion of the model. In particular, available 1Ft. LiDAR data, included as part of this modeling effort, can be used now to isolate discrete extant mound and midden locations and greatly refine a Phase 1 field survey of the park (Figure 20). Remote sensing efforts utilizing LiDAR is in this way a method of direct discovery, meaning that we can make improvements over merely modeling for sensitivity, by instead directly locating archaeological resources through such means. Use of direct discovery methods combined with field verification and field testing can greatly enhance our understanding of the past and is complimentary to sensitivity modeling efforts (Kvamme 2006). Large areas of high and moderate sensitivity can be further refined for North Peninsula State Park through these combined efforts.

Model Performance

Our archaeological resource sensitivity model for the park is shown at a 1:24,000 scale (Figure 21). When this model is verified using the FMSF polygonal site location data, the model captures 7 out of 8 recorded sites at least partially, in the designated high and medium sensitivity areas. The model misses sites primarily due to their polygonal extent recording on the FMSF showing large and vaguely defined spatial extents. Expressed as spatial percentages, the high archaeological resource sensitivity area at North Peninsula accounts for 74.36% of the land surface area (Table 4), with nearly 87% of the recorded archaeological spatial extents correlating with these modeled areas, representing a 13% improvement over chance of locating archaeological sites within our designated high probability area (see Kvamme 2006:28). The high sensitivity designated area at North peninsula State Park can be best refined by conducting a Phase 1 archaeological field survey that combines field verification with use of the model and direct remote sensing observations using high resolution aerals and LiDAR data.

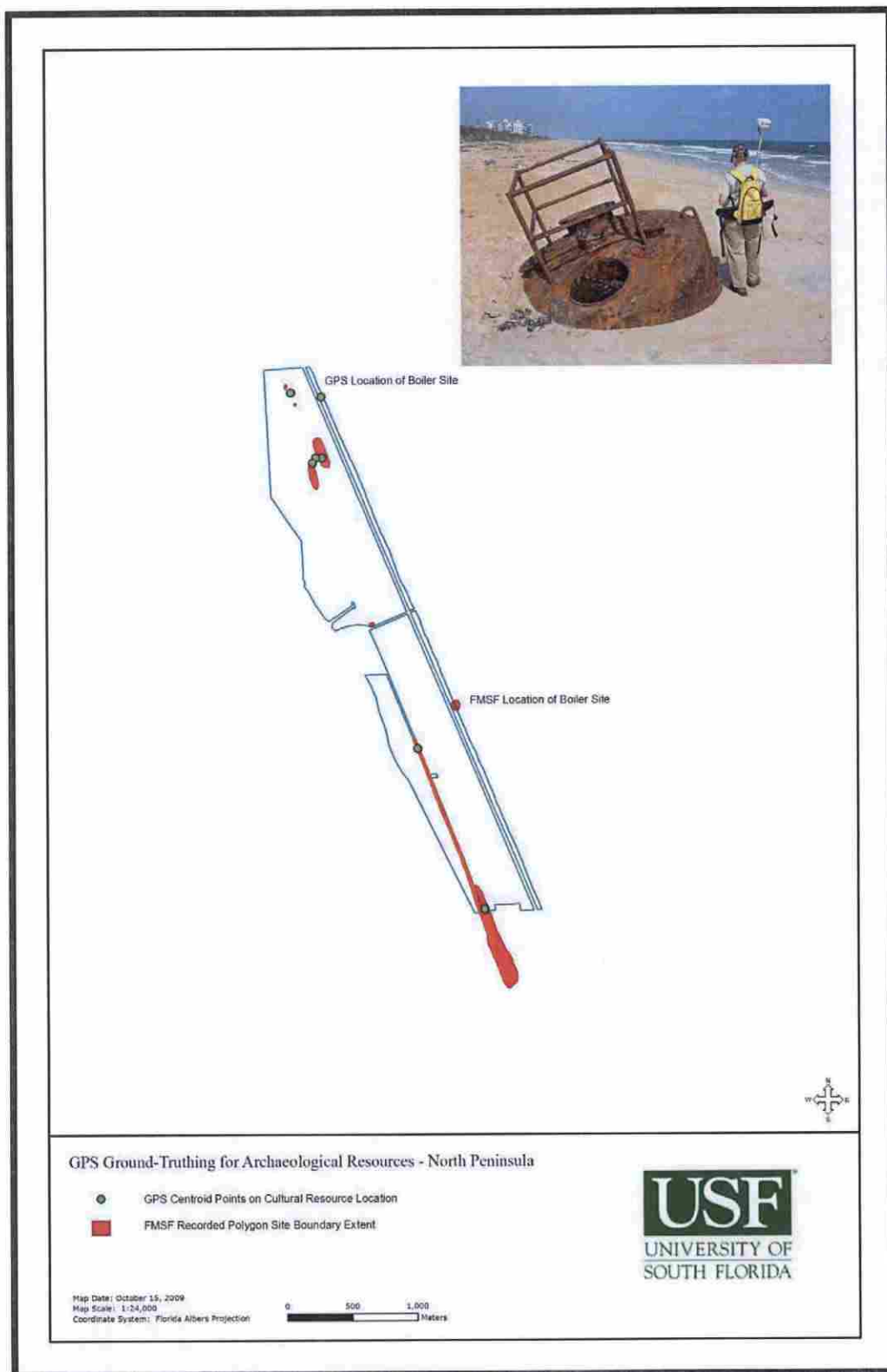


Figure 18. GPS Location Survey Map for North Peninsula State Park

1873 US Coast Survey - North Peninsula State Park

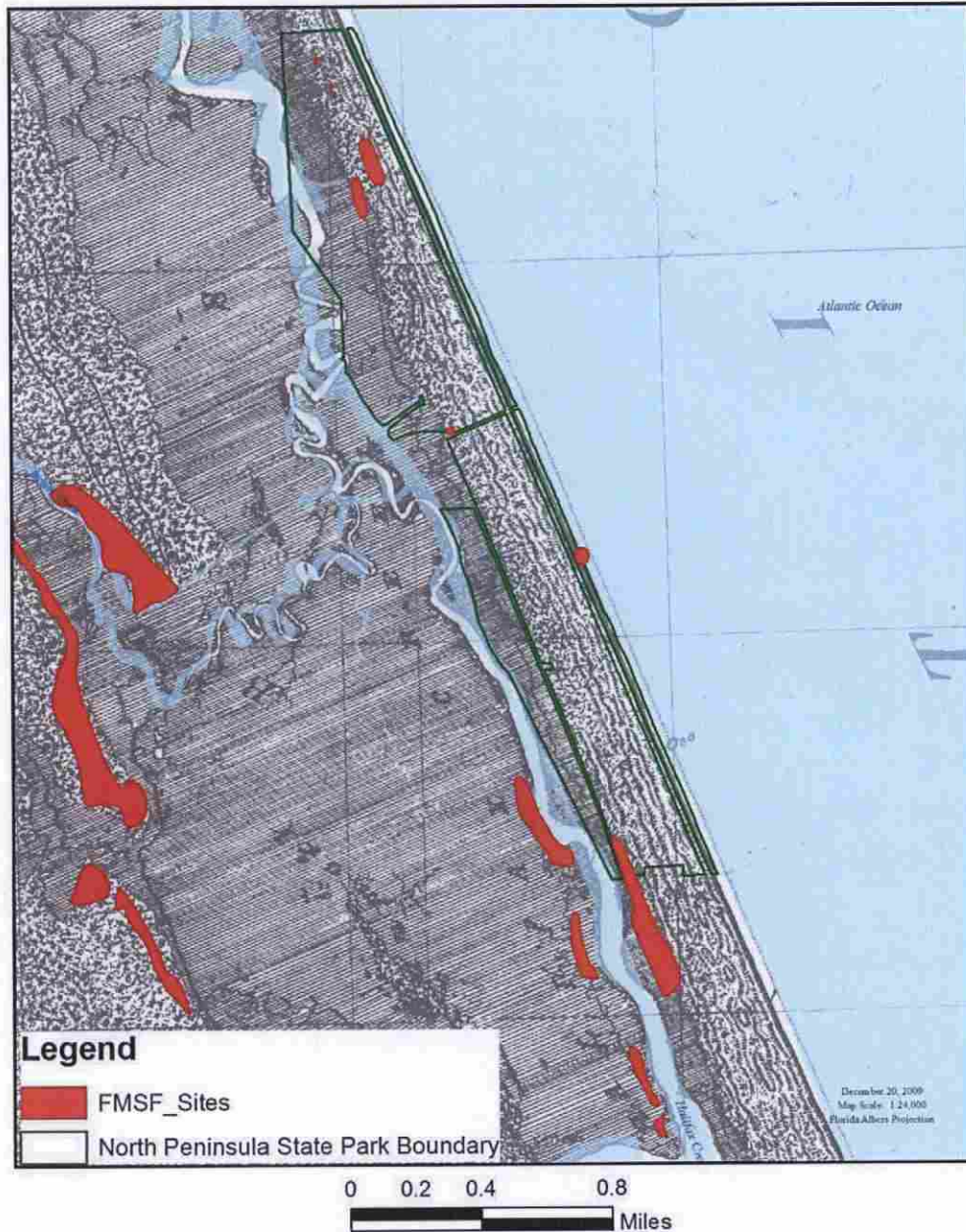


Figure 19. Map showing the FMSF recorded archaeological sites in relation to the 1873 USGS Coast Survey of the region surrounding North Peninsula State Park

LiDAR Data for Remote Sensing
Survey Applications,
North Peninsula State Park



Figure 20. LiDAR data for North Peninsula State Park showing three areas that could contain unrecorded cultural resources based on their contour signatures

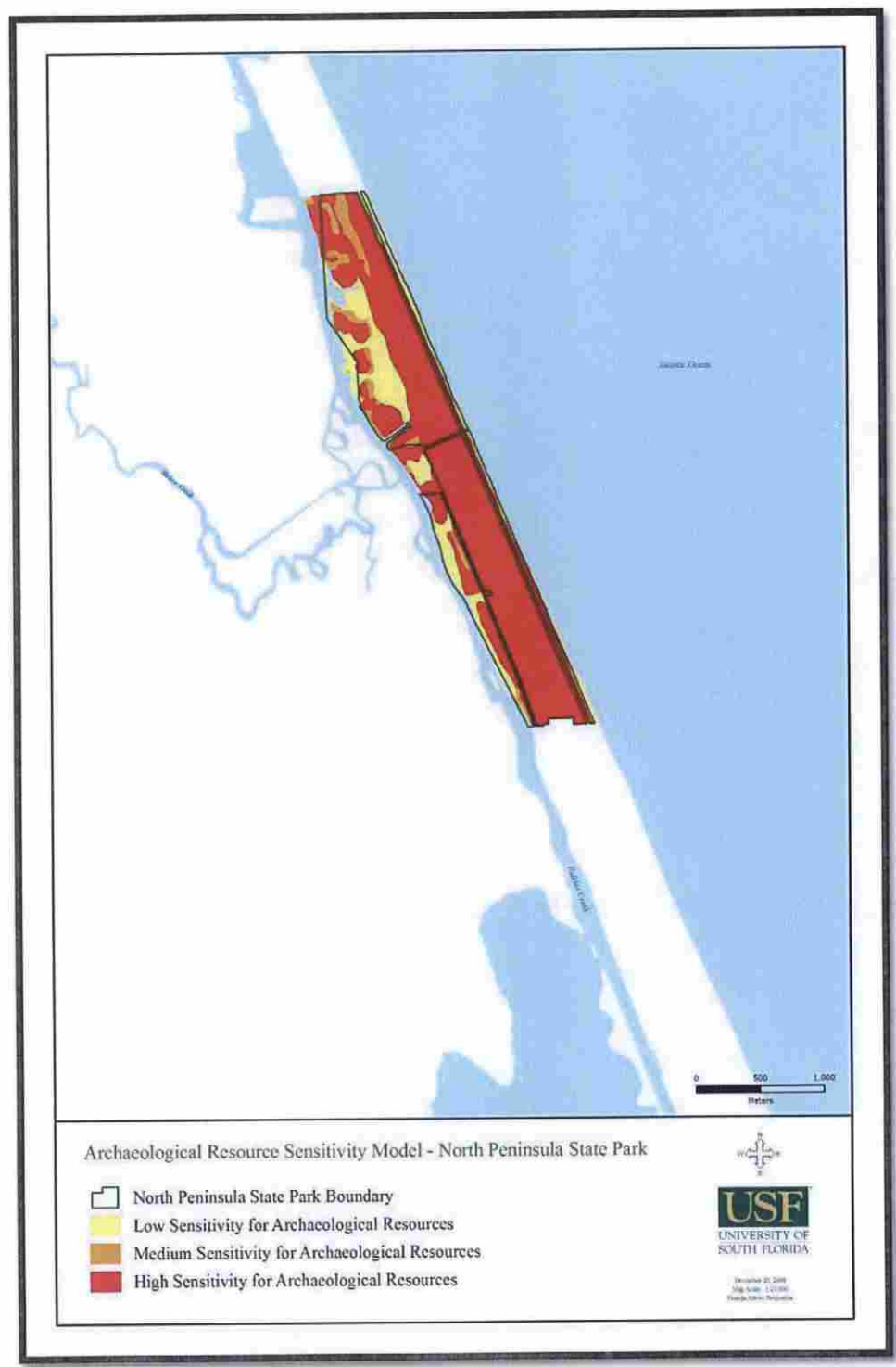


Figure 21. Map showing the archaeological resource sensitivity model developed for North Peninsula State Park

Table 4. GIS model performance calculations for North Peninsula State Park

North Peninsula Sensitivity Model	Acres	Percent		FMSF Site Acres	Percent
High Sensitivity Area	471.36	74.36%		9.26	86.70%
Medium Sensitivity Area	42.87	6.76%		0.53	4.97%
Low Sensitivity Area	119.71	18.88%		0.89	8.33%
	633.94	100.00%		10.68	100.00%

Colt Creek State Park

No professional archaeological survey has ever been conducted at Colt Creek State Park. There is one site recorded on the FMSF as possibly occurring at least partially within the boundary of the Colt Creek State Park. The Mark Overstreet site, 8PO215, is shown as general vicinity in its location. The site is listed as a prehistoric lithic scatter, found along the edge of a borrow pit that was mined for sand in the 1970s. The site was recorded in 1981 by Calvin Jones, who was conducting a larger regional survey in the vicinity. The recording is based on local informant information that numerous projectile points came from the borrow pit site during its operation in the 1970s. The site is more than half destroyed from these activities, but Jones still recorded observing a number of lithic flakes on the surface. This site is today within the park optimum boundary for land acquisition, although the FMSF shows a broad polygon extending into the present-day park boundary (Figure 22). Due to water in this area, we were unable to secure a GPS position on the location, and this site should be revisited and spatially recorded and updated for the FMSF. However, using aerial imagery available for the site, along with contour data and geological feature (karst) data in combination with Jones' description, a much more circumscribed location can be determined (Figure 23).

The park lands have been greatly disturbed and historically modified, primarily in an effort to drain and ditch the Green Swamp and associated wetlands in this area. The Green Swamp is a designated Area of Critical State Concern, largely due to its high potential for ground water recharge and the critical habitat found there such as its large stands of pinelands and hardwood forests, freshwater marshes and prairies, cypress domes, and mixed swamp forests (Division_of_State_Planning 1974). Other land alteration activities from the early 20th century that occurred in the Colt Creek State Park vicinity included lumber and timber harvest operations, creation of pasture for cattle, citrus and other agricultural crops such as watermelon, and mining for sand and for peat (Johnson 1986; Barry R. Wharton 1984).



Figure 22. Map showing the present park boundary and optimum boundary for Colt Creek State Park in relation to the general vicinity location of site 8PO215

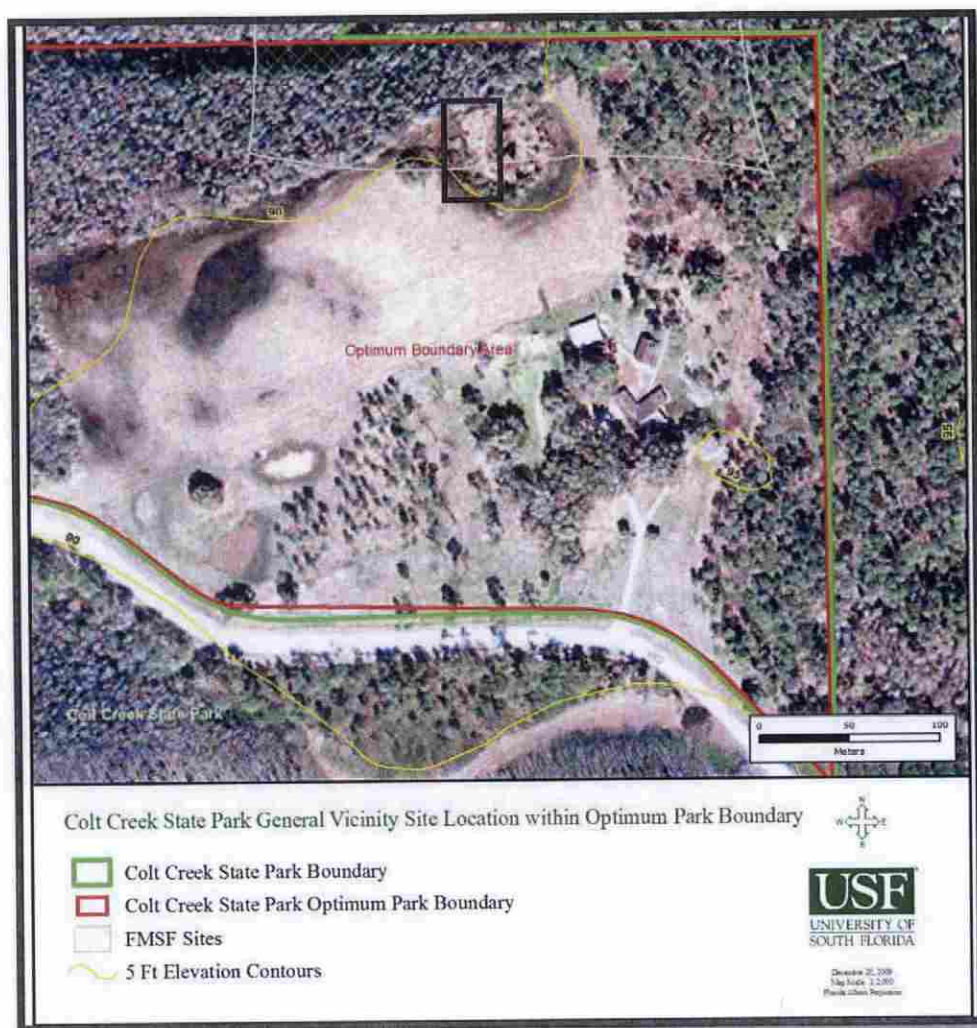


Figure 23. Map showing the likely location of site 8PO215 based on description by Calvin Jones in 1981, as being associated with a borrow pit in this general vicinity. Using high resolution aerals, this borrow pit can be better defined today even in the absence of re-visitation. Jones further reported that the site was primarily associated with the western edge of the borrow pit, which again can be delineated utilizing aerals

Professional surveys and research in the Green Swamp area have recorded sites largely associated with the influential Withlacoochee River corridor, which runs to the North of the Colt Creek tract, and with areas of relatively higher elevation than surrounding lands on knolls and ridges, and with karstic sinkhole features. These sites, recorded on the FMSF include Archaic lithic extraction and work sites and camp locations, often associated with chert outcrops that are found within the region (Milanich 1994; Piper 1980; Barry R. Wharton 1984). Mound and midden features from multiple temporal affiliations are also known in the region, associated with riverine and bayhead environmental settings, and also found in the vicinity of permanent lake and water sources (Mitchem 1989; Barry R. Wharton 1984). Models for

prehistoric human occupation in the area have focused primarily on soil type, distance to water features, and vegetative community differences. As water is ubiquitous, water drainages such as the Withlacoochee and larger tributaries were highly considered as favorable for settlement, as was the presence of lithic outcrop areas (Johnson 1986:53). Seminole period sites and travel corridors are also known in the Green Swamp region (Weisman and Marquardt 1988).

In consideration of other historic site types, drainage and resource-related activities are of consideration in the present model, with early agricultural activities relating to timber, turpentine, cattle, and tree and plant crops important to the cultural understanding of settlement in the region. Local informants and historical accounts attest to the turpentine activities, with collection and transportation from Colt Creek locales to nearby historic town location of Lumberton for distillation (Overstreet 2004; SWFWMD 2009). Numerous cat-faced trees stand today as evidence of the turpentine activities that once occurred on the property.

Results and Discussion

As part of the present model development and site visit, GPS points were taken of current park buildings, possible historic building sites, three separate locations along a narrow gauge historic rail bed, and at cleared agricultural field areas that were associated with early agriculture activity within the park boundary (Figure 24). The narrow gauge rail is said to have existed historically to move lighter tree stumps from the property for the production of dynamite. A valuable resource for the present modeling is in the use of historic maps and surveys produced in the area, primarily by the General Land Survey Office (GLO), who were in the Green Swamp in the 1840s and 50s (B.R. Wharton 1984). The maps produced often provide valuable details pertaining to pre-settlement coverage and prior to major drainage and terrain alterations that occurred in the Colt Creek vicinity. The approach taken for the Colt Creek modeling was to use the GLO survey to examine and digitize in water drainage features, trails, and land coverage found to occur prior to the early 20th century alteration. Also of noted value were USGS topographical maps that showed early rail systems and improved and unimproved roads that cross the site. These features were also digitized to provide a proxy understanding for historical settlement, land use and occupation in the area. Our GPS work conducted at the site also consisted of mapping in road and trail features, rail beds, fence lines, and areas of improved pasture, and verifying their location against historical referents (Figure 25). Also of value was the Florida Natural Communities GIS data layer that was used to identify the likelihood of historic land use activities. The category ruderal is land that has been altered to such a degree

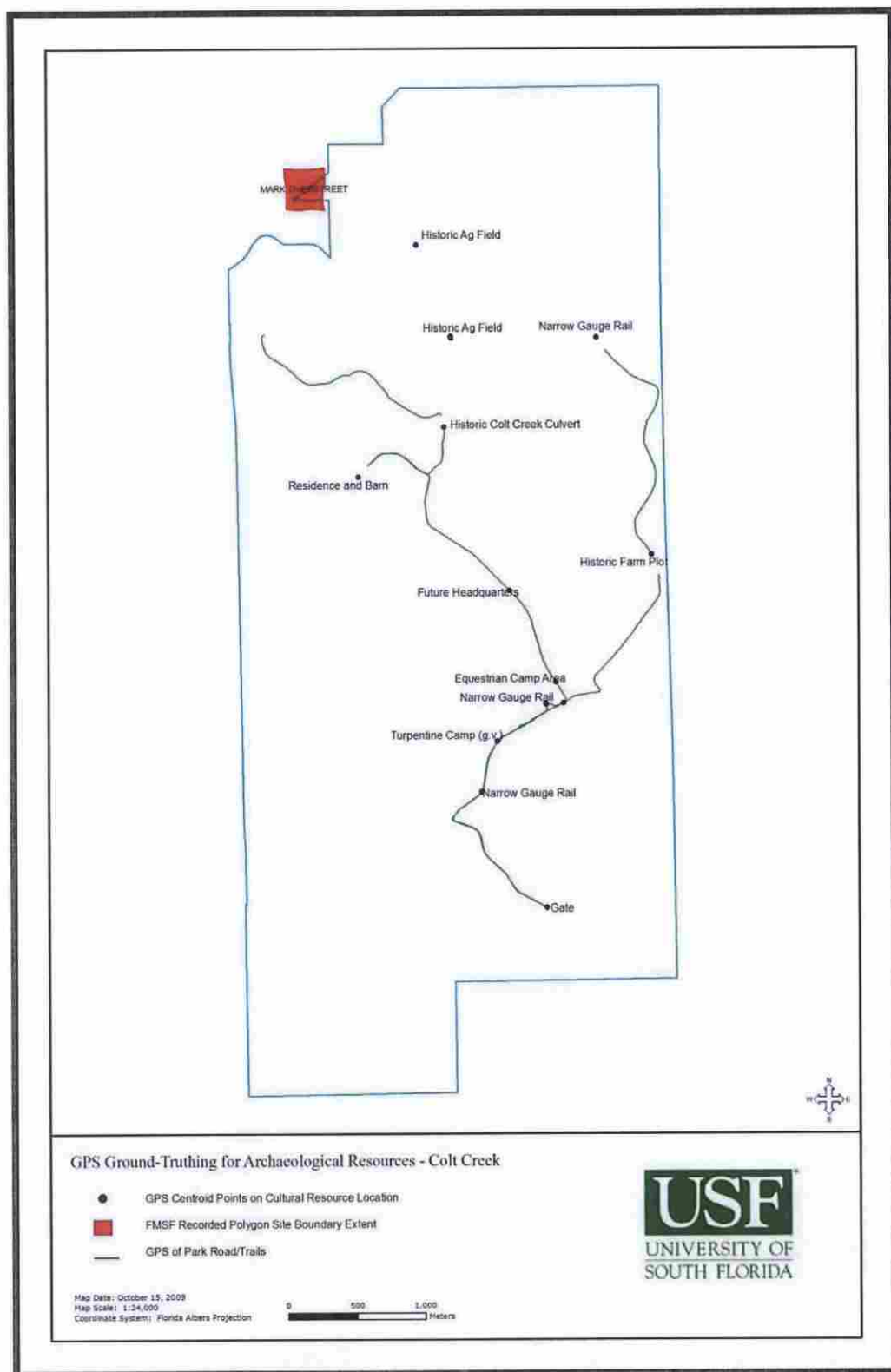


Figure 24. GPS Location Survey Map for Colt Creek State Park

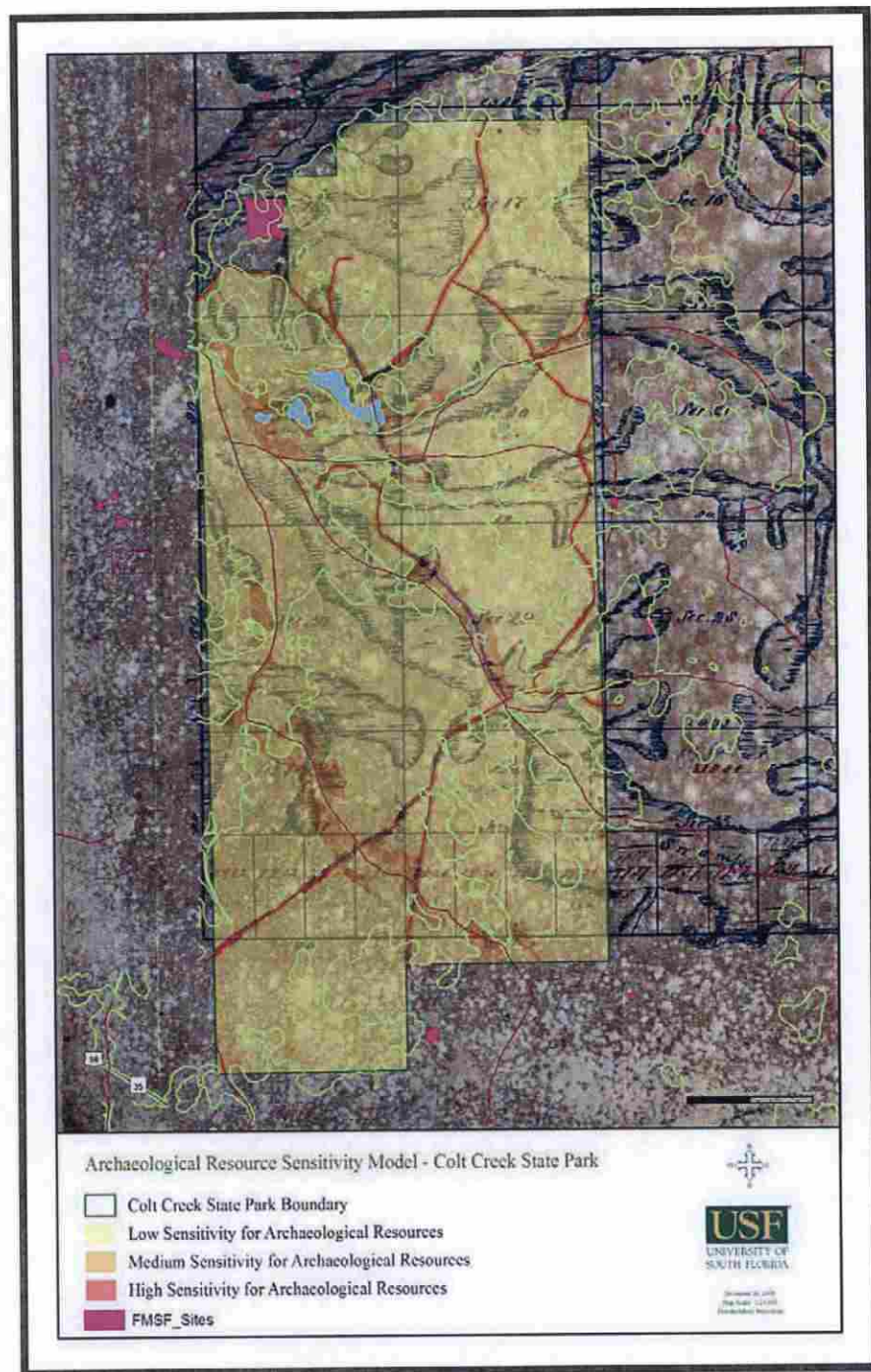


Figure 25. Archaeological Resource Sensitivity Model for Colt Creek State Park shown in overlay on historical GLO map of Township 25S, Range 23E made in 1848. Also shown are recorded locations for sites from the FMSF, topographical features, trails and historical features of note, and present-day water features. This map illustrates the numerous changes to the hydrology and land surface area at Colt Creek since the mid 19th century.

that the original natural community is no longer functioning. This category, along with field work verification, can be used to identify historic agriculture and settlement activities. An attribute query was performed to identify Ruderal areas from the Natural Communities Layer that have a high likelihood of historic land use activities. The results of the query are exported and then spatially clipped to the analysis extent. We assigned a model score of 12 to this map analysis layer. The final result is a map layer used in the sensitivity model map algebra function.

Landform modification areas were identified on historical maps by delineating areas that were formed by unnatural processes. Many waterways have been modified for navigation improvements, water flow management, environmental engineering, etc. This creates newly formed land masses that did not exist in the recent past and therefore would have a low probability of historic activity. A variety of Historical Maps were georeferenced and the landform modifications were digitized and assigned a model score of -30.

Features identified during field work were used in the model where there is a high likelihood of historic land use activities. Area features are digitized and assigned model score values. Point and line features are buffered appropriately to create zones of proximity to these features so that a model score can be assigned. Once the appropriate buffer zone is applied, a model score of 12 is assigned to these areas. This park has plans for new infrastructure and roads, and the sensitivity model developed will be of valuable use in the continued planning and site suitability selection processes, and will assist in the future land management activity planning and be of benefit for refining and focusing the direction for future archaeological phase 1 survey work at the park.

Evaluation of soils and their drainage patterns did not prove very useful for Colt Creek State Park due to the high degree of land modification. Relative elevation, or areas of higher elevation than land surrounding it, and elevated areas associated with knolls or ridges are known to be important cultural resource factors in the Green Swamp area (Johnson 1986; Barry R. Wharton 1984). Our model layers were queried for relative elevation, with 95 ft amsl as shown on available 5 ft. contours for the area, selected.

Model Performance

Our archaeological resource sensitivity model for the park is shown at a 1:24,000 scale (Figure 26). When this model is verified using the FMSF polygonal site location data, the model captures the only recorded site, relating high sensitive features such as karstic outcrops and higher relative elevation in the locale. This site likely lies outside the park boundary, but requires further spatial verification. Because there are no recorded site locations with the FMSF

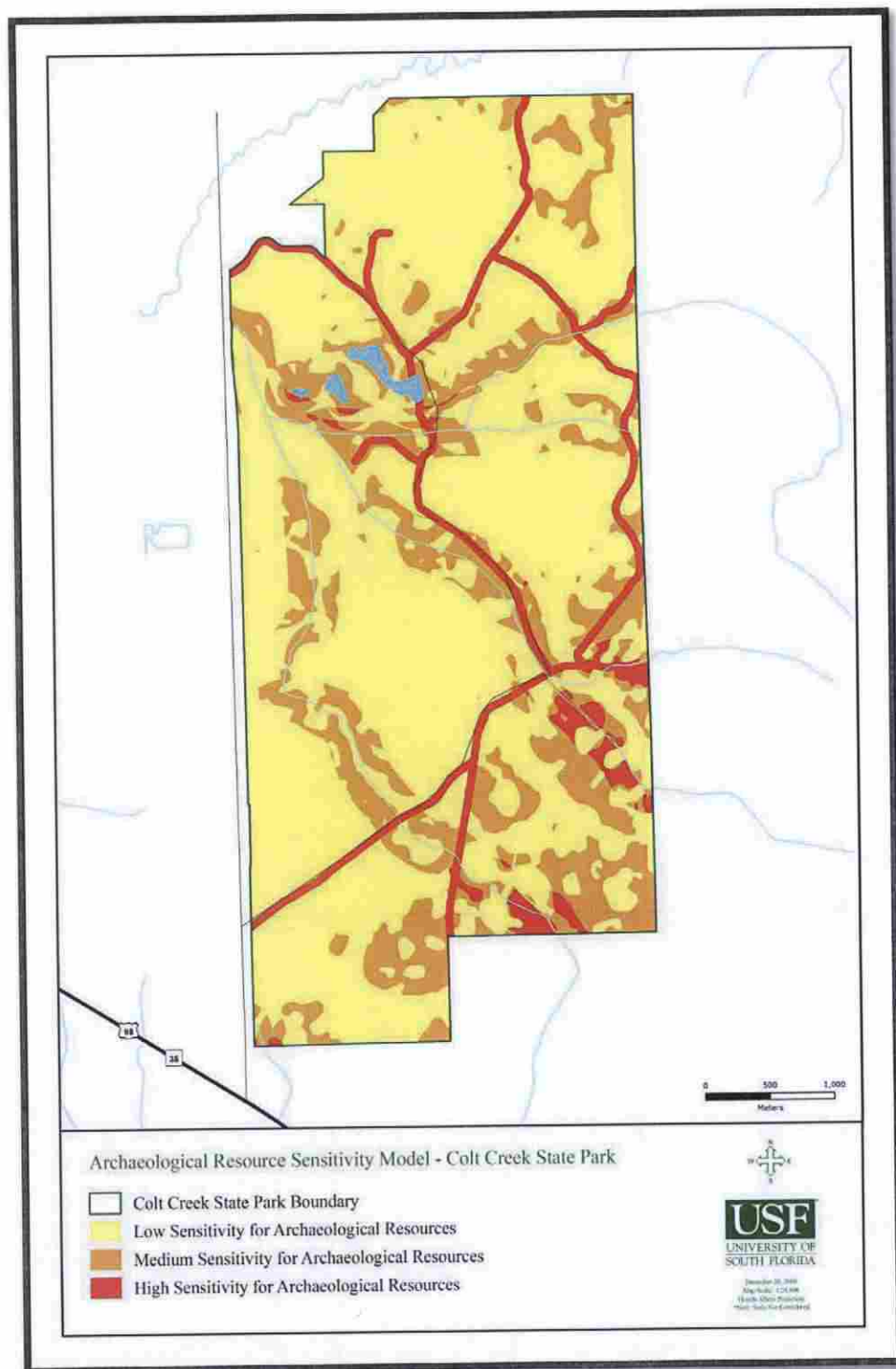


Figure 26. Archaeological Resource Sensitivity Model for Colt Creek State Park

within the park boundary, and no professional survey has been conducted, model verification cannot be conducted against known variables. As previously stated, we emphasize that this model is not a substitute for field-based archaeological assessment. This model is designed to be utilized as a planning tool, allowing for the understanding and visualization of archaeological sensitivity. This model offers an operational approach for management planning that considers cultural sensitivity, and can be used along with traditional archaeological approaches to more effectively target and survey areas. This model should be refined and verified, and refined again, as more information becomes known and field testing proceeds at this park.

Addison Blockhouse Historic State Park

The Addison Blockhouse Historic State Park is managed as part of the Tomoka Basin Geopark. The park has recorded archaeological features relating to the Addison and MacRae plantation era occupations and land use in the area. Within the boundary of the park, extant ruins including the Addison-MacRae sugar mill (8VO7496), the Addison Blockhouse (8VO193) and a prehistoric mound known as Addison's Mound (8VO243), are recorded in the FMSF.

Previous archaeological and architectural documentation work in the Addison Blockhouse Historic State Park includes projects by John W. Griffin, who worked at the Addison Blockhouse site in 1950 (Griffin 1952) (Figure 27), and produced drawings of the feature. Herschel Shepard's (2000) architectural class at the University of Florida worked to document the MacRae sugar works (Figure 28), and work conducted was by Ted Payne included the finding of slave settlement areas in the vicinity (Payne 2001). For a complete overview of these sites, structural integrity, and historic significance, refer to the SouthArc report which includes both Addison Blockhouse and the MacRae sites (Wayne 2001) or the more recent archaeological investigative report conducted by Bland and Associates (Bland 2004), who examined subsurface moat and wall features at the Addison Blockhouse.

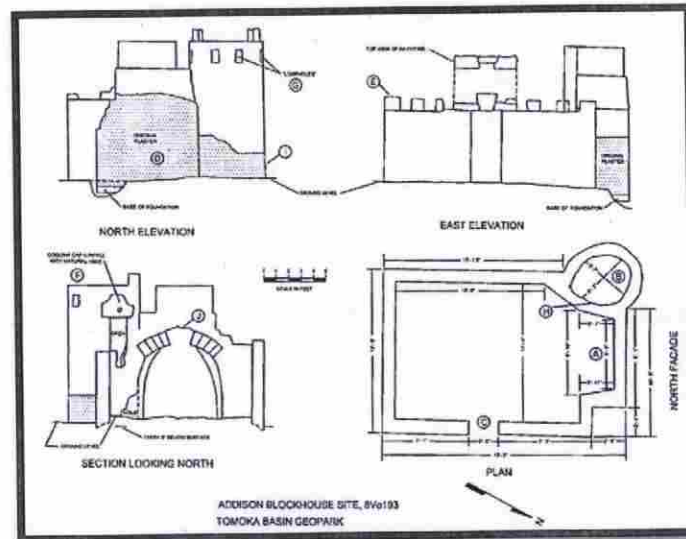


Figure 27. The Addison Blockhouse (8VO193) as documented by Griffin (1952)

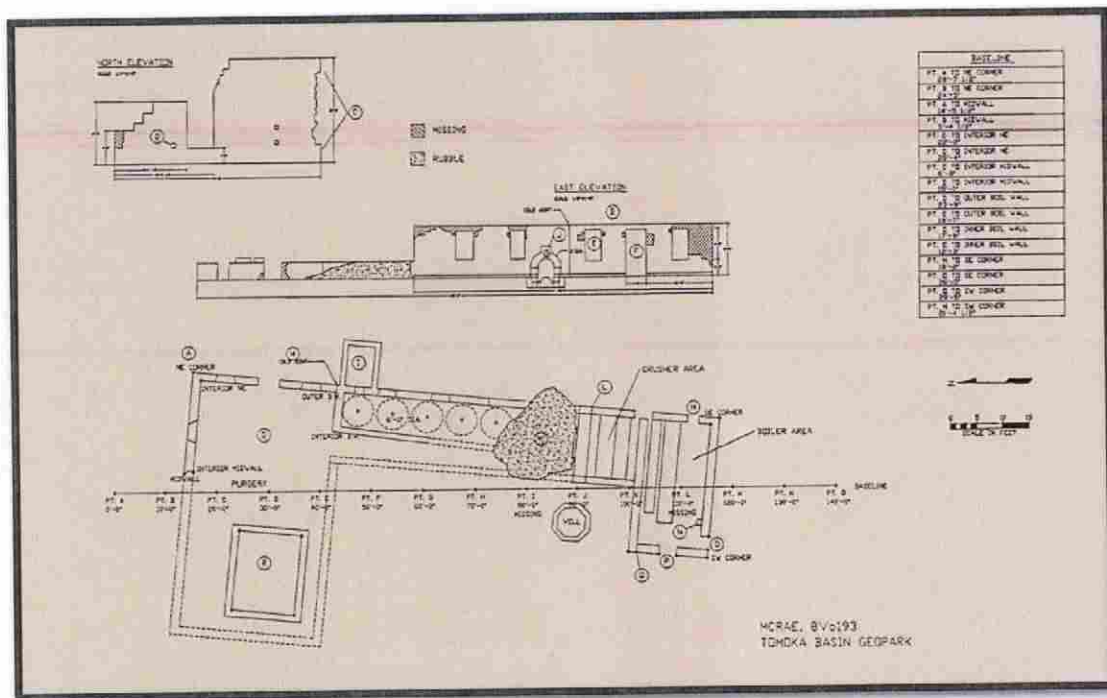


Figure 28. The MacRae Sugar Mill as documented by Shepard et.al. (2000) and adapted from (Wayne 2001)

Additional cultural resources as listed on the FMSF within Addison Blockhouse Historic State Park include a prehistoric mound location in the northern portion of the park, which is mapped with the FMSF as only general vicinity, and comprises a large, square polygonal extent that is vaguely defined (Figure 29). This mound site, called Addison's mound (8VO243), is the burial or tomb of John Addison and is part of a multi-component prehistoric mound site and is listed as containing human remains with the FMSF. Other subsurface and ephemeral extant ruin features are likely present on this park property, including portions of out structures associated with the John Addison land grant (previously the Carrick Fergus grant), and the MacRae sugar works location (Figure 30).

Our GPS work included bounding 8VO193, Addison's Blockhouse extant ruins, and visiting and mapping features at the Addison-MacRae Sugar mill location. In both of these instances, location data from the FMSF was found to be in error, and new plots were utilized in the sensitivity modeling for this park (Figure 31). Conditional assessment of the Addison Blockhouse site shows significant deterioration of the structural elements, with mortar and fabric spalling, and areas of collapse and at risk for collapse (Figures 32 and 33).

The GPS work at the Addison-MacRae Sugar Mill site included bounding the extant walls, the kettle train area, and associated well area. Vegetation remains a primary problem at the site. Several extant wall features remain (Figure 34), and have been preliminarily stabilized and strengthened (Figure 35).

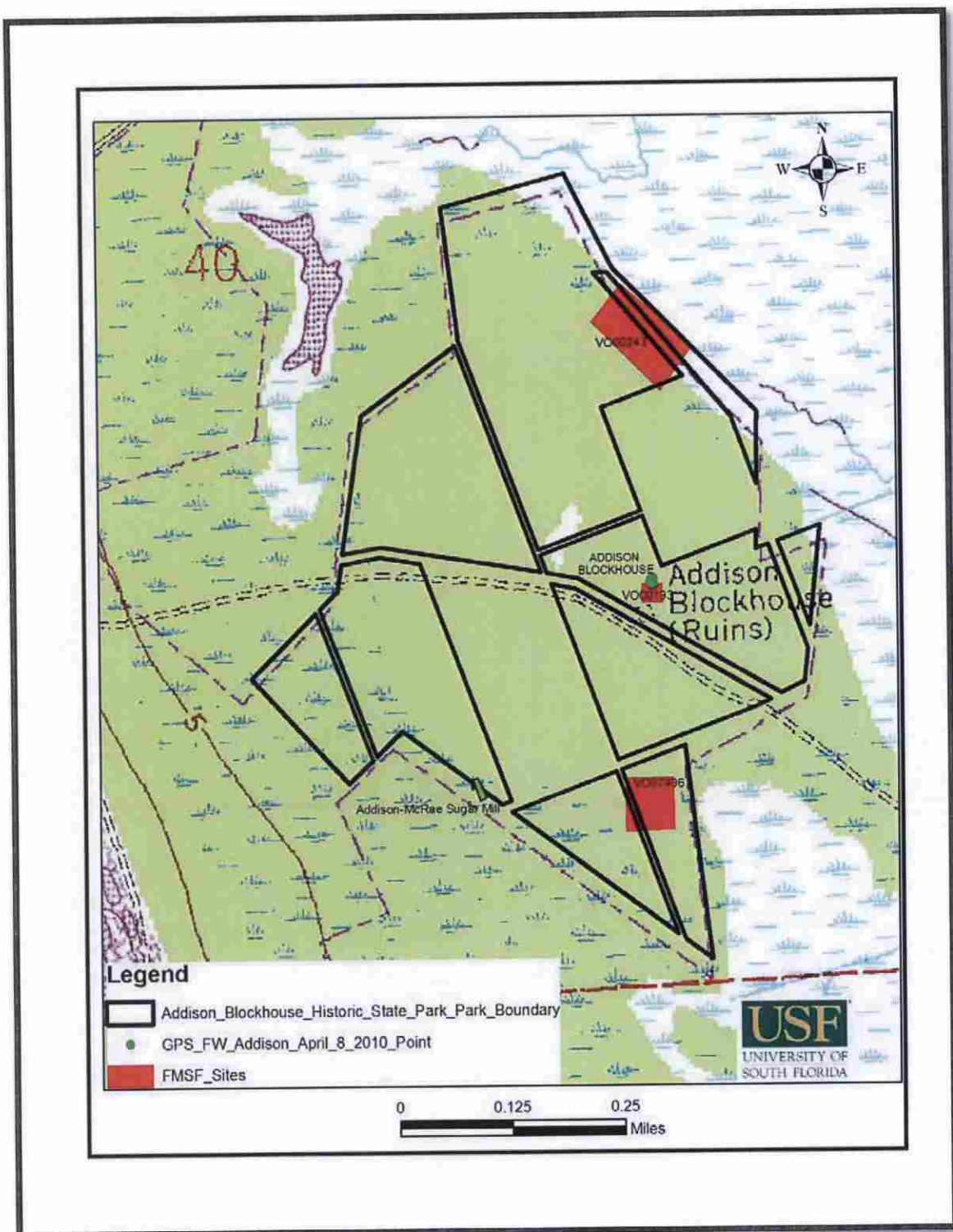


Figure 29. Florida Master Site File data and GPS corrected locations within the Addison Blockhouse Historic State Park

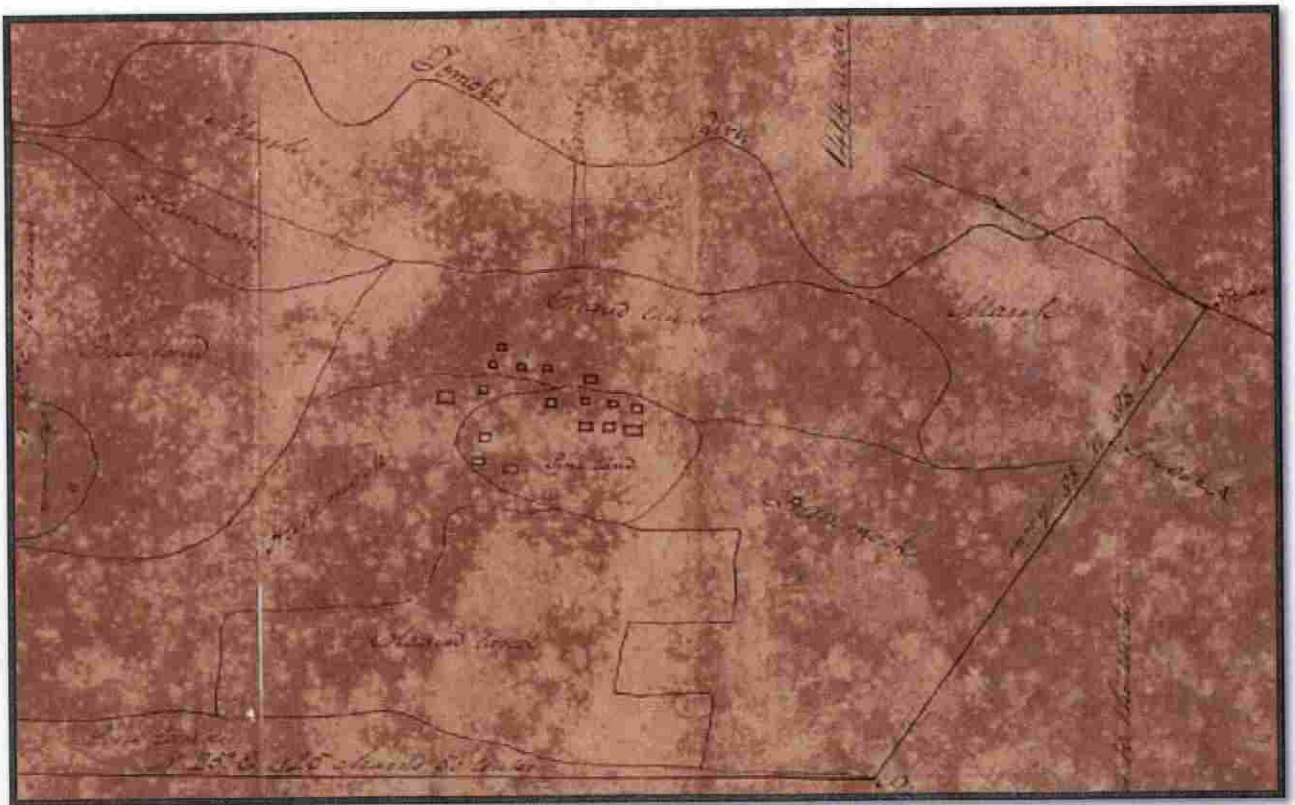


Figure 30. Spanish land grant documents include this 1816 sketch of the Addison application for the Carrick Fergus plantation lands. Named for Addison's Ireland birthplace, the property would later be purchased by Duncan and Kenneth MacRae, who would build a sugar mill in 1832 (J.W. Griffin 1952). This 1816 map shows 17 loosely grouped structures, possibly including slave quarters, which are all absent from the 1845 survey documents.

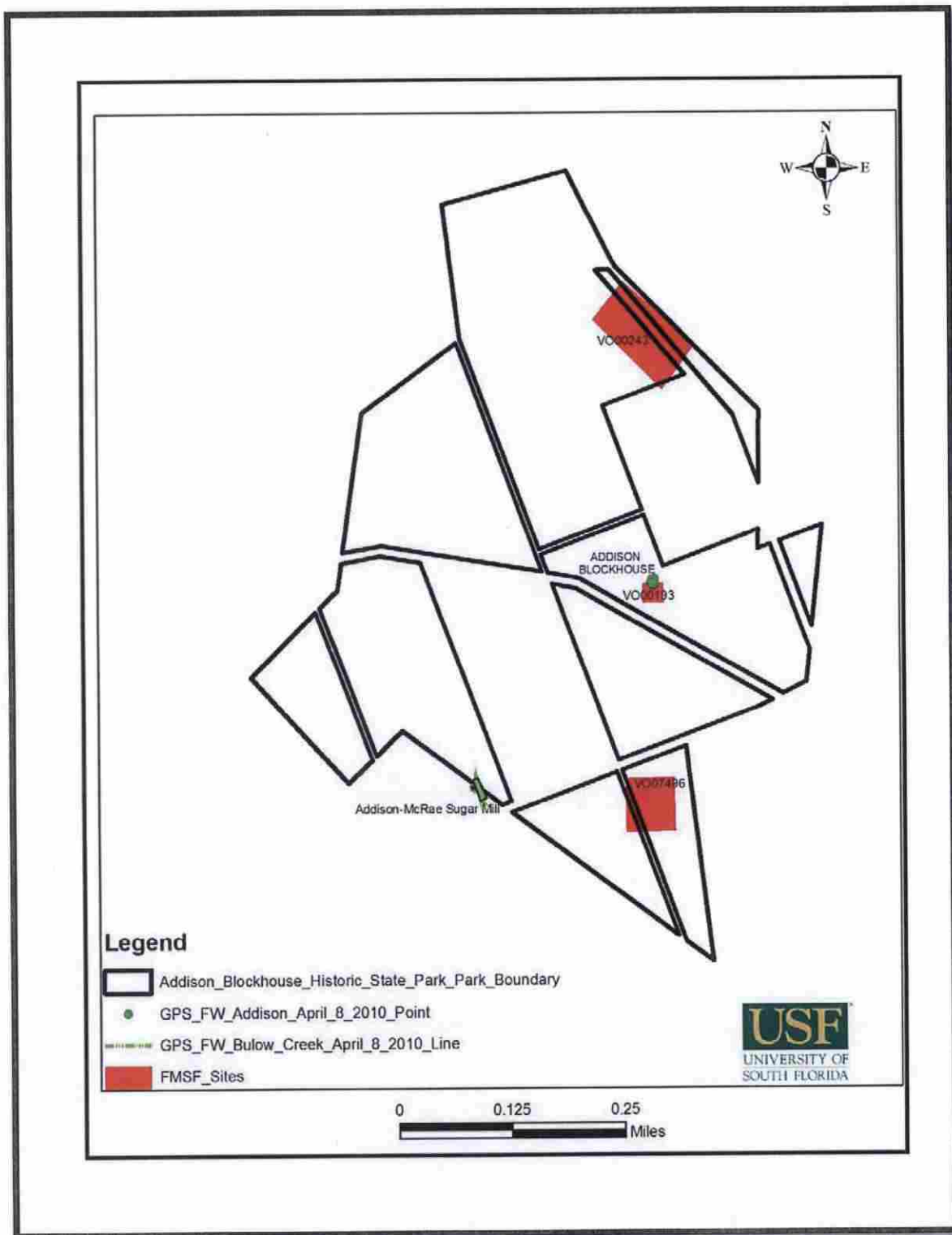


Figure 31. GPS survey data collected at Addison Blockhouse Historic State Park showing corrected locations as compared to the FMSF location data



Figure 32. Current conditions of the interior features of remaining chimney stack and structural elements at the Addison's Blockhouse (8VO193) as noted during the GPS survey in April 2010



Figure 33. Current conditions of the wall elevations at the Addison's Blockhouse (8VO193) as noted during the GPS survey in April 2010



Figure 34. Current conditions of Addison-MacRae Sugar Mill feature (8VO7496) as noted during the GPS survey in April 2010



Figure 35. Structural bracing of extant wall elements at the Addison-MacRae Sugar mill feature (8VO7496) as noted during the GPS survey in April 2010

Results and Discussions

The archaeological sensitivity model development for Addison Blockhouse Historic State Park included factors that took in a variety of environmental and cultural variables that account for the presence of sites through time and space and account for the variability of site types known to occur within the park as demonstrated through previous surveys and recorded archaeological sites as listed on the FMSF. A primary factor for cultural site locations in this park included the plantation-era historic landscape extant ruin locations. Data layers utilized include aerial LiDAR, aerial imagery, historical maps and references, and environmental layers such as the National Wetlands Inventory, hydrology, and SSURGO soil information (Figure 36). The GPS field truthing and ground control points were extremely useful as we were interested in delineating accurate field locations for extant structural remains relating to the Addison-MacRae Sugar Mill and the Addison's Blockhouse sites, and comparing to and correcting as necessary, the FMSF information (Figures 37 and 38).

Model Performance

Our archaeological resource sensitivity model for the park is shown at a 1:8,000 zoomed in viewable scale (Figure 39), but for consistency is provided in the geodatabase digital documents at 1:24,000 scale for which the model was performed. When this model is verified using the FMSF polygonal site location data and the updated plot locations for 8VO7496 (MacRae Sugar Mill) and 8VO193 (Addison Blockhouse), the model captures both recorded sites within the park's boundary at least partially, in the designated high and medium sensitivity areas. The model misses a portion of the polygonal extent for the 8VO243 (Addison's Mound) site. This site is listed with the FMSF as general vicinity and its polygonal extent is large and ambiguously defined. The portion of the site containing the prehistoric mound and Addison's tomb historic features are captured in the high sensitivity areas, and the portions with low sensitivity are likely inaccurate and should be re-plotted.

Expressed as spatial percentages, the high archaeological resource sensitivity area at Addison Blockhouse Historic State Park only accounts for approximately 17% of the land surface area (Table 5), however, more than 43% of the recorded archaeological spatial extents are found to correlate with these modeled areas, representing a 26% improvement over chance of locating archaeological sites within our designated high sensitivity area (Kvamme 2006:28).



Figure 36. LIDAR data for the Addison Blockhouse Historic State Park

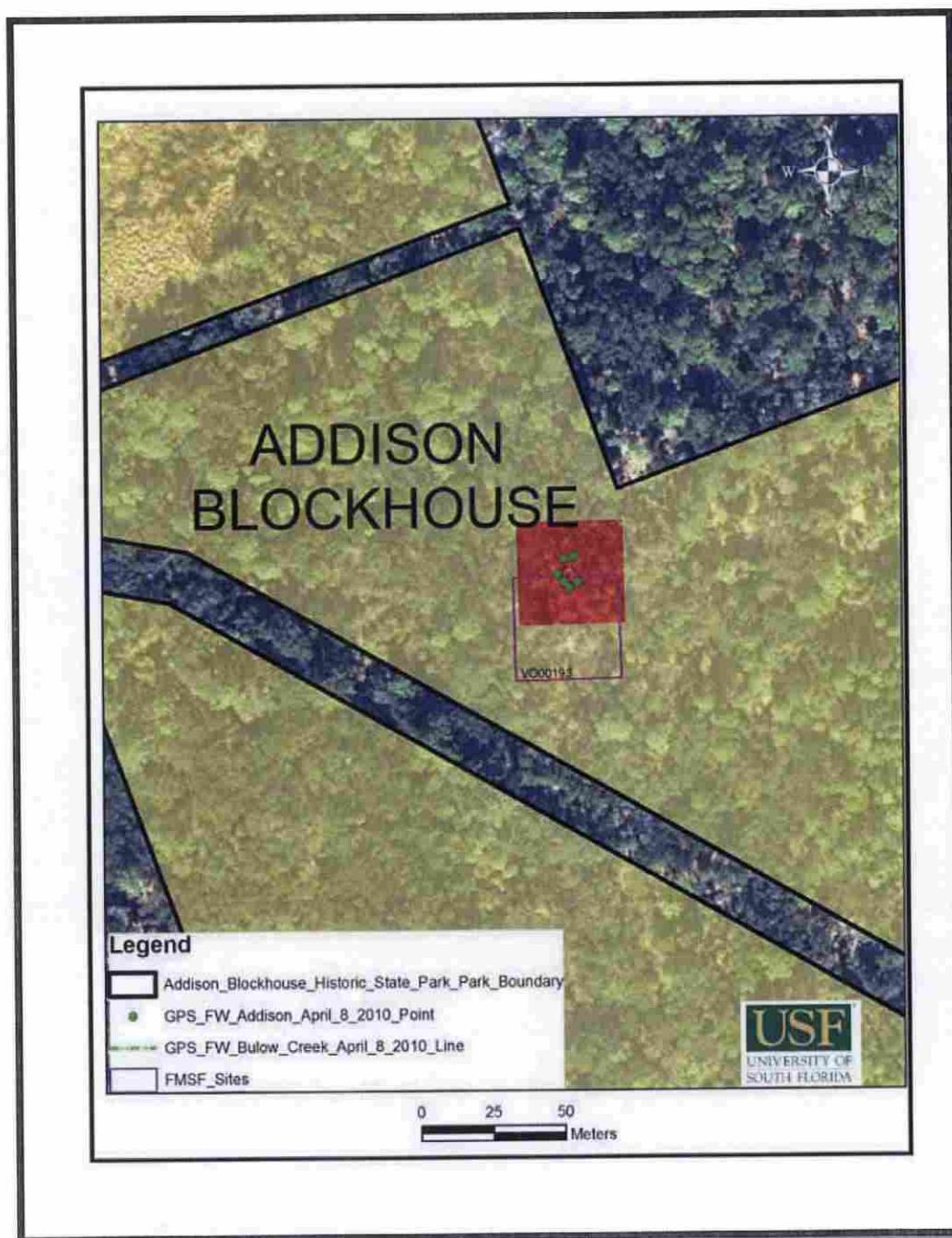


Figure 37. GPS survey data (in green) collected at Addison Blockhouse State Park showing shift in plots for corrected location of the Addison Blockhouse site as compared to the FMSF location data as well as the defined high sensitivity area from model shown in red.

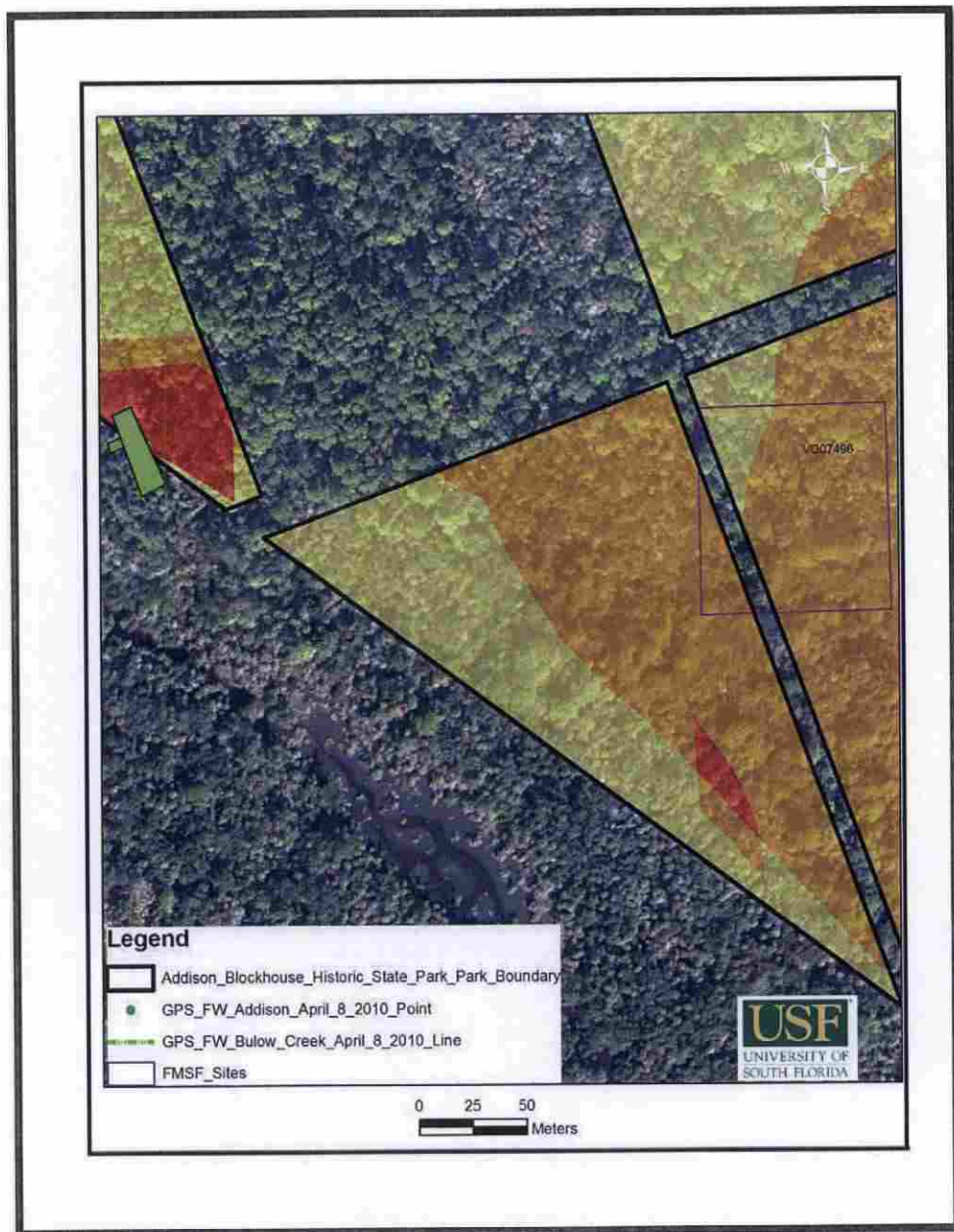


Figure 38. GPS survey data collected at Addison Blockhouse State Park showing shift in plots for corrected location of the Addison-McRae Sugar mill site (shown in green) as compared to the FMSF location data. The areas in red are high cultural sensitivity areas; orange corresponds to medium sensitivity, and yellow to low sensitivity areas. Note that the new location of MacRae (8V07496) shows part of the site to lie within the Bulow Creek State Park Boundary which is adjacent and abutting to the Addison Blockhouse Historic State Park.

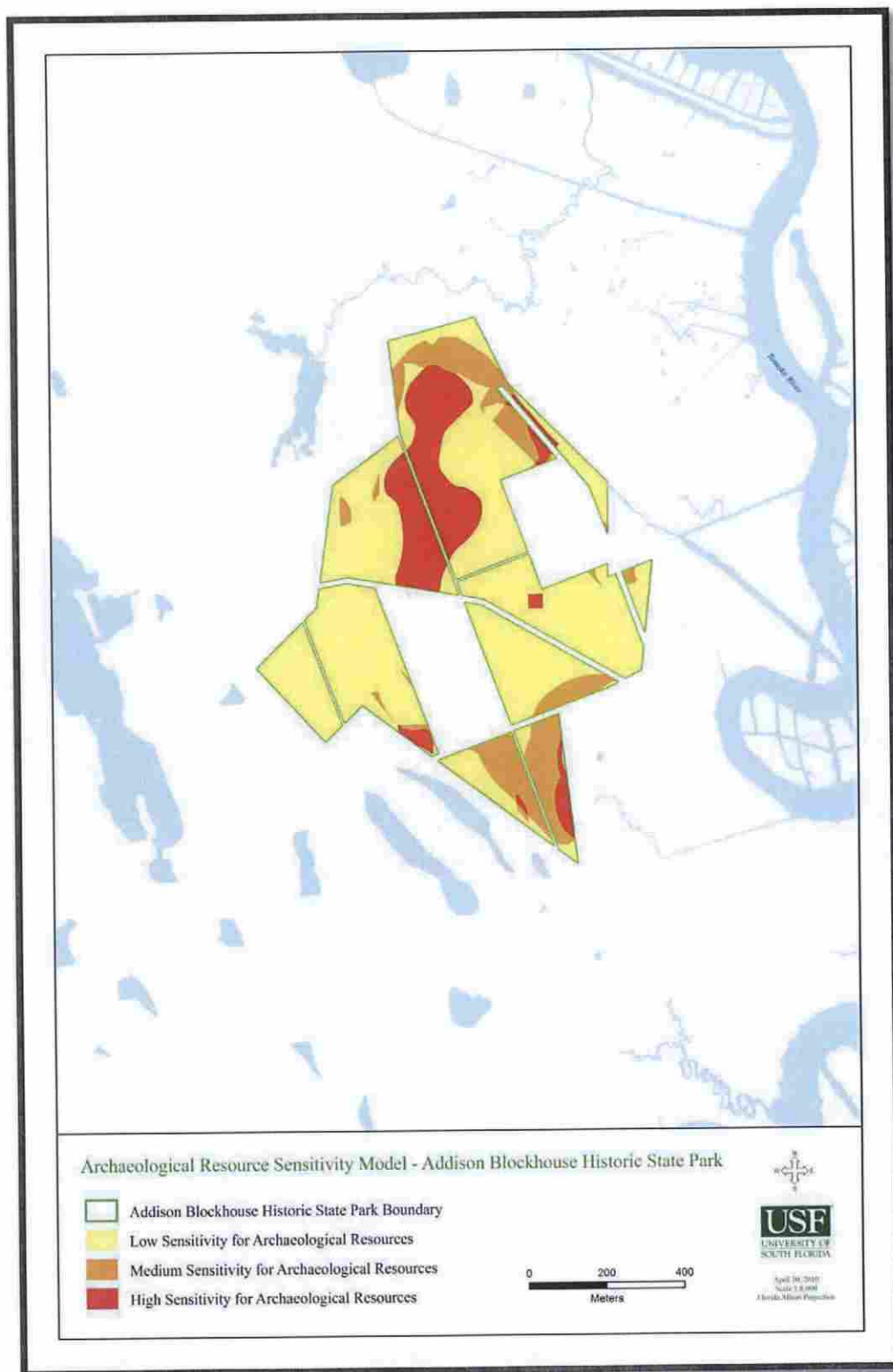


Figure 39. Map showing the archaeological resource sensitivity model developed for Addison Blockhouse Historic State Park

The model captures the full and corrected spatial extents of the two extant ruin sites within this high sensitivity area, and the re-plotting of these sites much more accurately defines the park cultural landscape, as noted in the differences in high and medium sensitivity areas associated with corrected and uncorrected site spatial extent data. The 8VO243 site also partially falls in medium and low probability areas, due to the aforementioned polygonal extent problems which account for the percentage of sites associated with low sensitivity areas. The model also suggests areas of high and medium sensitivity that currently do not contain recorded site locations. These areas are based on the inclusion of historic documents and their noted locations, as well as suitable environmentally-defined areas.

Table 5. GIS model performance calculations for Addison Blockhouse Historic State Park, showing model results using GPS data collected (above) versus the FMSF plots for the park's recorded resources (below)

Addison Blockhouse Historic Sensitivity Model	Acres	Percent		FMSF Acres	Percent		
High Sensitivity Area	22.81	16.96%		1.91	43.21%		
Medium Sensitivity Area	20.30	15.09%		2.03	45.93%		
Low Sensitivity Area	91.39	67.95%		0.48	10.86%		
Total	134.50	100.00%		4.42	100.00%		

Area Stats based off original FMSF Location	Acres	Percent		FMSF Acres	Percent		
High Sensitivity Area	22.81	16.96%		0.98	19.00%		
Medium Sensitivity Area	20.30	15.09%		3.46	65.00%		
Low Sensitivity Area	91.39	67.95%		0.84	16.00%		
Total	134.50	100.00%		5.29	100.00%		

Allen David Broussard Catfish Creek Preserve State Park

The Allen David Broussard Catfish Creek Preserve State Park is a large, 8,317.73 acre tract that is bounded on the west by Lake Pierce, and contains a number of creeks, lake, and depressional wetland features. The preserve affords conservation lands along the Lake Wales Ridge natural community system and Central Lake District, and has a diverse range of scattered scrub and xeric habitats along with wetland and floodplain features (FDEP 2004a; Myers and Ewel 1990).

Elevations also have a wide range across the preserve, from 150 ft in the western portion to lows of 55 ft (Figure 40). The park has two recorded archaeological features as listed on the FMSF. Sites 8PO5447 and 8PO5448 were both recorded during a 1998 field survey by archaeologists with the Conservation and Recreational Land Acquisition (CARL) program, of what is now only a portion of the preserve. Site 8PO5447, the Jaw Claw Site, is described as a lithic and ceramic prehistoric artifact scatter of low density and without any diagnostic artifacts recovered. Site 8PO5448, the Smith Place, is an historic artifact scatter consisting of domestic refuse that surrounds an historic homestead that was reportedly occupied up until the 1940s by cow hunters working in the area (Memory and Newman 1998) (Figure 41).

This preserve is in a transitional area as far as cultural areas, almost bisected by defined boundaries for the east and central regions, the central Peninsular Gulf Coast, and the Okeechobee Basin (Milanich 1994). Synthetic approaches and modeling for the Kissimmee River Valley areas prove useful in understanding the settlement and resource utilization within the region as are previous GIS models conducted in the Okeechobee Basin (Austin 1996; Austin and Collins 2003). The occupational history in the region spans from Paleoindian to historic times, with emphasis on cattle ranching and agro industries with possible Seminole era sites and travel corridors (Carr and Stelle 1993). A military trail, located just south of the present day boundary of the preserve, runs east toward the 8PO1547 site of Fort Gardiner, listed only as general vicinity with the FMSF. A review of the General Land Survey maps show the site to be located outside the preserve boundary, with the military road in close proximity but also outside the boundary (Figure 42).

Our visit to the preserve included the collection of sub-meter level GPS data for the site locations of 8PO5447 and 8PO5448. At the 8PO5447 Jaw Claw site, no artifacts were observed and the GPS point was taken in coordination with the ranger's knowledge of the site locale. At 8PO5448, GPS coordinates were taken on the debris and structural scatter areas associated with a house and out-building (Figure 43).



Figure 40. Elevation contour map for the Allen David Broussard Catfish Creek Preserve State Park area

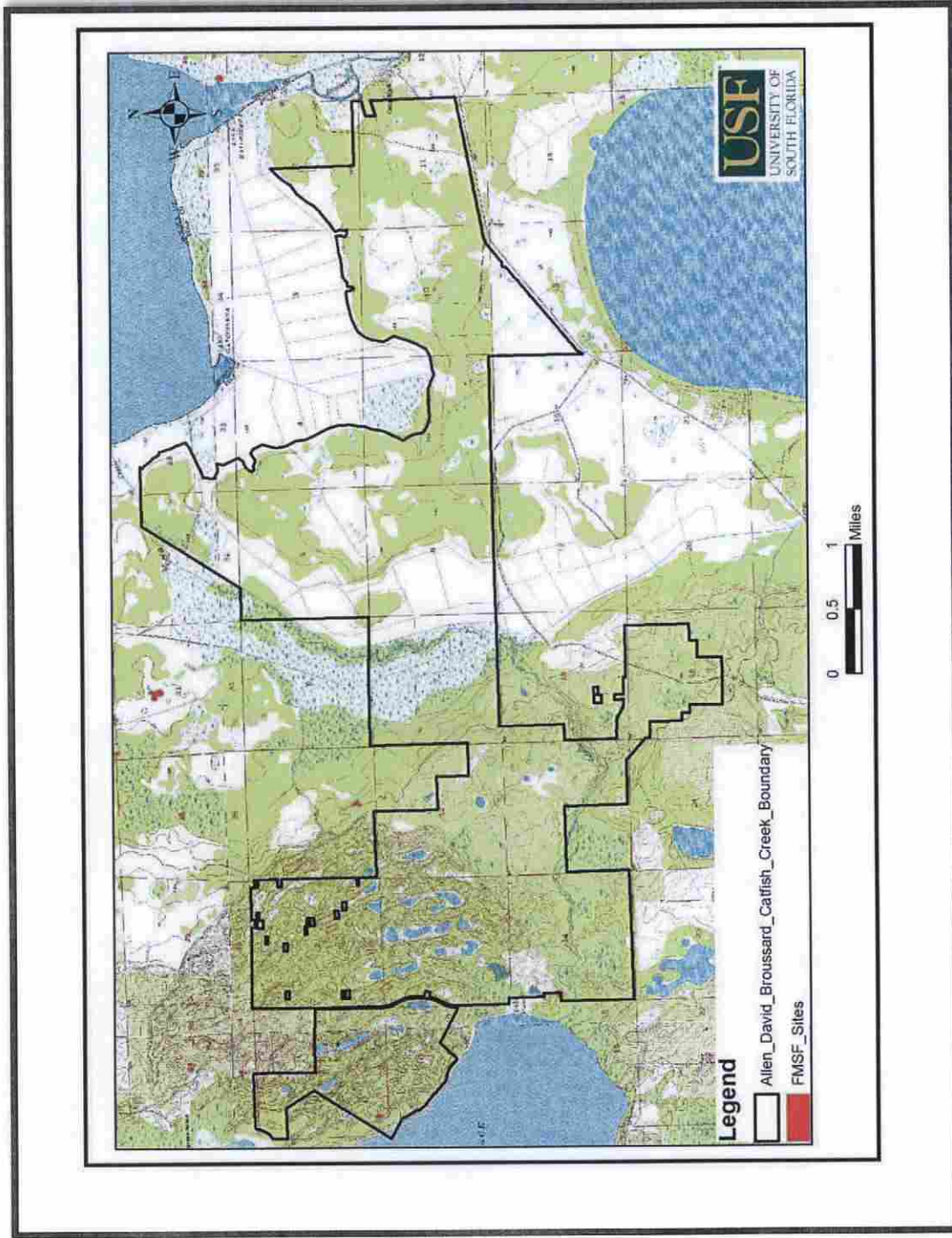


Figure 41. Florida Master Site File data showing archaeological site locations within the Allen David Broussard Catfish Creek State Park

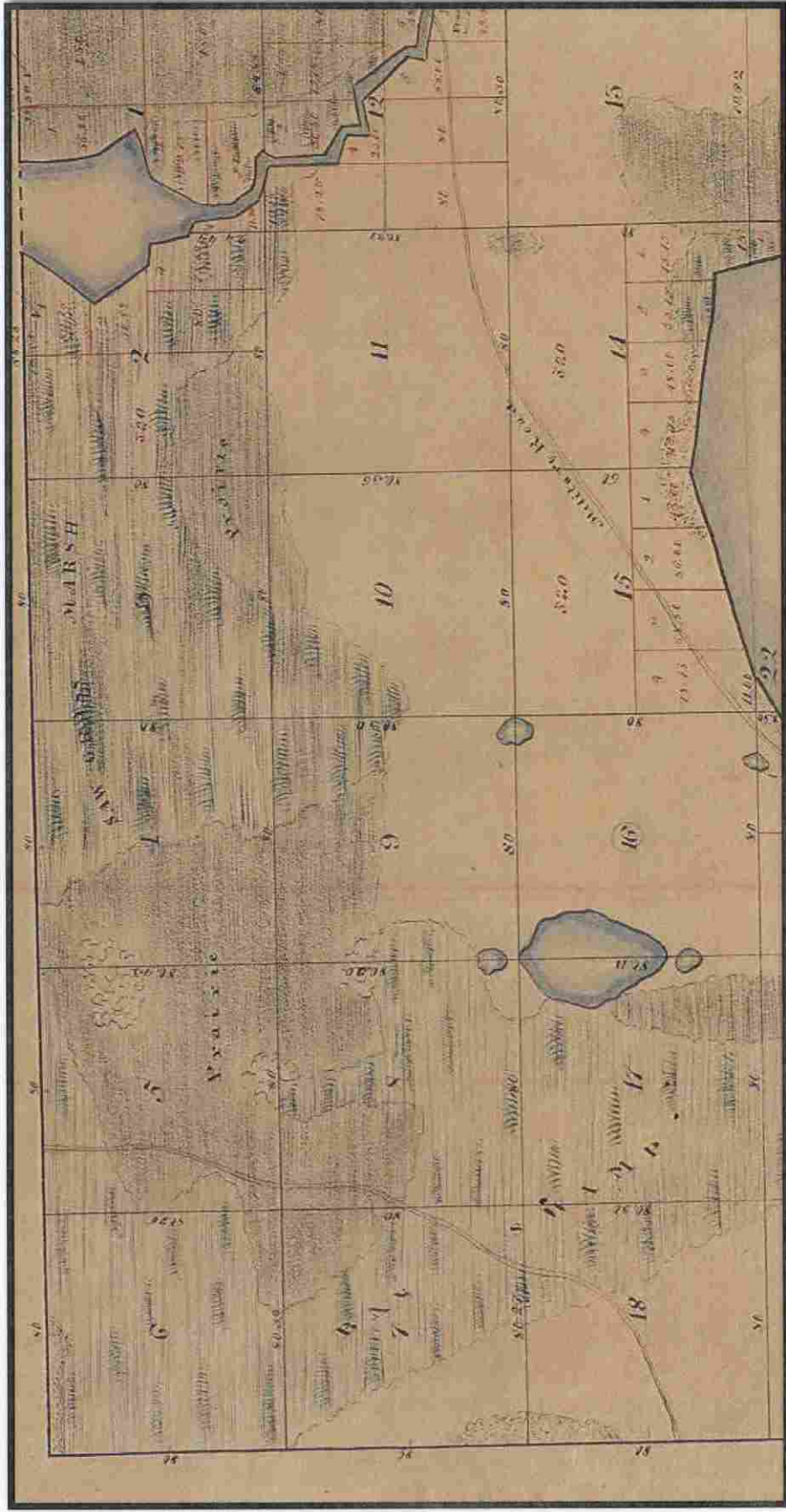


Figure 42. 1853 Map showing a military road that runs just adjacent to the present day preserve boundary to the south

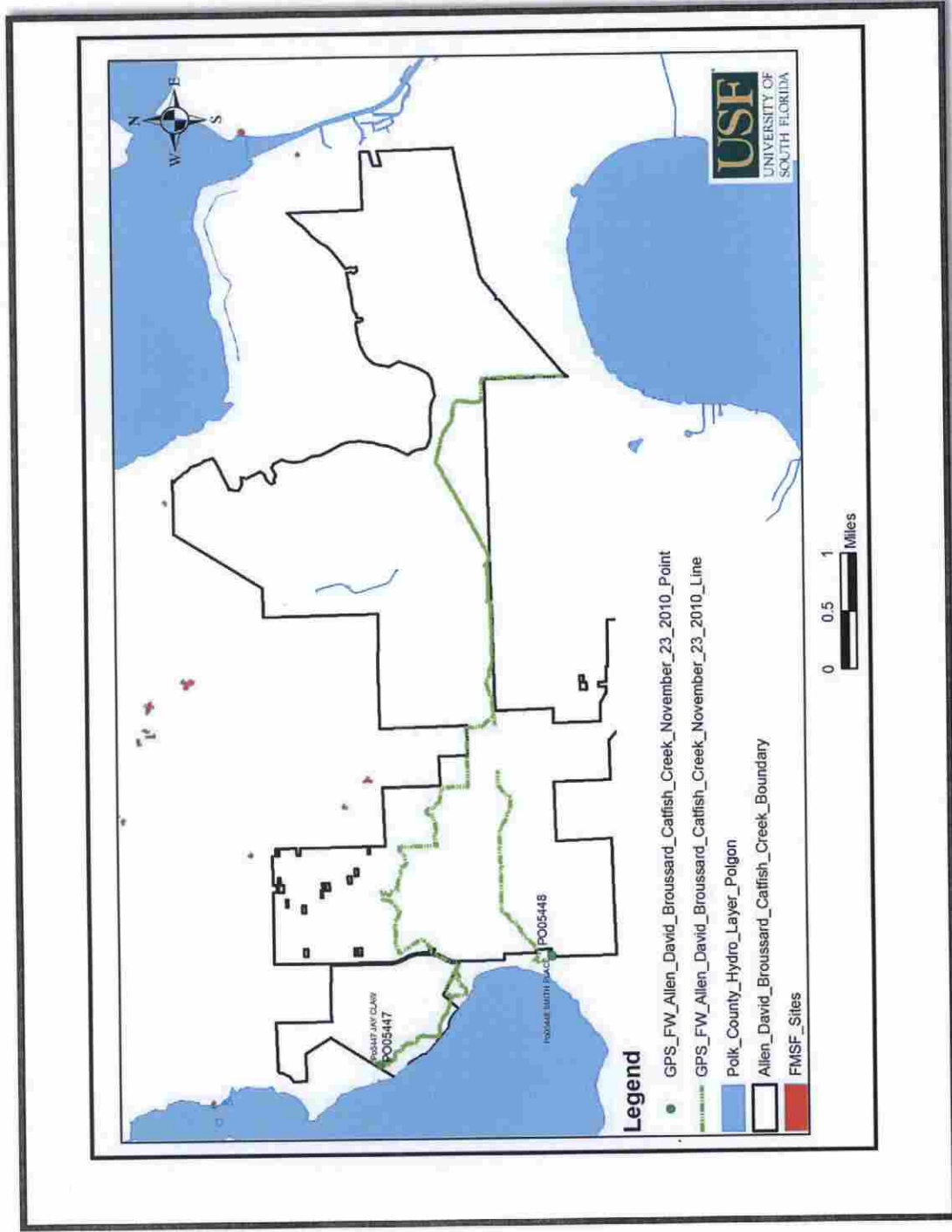


Figure 43. GPS survey data collected at Allen Broussard Catfish Creek State Park showing corrected locations as compared to the FMSF location data.

Results and Discussion

The archaeological sensitivity model development for Allen David Broussard Catfish Creek Preserve State Park included factors that took in a variety of environmental and cultural variables that account for the presence of sites through time and space and account for the variability of site types known to occur within the park as demonstrated through previous surveys in and within the regional vicinity to the preserve. A primary factor for cultural site locations in this park included the presence of hydrographic features including Lake Pierce to the west of the preserve boundary, Lake Rosalie to the south of the preserve and Lake Hatchineha to the northeast of the preserve. Additionally, Catfish Creek and numerous wetland and depressional water features occur in the preserve bounded area. Early General Land Survey Office maps and other historical maps were of benefit in checking both landform configurations and in reviewing land use, cultural feature location and modification through time. Professional surveys that included investigation into the historical contexts of sites within the park boundary were also useful (Memory and Newman 1998).

Matrix factors utilized for model evaluation included distance to wetlands, distance to ponds or lakes, relative elevation, soil drainage characteristics, and presence of flood plain and zone areas. Our archaeological resource sensitivity model for the park is shown at a 1:24,000 scale, and is depicted in two separate maps (Figures 44 and 45).

Model Performance

When the Allen David Broussard Catfish Creek Preserve model is verified using the FMSF polygonal site location data, the model captures the two known recorded sites at least partially, in the designated medium sensitivity area. Expressed as spatial percentages, the high archaeological resource sensitivity area at Allen David Broussard Catfish Creek Preserve only accounts for approximately 6% of the land surface area (Table 6), with no recorded archaeological spatial extents found to correlate with these modeled areas. The only recorded site in the park falls within our designated medium sensitivity area that accounts for approximately 17% of the land area within the park. A small portion of this known site plots into our low sensitivity area, and is likely a factor of poor boundary distinction in the FMSF polygonal data layer. Because this preserve has not been completely surveyed, this sensitivity model can serve as a foundation for further Phase I archaeological testing in the future and can assist with current management for cultural resource potential areas. The large amount of low sensitivity area associated with the model relates to the poor soil quality and inundation. High sensitivity areas are attributable largely to topography and better soil drainage characteristics in proximity to wetland and hydrologic features.

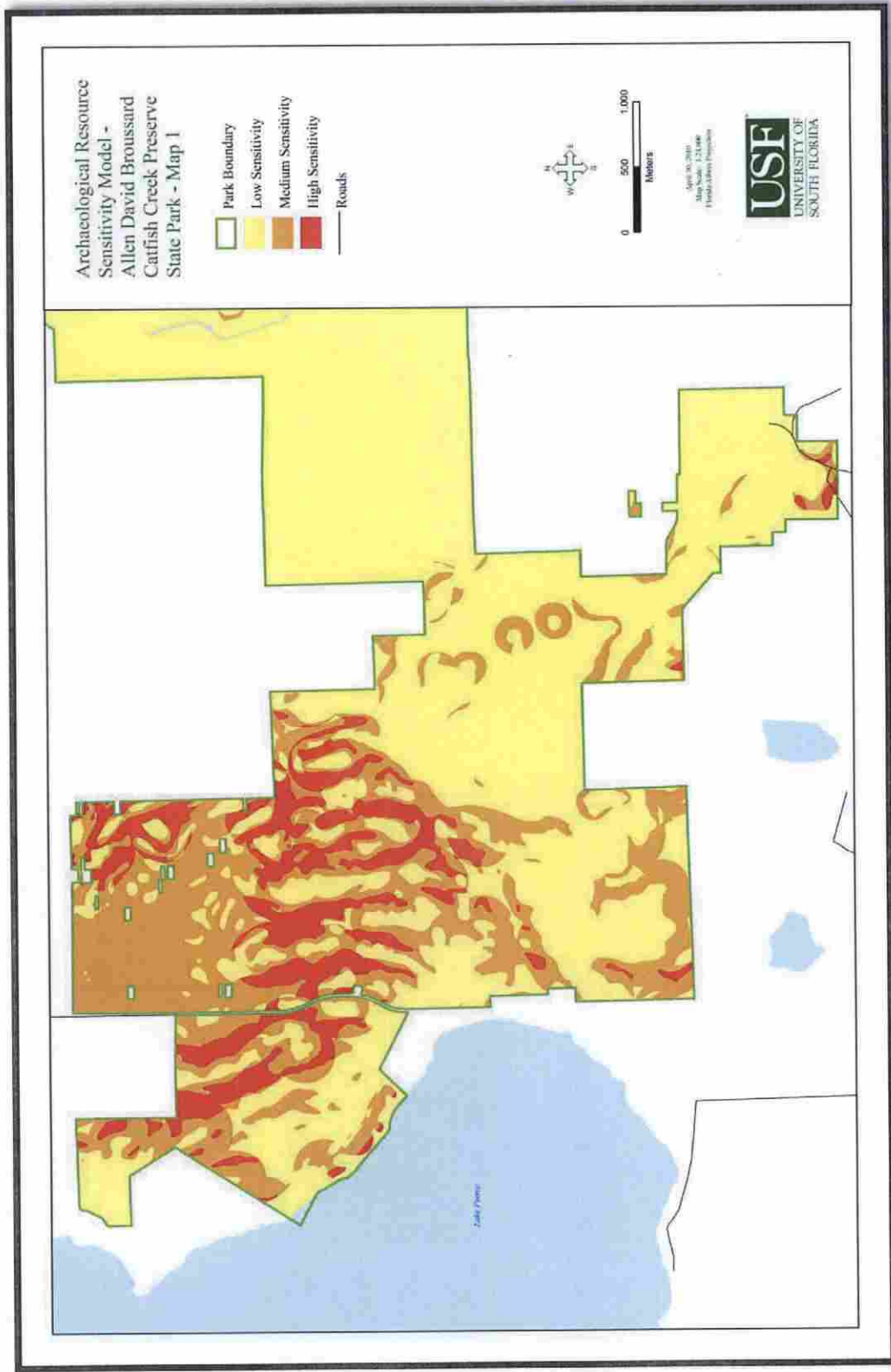


Figure 44. Map 1 of 2, showing the archaeological resource sensitivity model developed for Allen David Broussard Catfish Creek Preserve State Park.

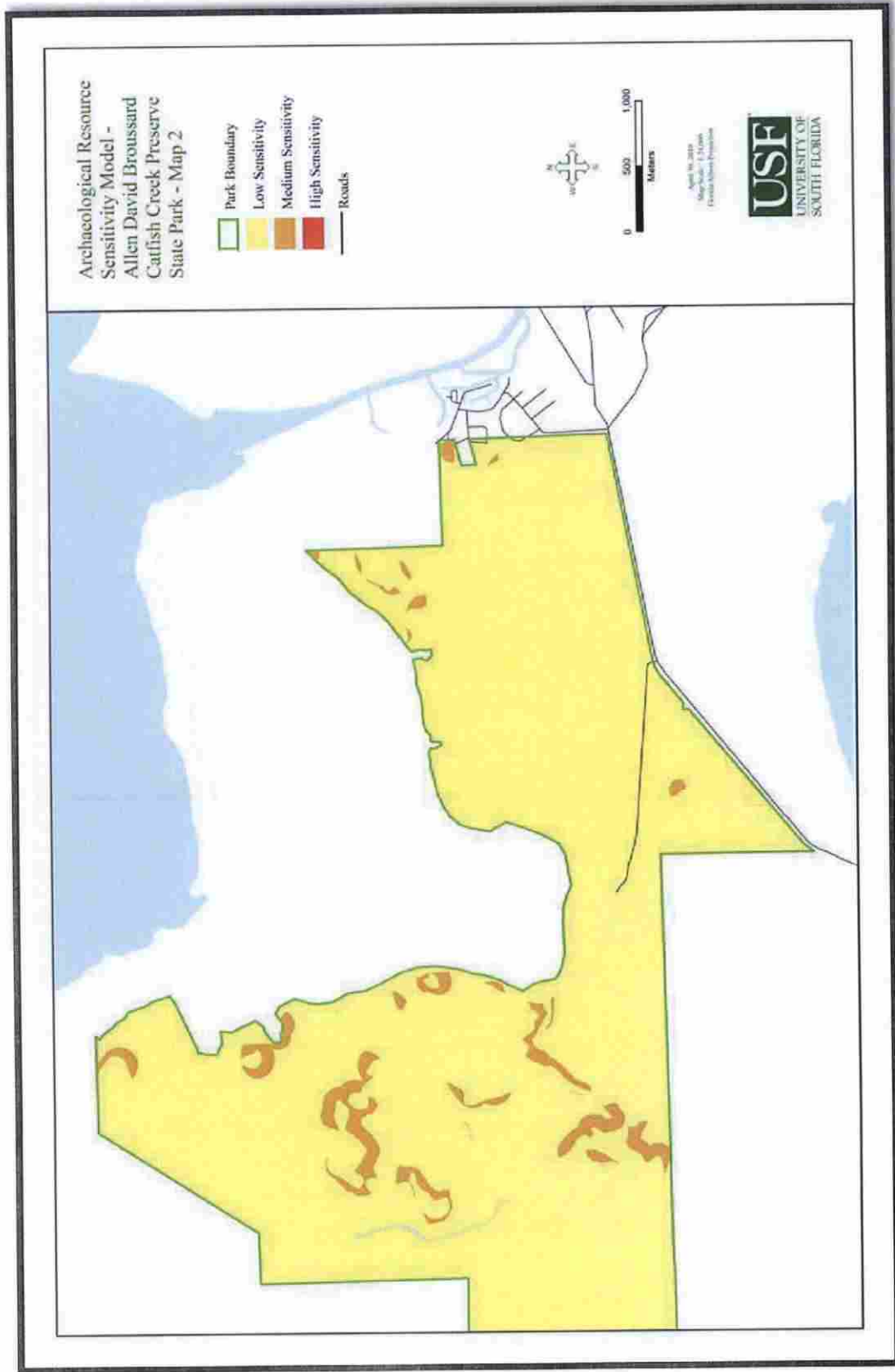


Figure 45. Map 2, showing the archaeological resource sensitivity model developed for Allen David Broussard Catfish Creek Preserve State Park

Table 6. GIS model performance calculations for Allen David Broussard Catfish Creek Preserve State Park

Allen David Broussard Catfish Creek Preserve Sensitivity Model	Acres	Percent		FMSF Acres	Percent
High Sensitivity Area	465.42	5.60%		0.00	0.00%
Medium Sensitivity Area	1,411.05	16.96%		1.60	96.39%
Low Sensitivity Area	6,441.26	77.44%		0.06	3.61%
Total	8,317.73	100.00%		1.66	100.00%

Blue Spring State Park

Blue Springs State Park is a 2,438.70 acre parcel with diverse natural and cultural features. The Deland Ridge area of the park affords higher elevations and well-drained soils. The ridge feature is primarily in the north, northeast, and east sections of Blue Spring (Figure 46). Other dominant environmental features include the St. Johns River and floodplain, Lake Beresford in the northern section of the park boundary, the spring run, various creek and wetland habitats, and karstic environments with springs and caves present (Myers and Ewel 1990) (Figure 47).

The FMSF shows 16 recorded archaeological sites, one resource group, and three historic structures that have polygonal extents that at least partially fall within the Blue Springs State Park boundary (Figure 48). These sites include a rail road line, one NRHP eligible house (8VO5162)(Figure 49), and two other 20th century American historic structures, several prehistoric mounds and middens, historic sites relating to agro industries, prehistoric campsites and prehistoric habitation sites. Two prehistoric sites are potentially eligible for listing on the NRHP as determined by the SHPO (8VO7229 and 8VO7230) and one site was recorded by the surveyor as being likely eligible for NRHP listing. An additional four sites contain human remains. The recorded sites temporally range from the St. Johns period of 700 BC to AD 1500 to the historic period.

Archaeological surveys and inquiry into the area date back to antiquarians and early archaeologists in Florida's history, with Jeffries Wyman and C.B. Moore working at area mounds and middens in the late 19th century (Milanich 1994). In the modern era, the Florida Division of Historical Resources (FDHR) examined a portion of Blue Springs Park along with adjacent Hontoon Island as part of a published report (Dunbar et al. 1978). CARL archaeologists worked at Blue Springs in the 1990s, and the FDHR clarified spatial locations for human remain sites in the early 2000s (Tesar 2003). A University of Florida Field School under the direction of Dr. Ken

Sassaman worked at the Thursby House Blue Spring Midden B (8VO43). Also, Cultural Resource Management firms worked at the site for construction and proposed maintenance projects (Estabrook 2002). A number of nearby academic research projects, focused primarily on Hontoon Island, provide significant details into the settlement pattern and lifeways of prehistoric populations in the area (Purdy 1990; Purdy 1981; Randall and Sassaman 2009; Sassaman 2003b; Sassaman and Anderson 1996), as do previous environmental and cultural characterizations, and predictability model criteria that have been developed for this area (Austin 1989; Goggin 1952) (Madry et al. 2001; Sassaman et al. 2000).

Our visit to Blue Springs and GPS work conducted included a tour with the park's naturalist, acquiring control points on several recorded mounds and middens, historic structures, rail bed areas, trails, and historic features (Figure 50). Several areas were inaccessible due to water levels.

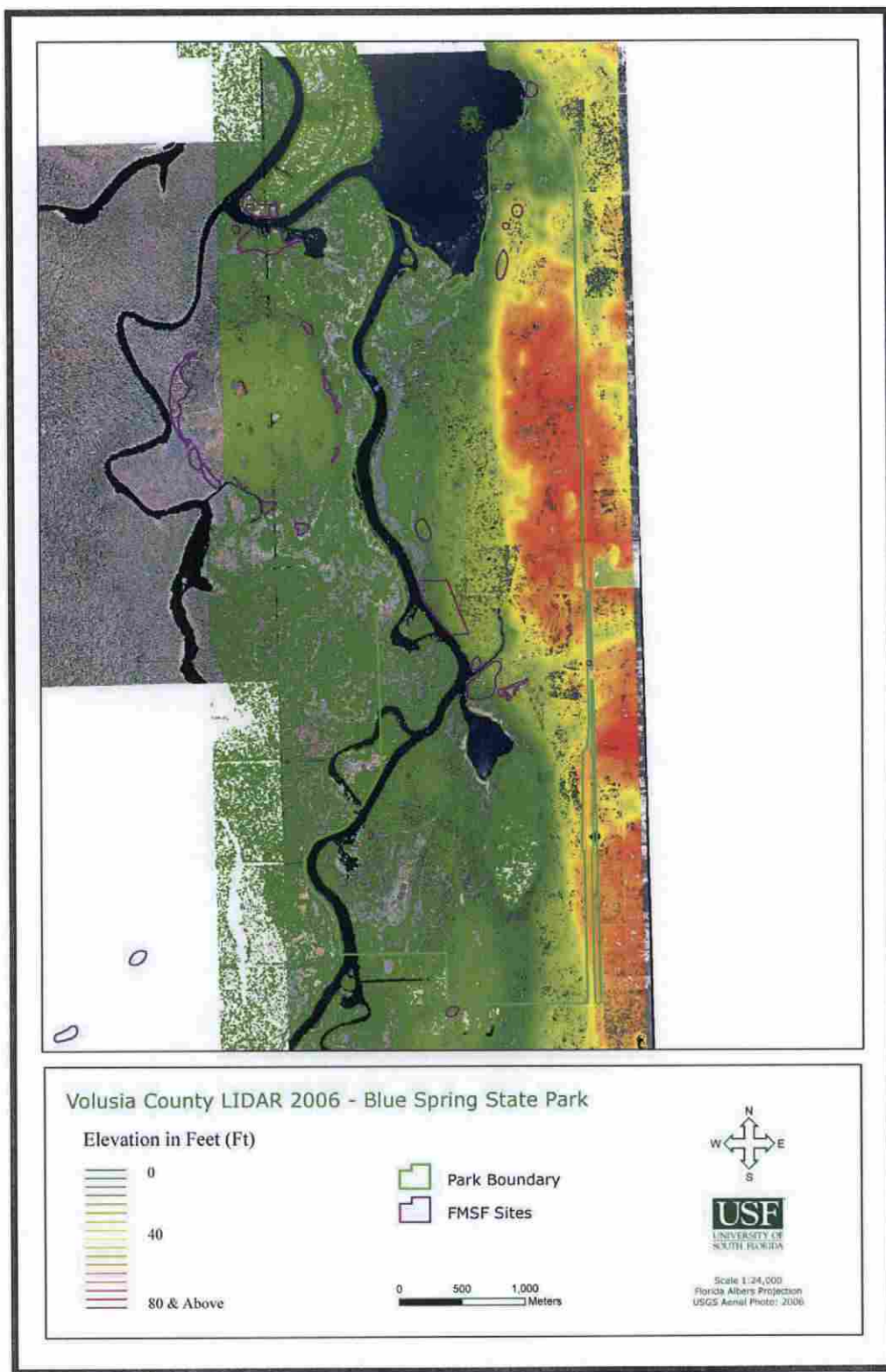


Figure 46. LiDAR data for the Blue Spring State Park area



Figure 47. Karstic features such as springs are noted at Blue Spring State Park with mounds and midden areas found along the river and spring run areas

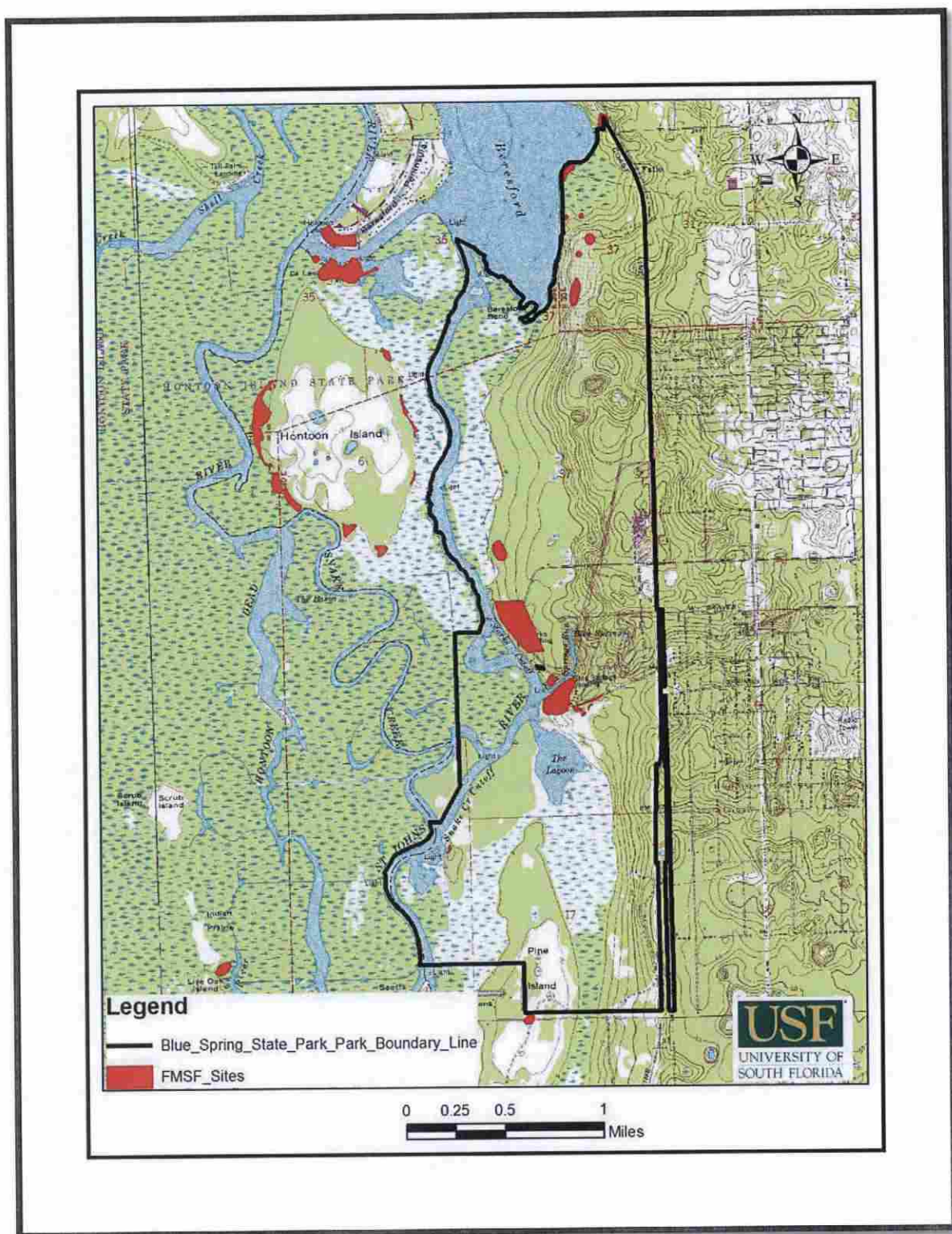


Figure 48. Florida Master Site File data for the Blue Spring State Park area



Figure 49. The Thursby House (8VO5192) built in 1872 sits on the Blue Springs Midden B (8VO43) shell midden

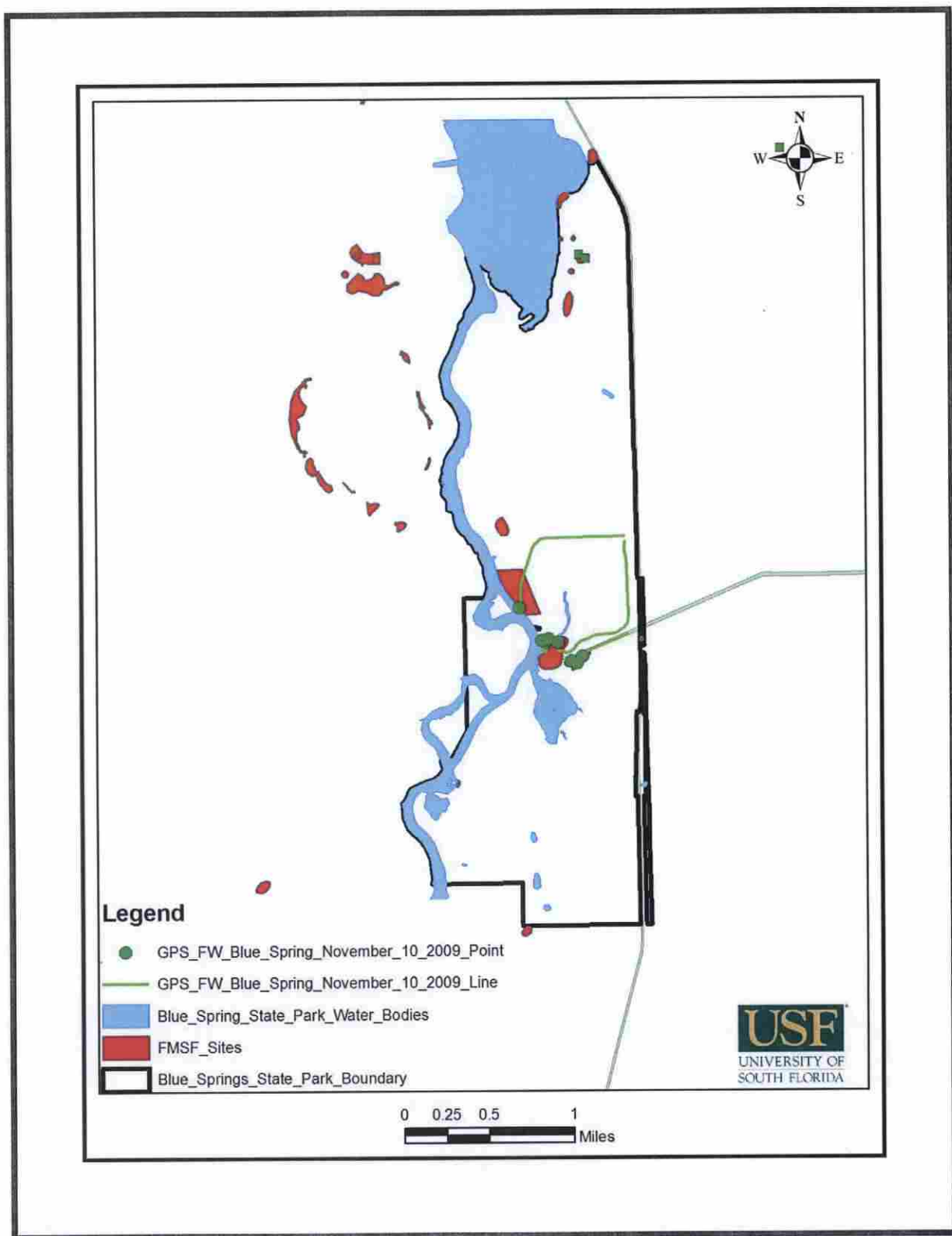


Figure 50. GPS survey data collected at Blue Spring State Park along with FMSF location data

Results and Discussion

The archaeological sensitivity model for Blue Springs State Park includes a variety of environmental and cultural variables that account for the presence of sites through time and space and account for the variability of site types known to occur within the park as demonstrated through previous surveys in and within the regional vicinity to the preserve. Primary factors for cultural site locations in the park relate to soil drainage characteristics, distance to water, and relative elevation. The presence of unique environmental setting characteristics, such as the spring and spring run, the adjacency to the St. Johns River and associated water features, and elevated areas, are all contributory to cultural settlement. At Blue Spring State park, the environmental and cultural matrix items used in the model analysis included: distance to river or permanent stream, distance to intermittent stream, distance to pond, distance to wetlands, existing or relic spring, relative elevation, presence of travel corridors, soil drainage characteristics, recorded sites with human remains, high likelihood of containing significant sites based on recorded or archival data or oral tradition (survey evals from FMSF = likely, potentially or eligible for the NRHP High likelihood of historic sites or (noted on FMSF or other informant data. GPS data collected with sub-meter instrumentation was useful in verifying control points on the ground, and comparing the data collected against known site spatial locations as listed in the FMSF. These data, along with historical maps and information further clarified pertinent features for sensitivity modeling purposes. Our archaeological resource sensitivity model for the park is shown at a 1:24,000 scale (Figure 51).

Model Performance

When this model is verified using the FMSF polygonal site location data, the model captures all 16 recorded sites at least partially, in the designated high and medium sensitivity areas. A few of the recorded sites (8VO40, 8VO7229 and 8VO8263) have polygonal extents that include some low sensitivity areas in our model. This occurrence is likely a result of vaguely defined boundaries as listed with the FMSF, or potential for plot errors with the FMSF data. In this case, differences of 10 meters could make a difference between high and low probability areas, and so all site locale boundaries would need to be further verified with sub-meter GPS and LiDAR review if possible. For example, site 8VO8263 is an historic homestead location with a circular polygonal extent that accounts for some of the low sensitivity area value, although the plot points for the structures fall in high and medium sensitivity areas. Expressed as spatial percentages, the high archaeological resource sensitivity area at Blue Spring State Park accounts for less than 6% of the land surface area (Table 7), but it has more than 67% of the recorded archaeological spatial extents correlating with these modeled areas.

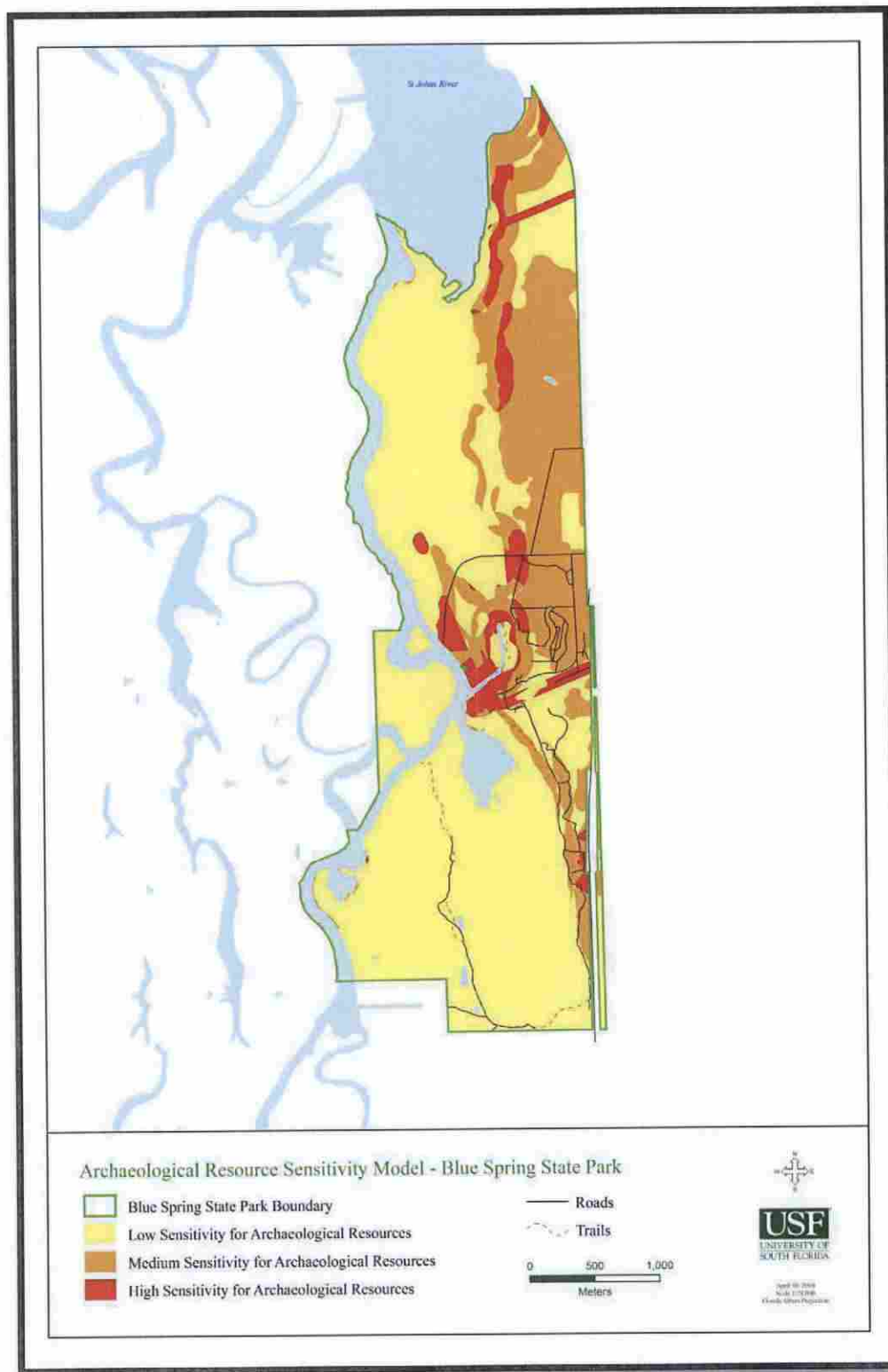


Figure 51. Map showing the archaeological resource sensitivity model developed for Blue Spring State Park.

Using the aforementioned performance statistics ($p[MIS]-p[M]=.62$), our model represents a 62% improvement over chance of locating archaeological sites within our designated high probability area (see: Kvamme 2006:28). Combining the high and medium sensitivity areas shows that 80% of recorded archaeological spatial extents occur within our sensitivity areas, showing a 49% overall improvement over chance. These sensitivity areas can be best refined through further field verification with use of the model and direct remote sensing observations using high resolution aeriels, LiDAR, and GPS data. Additionally, spatial locations of sites listed within the FMSF can be further verified to offer even more improvement. For example, archaeologists typically utilize 1:24,000 scale USGS topographical quad maps to draw polygonal extents of site locations. The topo quads themselves can be inaccurate, and LiDAR and GPS data can be used to better portray spatial location extents (Figure 52).

Table 7. GIS model performance calculations for Blue Spring State Park

Blue Spring Sensitivity Model	Acres	Percent		FMSF Acres	Percent
High Sensitivity Area	147.47	5.50%		34.59	67.27%
Medium Sensitivity Area	695.09	25.91%		6.32	12.29%
Low Sensitivity Area	1,840.30	68.59%		10.51	20.44%
Total	2,682.86	100.00%		51.42	100.00%

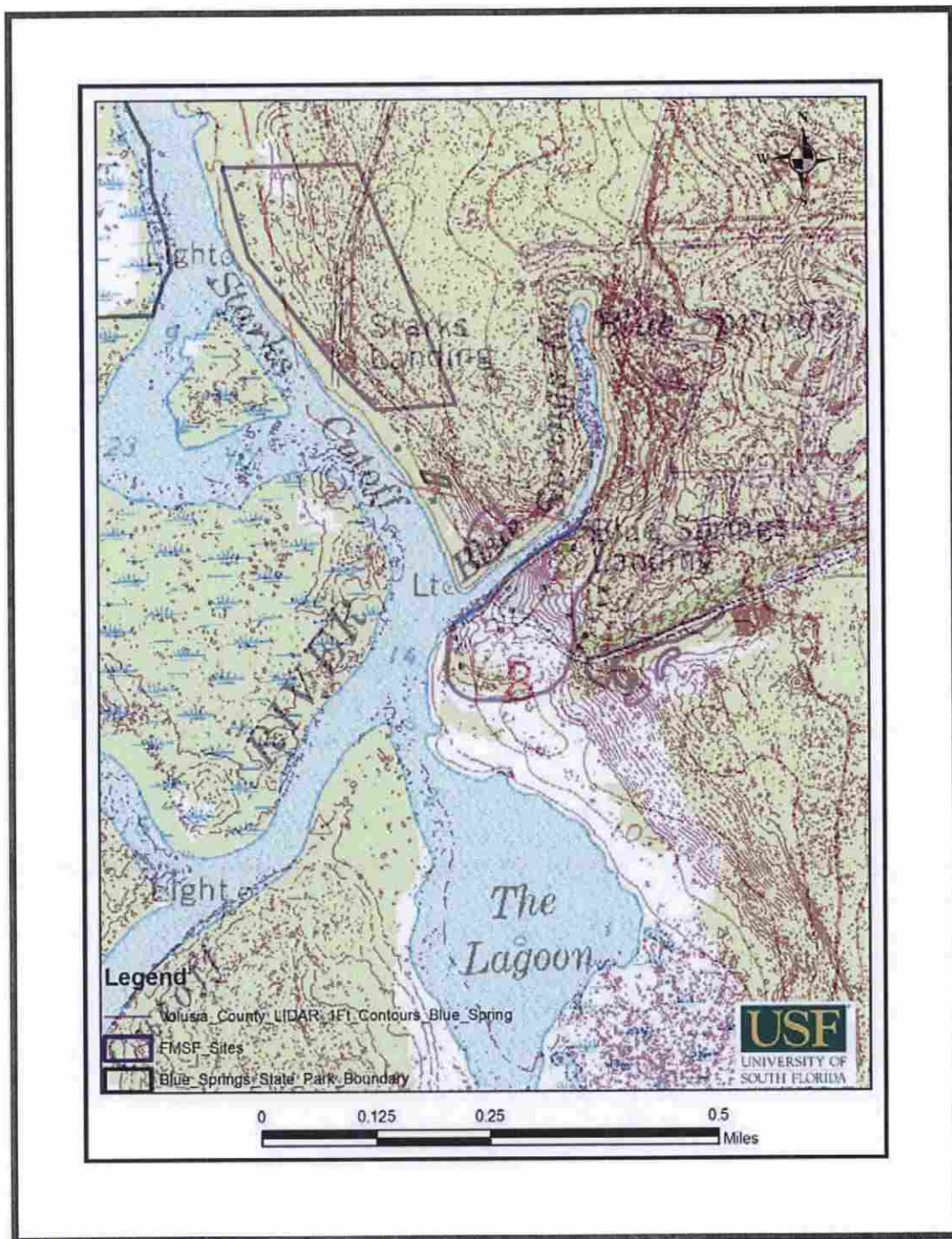


Figure 52. Map showing the archaeological site locations from the FMSF data in the spring run area of Blue Spring State Park, in relation to the topographical quad map and LiDAR data. Linear features and shoreline areas show variability, and elevations associated with site extents can be re-verified.

Bulow Creek State Park

Bulow Creek State Park is a 5,697.59 acre parcel with diverse natural and cultural features. The park is located in the Atlantic Coastal Lowlands primary physiographic zone, with two major landforms of the Atlantic Coastal Ridge and the Silver Bluff Terrace (Myers and Ewel 1990). The highest elevations in the park are approximately 25 ft. MSL (Figure 53). Soils at Bulow Creek are predominated by Tuscawilla series, underlain by clays and shell matrix. This subsurface layering leads to higher fertility rates, likely associated with the Plantation-era agricultural activities in the area (FDEP 2003a). Today's vegetation is largely hammock forest throughout the park's range.

The FMSF shows 21 recorded archaeological sites and one historic structure (Figure 54). These sites include several site types, such as homesteads, plantation-era structures and related building remains, slave related sites and building remains, prehistoric mounds and middens, historic refuse dumps, wharf sites, agro-industry sites. Also present are a number of trails and travel corridors, although not all listed on the FMSF. There is also numerous building and structural remains and scatters, some of which we collected GPS data that are not currently listed separate from plantation ruins with the FMSF. Three sites are eligible for listing on the NRHP as determined by the surveyor recommendations (8VO241-Dummett Plantation and sugar mill; 8VO244-McHardy Plantation sugar mill; and 8FL7C – Bulow Plantation Slave Quarters). Three prehistoric mound and midden sites are also recommended for preservation by the recorder (8FL18, 8FL19, and 8FL20 – Bellemead 5, 6, and 7 respectively). Additionally, 8VO63 (the Tomoka River Midden) is listed with the FMSF as containing human remains, and 8VO251 (the Ormond Plantation) is determined by the SHPO to be eligible for listing on the NRHP.

Because Bulow Creek State Park is jointly managed as a multi-unit park along with Tomoka State Park, Addison Blockhouse, and Bulow Historic Ruins State Park, archaeological, historical and architectural surveys that have taken place in these areas contain useful information for all the parks. Surveys and inquiry at the Bulow Creek include Phase I archaeological survey that was conducted by the FDHR in 1980 for a proposed development (Daniel 1980), and included the recording of a number of new prehistoric site locations. In 1995 and 1996 surveys focused on the various periods of plantation-era extant structures, features and building remains (Payne 1996; Payne 1998a, b; Payne 1999; Payne 2001). There are also a number of articles and reports with valuable information on the history and archaeological background for parks within this multi-unit area (Baker 1999; Gluckman 1967; Newman 2005b; Stanton 1949; Strickland 1980; Wilson 1945), and prehistoric landscape predictability factors that have been examined for the region (Austin 1989).

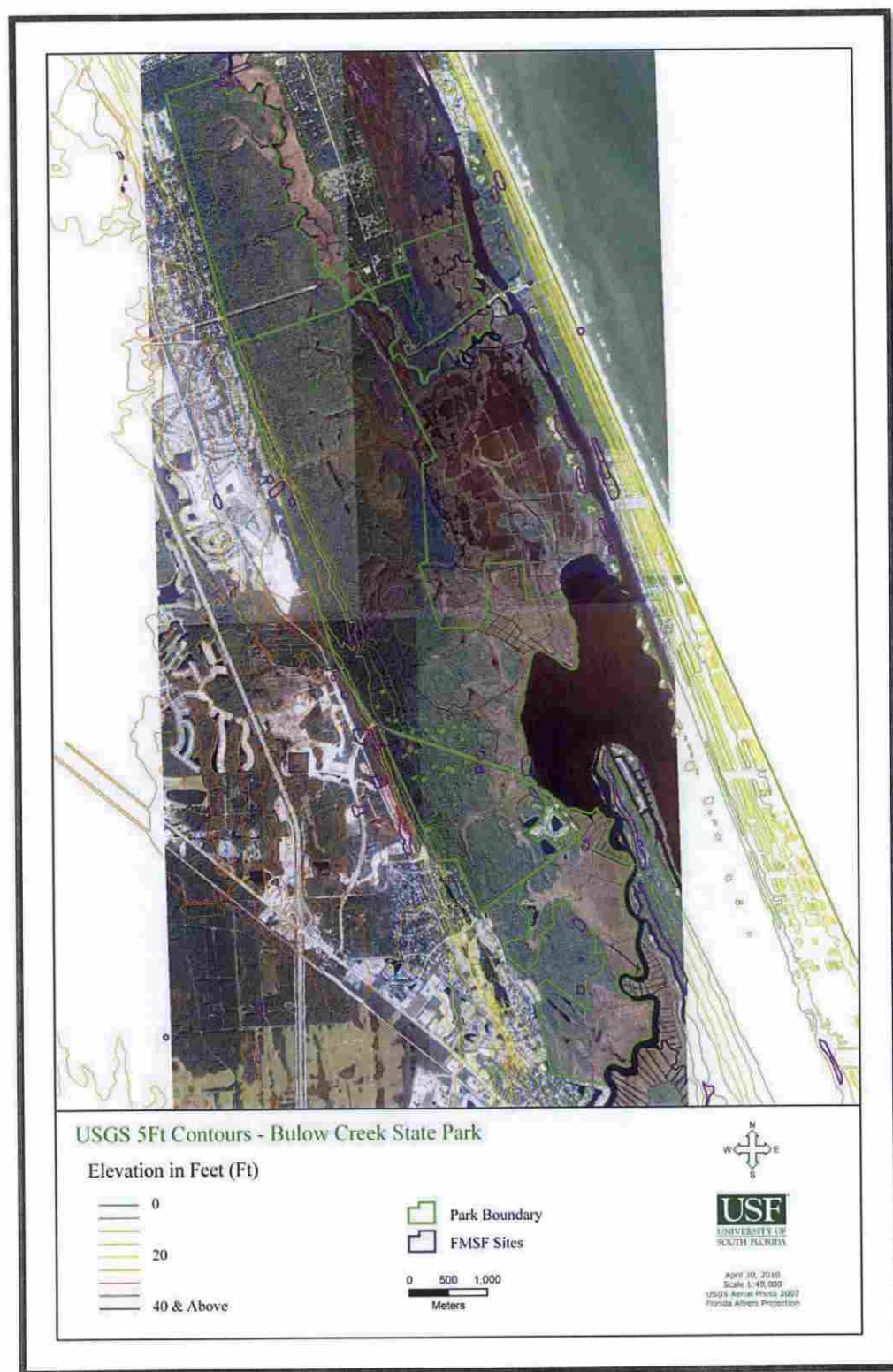


Figure 53. Contour elevation data for the Bulow Creek State Park area

There have also been a number of architectural projects that have largely focused on stabilization and documentation of extant structural ruins associated with plantation and sugar mill features (Wayne 2001). In 2009, AIST became involved in the documentation and conditional assessment for sugar mill ruins at both the Bulow Historical Ruins State Park and at the Bulow Creek (Collins and Doering 2009). The use of non-invasive documentation techniques such as GPS, Ground Penetrating Radar, and 3D Terrestrial Laser Scanning have been the focus of these works, which at Bulow Creek State Park, have been used for stabilization and conservation planning (Figures 55 and 56). Several students at USF are also currently working on Master's thesis projects involving these plantation-era projects.

Our site visit to Bulow Creek State Park and GPS work in the area is combined for our modeling of the parks in this multi-unit managed area. Many sites extend in their boundaries from one park to the next, and so consideration for the landscape is important. Also, some sites, such as the Bulow Plantation Slave Quarter area (8FL7C) are plotted inaccurately with the FMSF, and have a number of features that occur on both Bulow Historical Ruins State Park and at Bulow Creek. The Addison-McRae Sugar mill site also partially extends into Bulow Creek boundary from the Addison Blockhouse Historic State Park. We have additionally added a number of new GPS positions for features and remains primarily associated with the plantation-era and agro-industrial use of the area, including building remains, historic refuse locales, trails and travel corridors, and historic dumps (Figure 57).

Results and Discussion

The archaeological sensitivity model development for Bulow Creek State Park included factors that took in a variety of environmental and cultural variables that account for the presence of sites through time and space and account for the variability of site types known to occur within the park as demonstrated through previous surveys and recorded archaeological sites as listed on the FMSF. A primary factor for cultural site locations in this park included the plantation-era historic landscape extant ruin locations. Data layers utilized include aerial LiDAR, aerial imagery, historical maps and references, and environmental layers such as the National Wetlands Inventory, hydrology, and SSURGO soil information. The GPS field-truthing and ground control points were extremely useful as we were interested in delineating accurate field locations for extant structural remains relating to the Dummett Plantation and sugar mill, the McHardy Plantation and mill site, the Ormond Plantation, and the Bulow Plantation slave quarters. The FMSF data was used in the model, and assisted with the matrix evaluation in terms of sites that were eligible, potentially eligible, or likely eligible for the NRHP, contained human remains, or

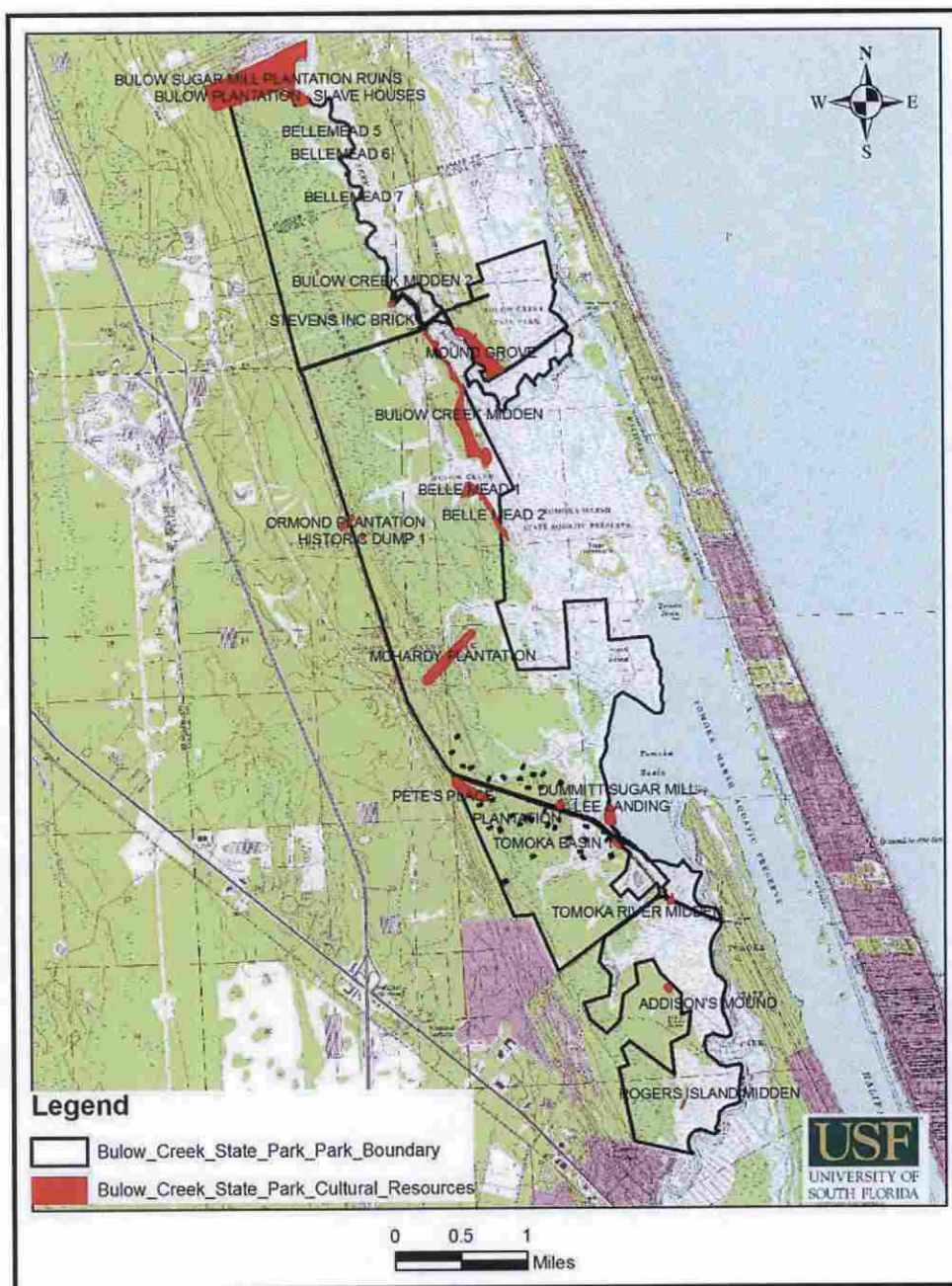


Figure 54. Florida Master Site File data showing archaeological sites within the Bulow Creek State Park



Figure 55. Color point cloud from the Dummett Sugar Mill Ruins (8VO241) TLS survey conducted post-collapse.

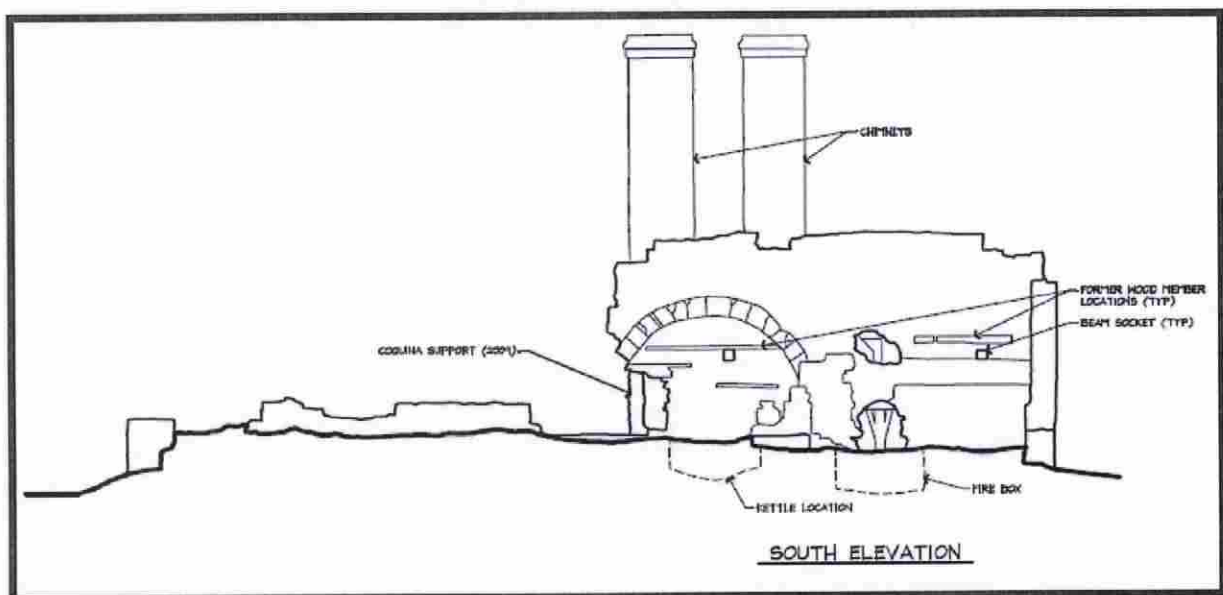


Figure 56. CAD line work from scan data showing the South elevation of the Dummett Mill Ruins (post-collapse with new coquina support)

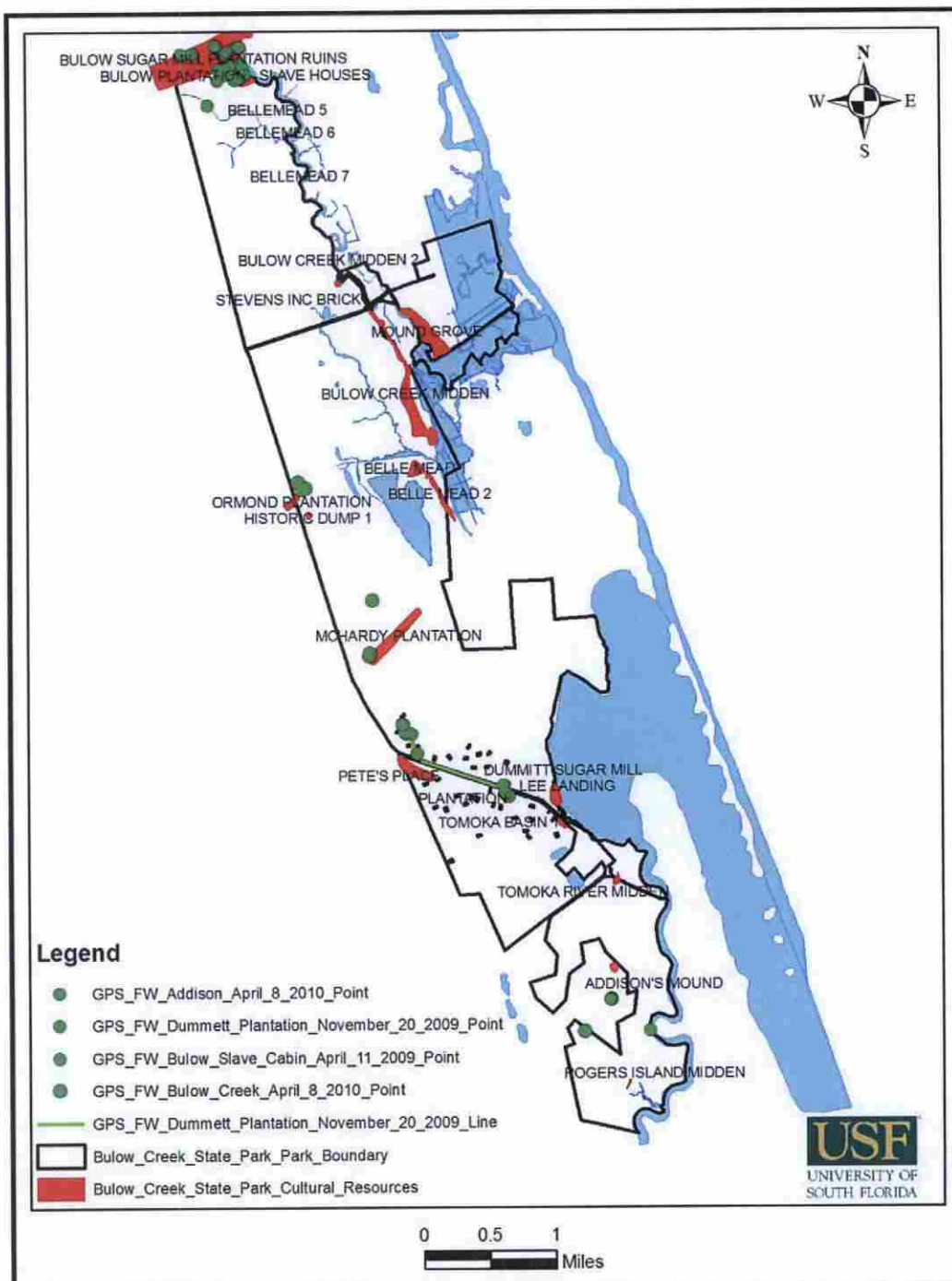


Figure 57. GPS survey data collected at Bulow Creek State Park showing corrected locations as compared to the FMSF location data

were representative of an area of site density or significance. Other factors used in the sensitivity model development included distance to rivers and permanent streams, distance to Intermittent streams, ponds or lakes, distance to wetlands, relative elevation, distance to potential or apparent quarry sites for stone or coquina procurement, special environmental or natural areas, including historic or prehistoric sacred or traditional site locations and prehistoric site types, and soil drainage characteristics.

Model Performance

Our archaeological sensitivity model for Bulow Creek State Park is shown at 1:24,000 scale, and is depicted in two map layout extents due to the size of the park (Figures 58 and 59). When this model is verified using the FMSF polygonal site location data and corrections to the FMSF based on our GPS field reconnaissance and documentation, the model captures 16 out of 21 recorded sites at least partially, in the designated high and medium sensitivity areas. Recorded sites that were not in the high and medium sensitivity area were located in areas with poor drainage characteristics and because of the lack of information in the FMSF, primarily no evaluation allowing for any significance determination, they fall into lower sensitivity area designations. This was the case with sites 8FL19, 8VO7223, 8VO7165, 8VO248, and 8VO249. A few of the recorded sites have polygonal extents that include some low sensitivity areas in our model. This occurrence is likely a result of vaguely defined boundaries as listed with the FMSF, or potential for plot errors with the FMSF data. In this case, differences of 10 meters could make a difference between high and low probability areas, and so all site locale boundaries would need to be further verified with sub-meter GPS and LiDAR review if possible. For example, site 8VO246 the Bulow Creek Midden, is a very long and complexly shaped site. It appears to be incorrectly plotted, with a possible correction to the plot over portions of the site placing more of its area into the model's high and medium sensitivity areas. Another example of a site with some low sensitivity area associated is the McHardy Plantation site (8VO244), which appears on the FMSF as a rectangular large plot. Our GPS data showed structural remains to actually be located slightly outside the plotted area, and so some shift in the FMSF data is likely needed.

Expressed as spatial percentages, the high archaeological resource sensitivity area at Bulow Creek State Park accounts for less than 8% of the land surface area (Table 8), but has more than 37% of the recorded archaeological spatial extents correlating with these modeled areas. Using statistics ($p[MIS]-p[M]=.29$), our model represents a 29% improvement over chance of locating archaeological sites within our designated high probability area (Kvamme 2006:28). Combining the high and medium sensitivity areas shows that 69% of recorded archaeological spatial extents occur within our sensitivity areas, showing a 53% overall improvement over chance. We have shown the validation table using area calculations from GPS locations and

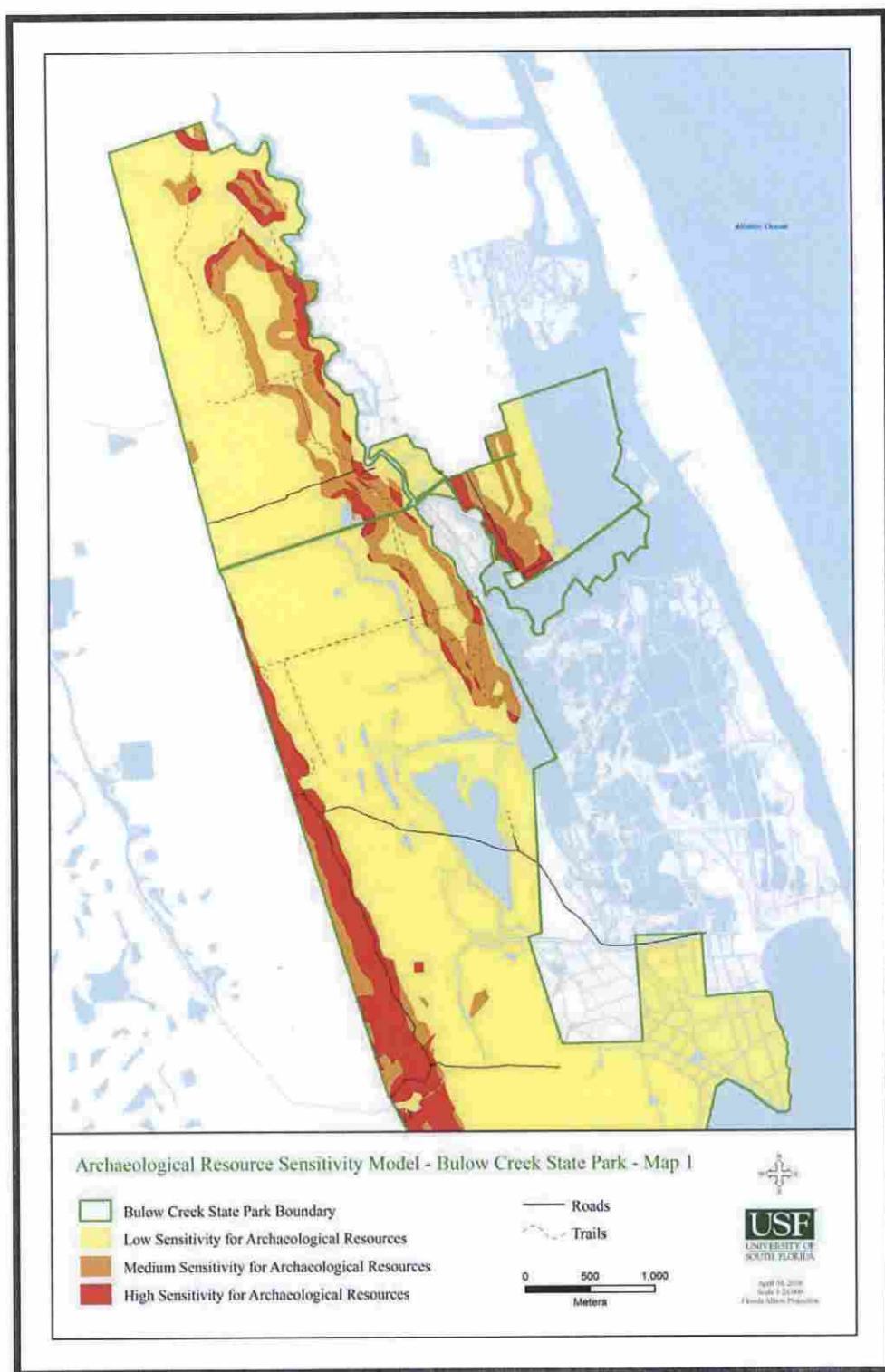


Figure 58. Map showing the archaeological resource sensitivity model developed for northern sections of Bulow Creek State Park.

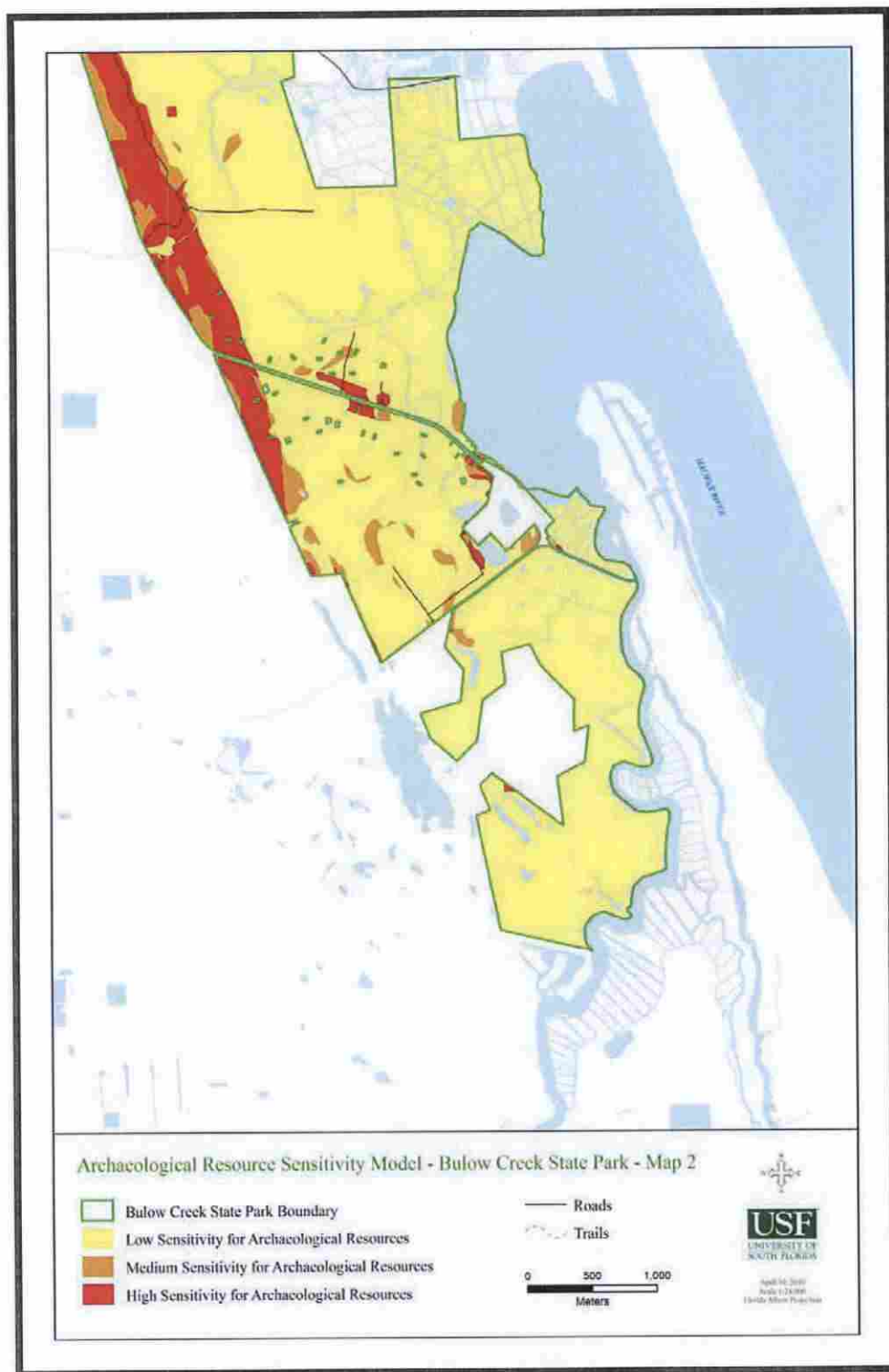


Figure 59. Map showing the archaeological resource sensitivity model developed for southern portion of Bulow Creek State Park

Table 8. GIS model performance calculations for Bulow Creek State Park showing FMSF polygonal data and the corrected GPS polygonal data used

Bulow Creek Sensitivity Model	Acres	Percent		FMSF Acres	Percent
High Sensitivity Area	431.19	7.57%		55.21	36.61%
Medium Sensitivity Area	467.43	8.20%		48.57	32.21%
Low Sensitivity Area	4,798.98	84.23%		47.02	31.18%
Total	5,697.59	100.00%		150.80	100.00%

Area Stats based off original FMSF Location	Acres	Percent		FMSF Acres	Percent
High Sensitivity Area	431.19	7.57%		47.16	32.75%
Medium Sensitivity Area	467.43	8.20%		48.48	33.66%
Low Sensitivity Area	4,798.98	84.23%		48.36	33.59%
Total	5,697.59	100.00%		144.00	100.00%

FMSF data versus FMSF data before correction. It should be noted that our GPS data provides for accurate centroid point positions, but the full polygonal extent of sites was not often verified with GPS due to either lack of visibility or access. These sensitivity areas can be best refined through further field verification with use of the model and direct remote sensing observations using high resolution aeriels, LiDAR, and GPS data. Additionally, spatial locations of sites listed within the FMSF can be further verified to offer even more improvement. For example, archaeologists typically utilize 1:24,000 scale USGS topographical quad maps to draw polygonal extents of site locations. The topo quads themselves can be inaccurate, and LiDAR and GPS data can be used to better portray spatial location extents. Additionally, with either SHPO or the survey recorder making an entry for the NRHP evaluation category, sites could be scored much more effectively in the matrix evaluation.

Bulow Plantation Ruins Historic State Park

Bulow Plantation Historic Ruins State Park is a small parcel of 147.99 acres that is managed as part of a multi-park unit along with Bulow Creek, Tomoka, and Addison Blockhouse Historic State Park. The park is located in the Atlantic Coastal Lowlands primary physiographic zone, with two major landforms of the Atlantic Coastal Ridge and the Silver Bluff Terrace (Myers and Ewel 1990). The park is of relatively low topographic relief, with the highest elevations indicated by LiDAR seen on the western edge of the park of slightly more than 14 feet (Figure 60). Soils at Bulow Plantation Ruins Historic State Park are predominated by Tuscowilla series, underlain by clays and shell matrix. This subsurface layering leads to higher fertility rates, likely associated with the Plantation-era agricultural activities in the area (FDEP 2003a). Today's vegetation is largely hammock forest throughout the park's range. Toward Bulow Creek, the soils are comprised largely of Cassia Fine Sands that are somewhat poorly drained.

The FMSF shows five recorded archaeological site loci, with three relating to the historic occupation and plantation-era structures and activities (8FL7). Another site (8FL17) has prehistoric temporal affiliation, and one site is shown as an historic road segment (8FL142) that also has a prehistoric component (Figure 61). The historic Plantation-era sites include 8FL7A, 8FL7B, and 8FL7C that comprise the main house ruins, sugar mill, and slave houses of the Bulow Plantation, with periods ranging from the British and Spanish Second Period to the Seminole First and Second Wars. There are also a number of building and structural remains and scatters, some of which we collected GPS data for, that are not currently listed separate from plantation ruins with the FMSF. Nearly 75% of the park is a National Register designation. Interestingly, the designated polygonal area does not capture all of the features associated with the plantation landscape, namely the slave houses and slave activity areas to the south and east of the property (Figure 62).

Because Bulow Plantation Historic Ruins State Park is jointly managed as a multi-unit park along with Tomoka State Park, Addison Blockhouse, and Bulow Creek State Park, archaeological, historical and architectural surveys that have taken place in these areas contain useful information for all of these parks, and serve as background literature reviewed for the sensitivity modeling and field reconnaissance. Surveys and inquiry at the Bulow Plantation Historic Ruins include archaeological work near the sugar mill portion of the site (Gluckman 1967), historical overviews of the Plantation-era at the site (Baker 1991; Baker 1999; Wilson 1945), and Phase I archaeological survey that was conducted in the vicinity by the FDHR in 1980 for a proposed development (Daniel 1980), that included the recording of a number of new prehistoric site locations in the vicinity. In 1995 and 1996 surveys in the area of Bulow Plantation focused on the various periods of plantation-era extant structures, features and building remains (Payne 1996; Payne 1998a, b; Payne 1999; Payne 2001). Park construction and

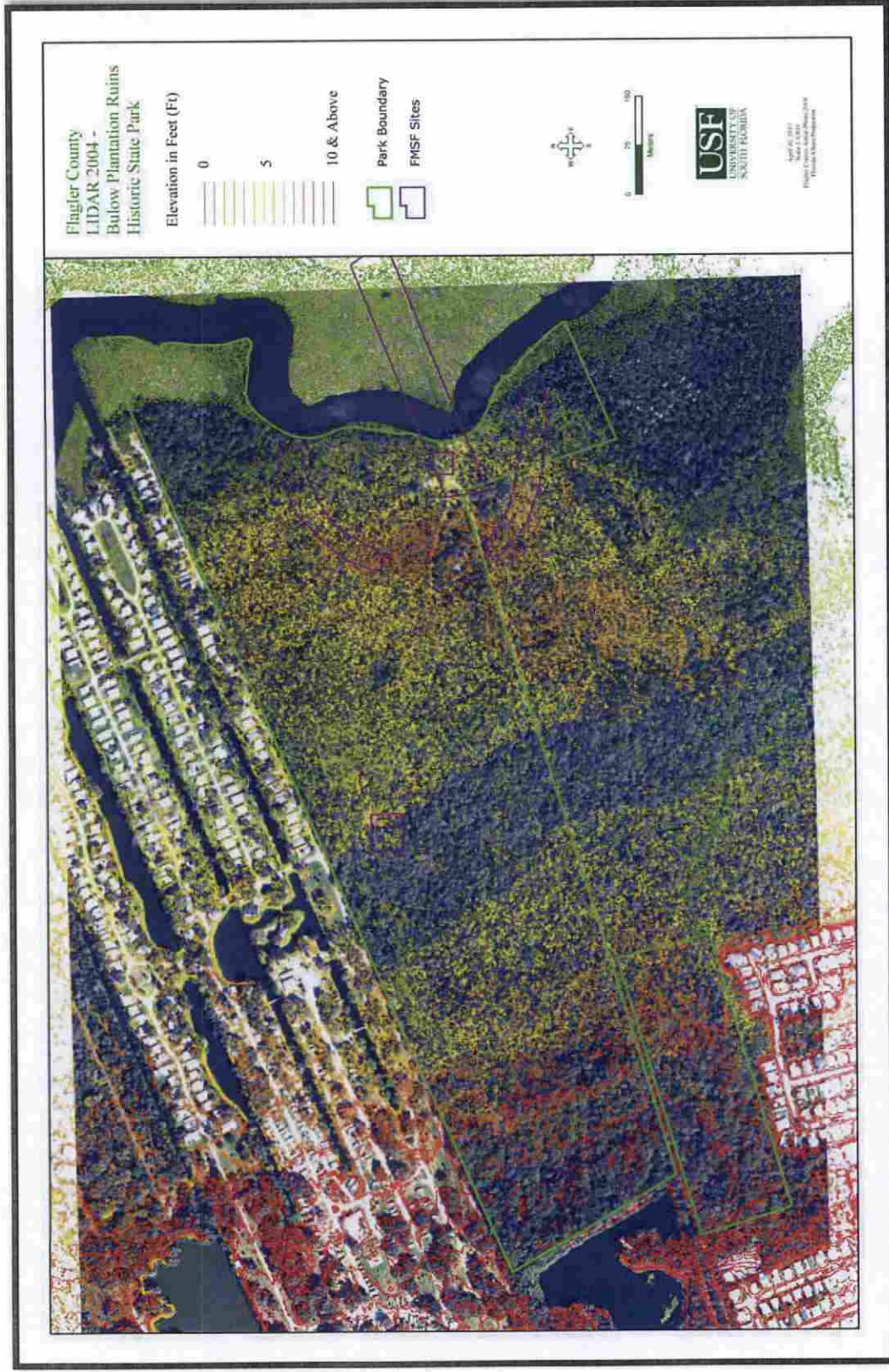


Figure 60. LiDAR data for the Bulow Historic Ruins State Park area

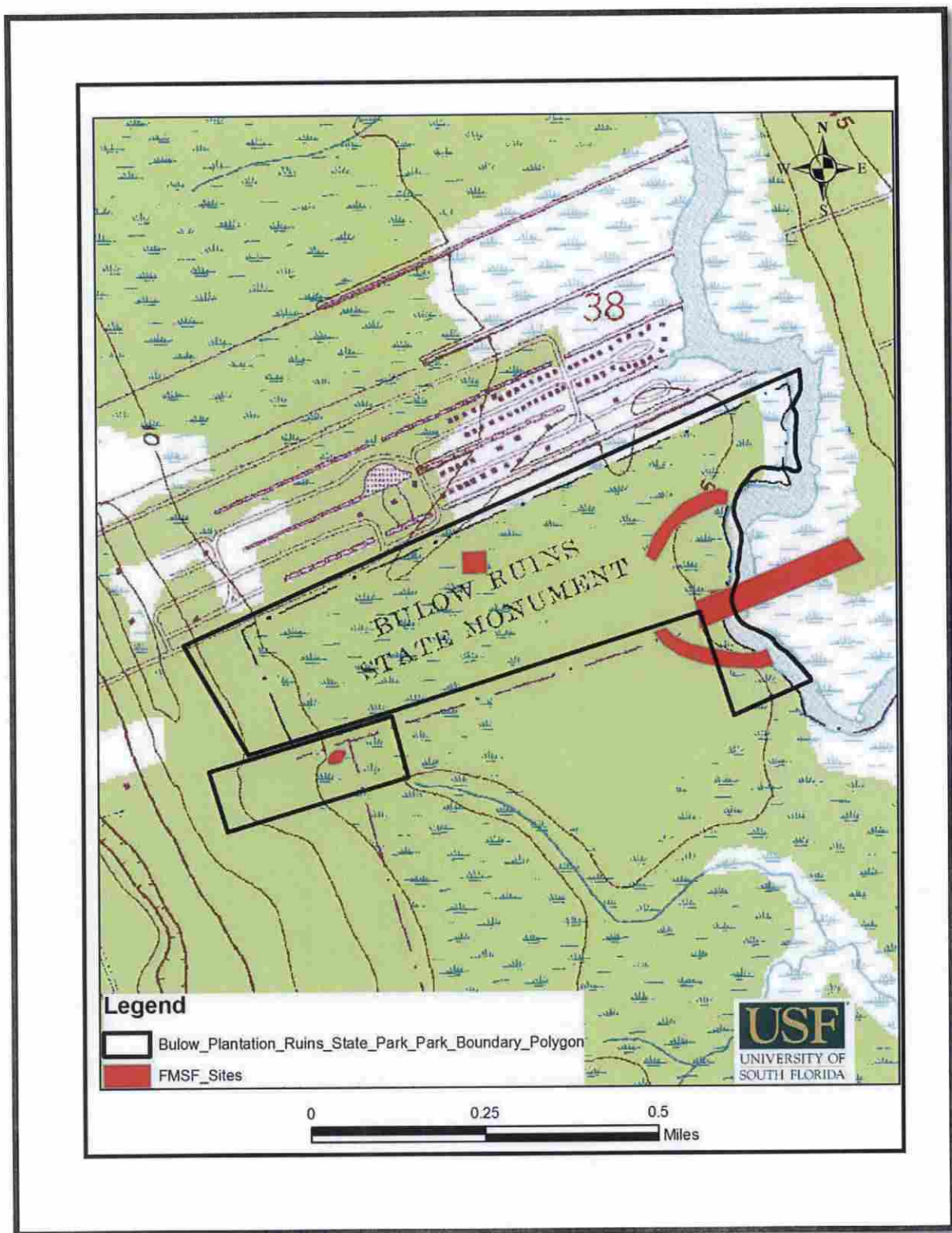


Figure 61. Florida Master Site File data showing recorded archaeological sites within the Bulow Plantation Historic Ruins State Park

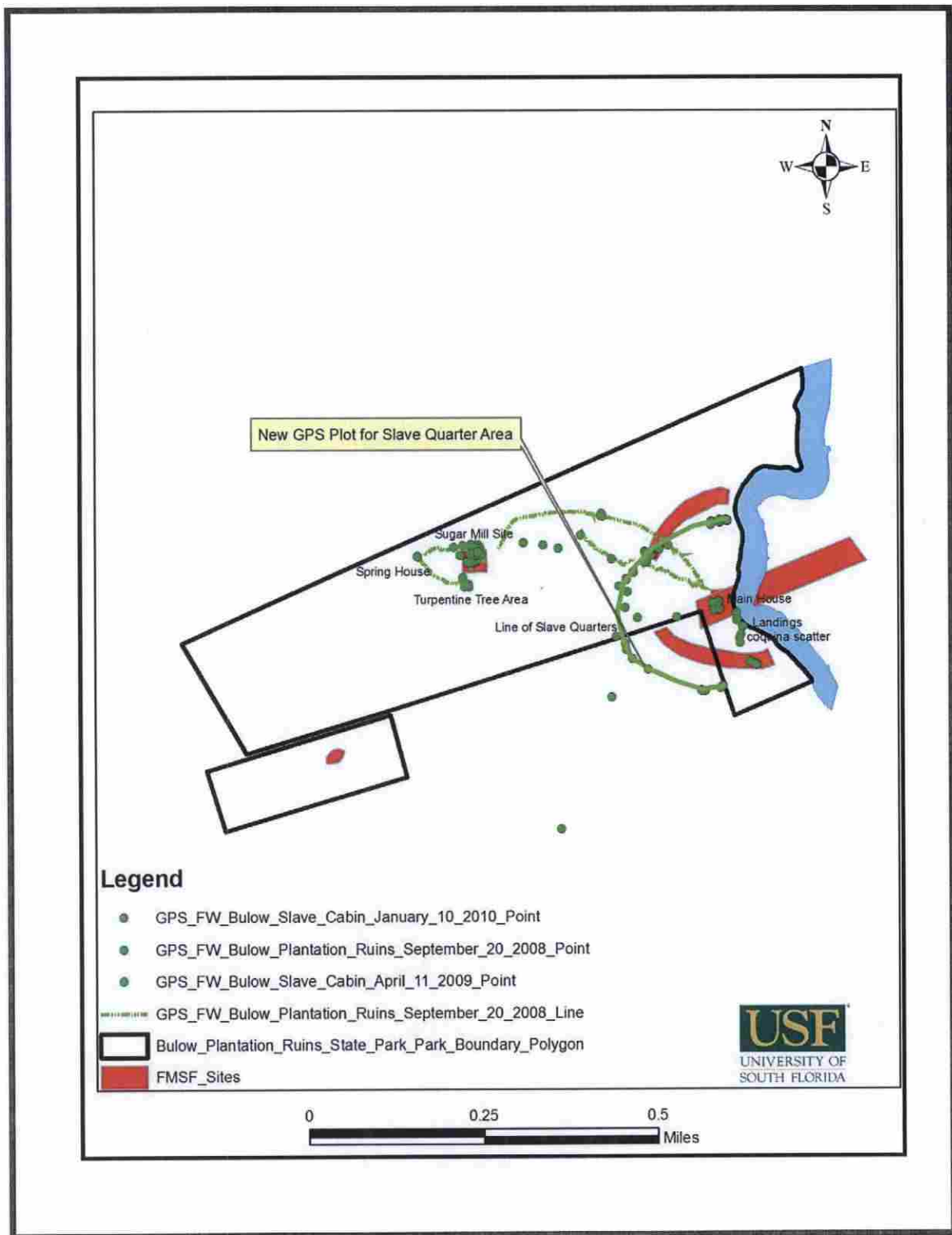


Figure 62. GPS survey data collected at Bulow Plantation Historic Ruins State Park showing corrected locations and cultural resource areas as compared to the FMSF location data

maintenance projects led to monitoring and recording of features in the mid-2000s (Newman 2005b) , and there are also a number of articles and reports with valuable information on the history and archaeological background for parks within this multi-unit area (Stanton 1949; Strickland 1980), and on prehistoric landscape predictability factors that have been examined for the region (Austin 1989). A number of architectural surveys and projects, some published and others unpublished, have been conducted relating to maintenance and repair at the Bulow Sugar Mill and the Main House investigation. The published surveys provide details relating to the landscape and these important features (J. W. Griffin 1952; Wayne 2001). In 2009, AIST became involved in the documentation and conditional assessment for sugar mill ruins at both the Bulow Plantation Historical Ruins State Park and at the Bulow Creek. The use of non-invasive documentation techniques such as GPS, Ground Penetrating Radar and 3D Terrestrial Laser Scanning have been the focus of these works, which at Bulow Plantation Historical Ruins State Park, have been used for stabilization and conservation planning, (Figures 63), and are providing research inquiries and data for several students at USF are also currently working on Master's thesis projects involving these plantation-era projects.

Our previous and on-going research at Bulow Plantation Historic Ruins and Bulow Creek State Park has generated GPS data that has been useful in this modeling and analysis. Corrected positions for the slave house arc pattern (8FL7C) have been plotted and will be submitted to the FMSF. Additionally, we have mapped a number of historic road and trail segments, affiliated out-structure buildings, such as the spring house, wells, building remains and boat slips (Figure 64). We are also using GPS to examine social spatial patterning with the extant slave house remains, and have been mapping in agro-industry features, such as cat-faced trees, field boundaries and historic fence-line indicators, ditching, drainage, and canal features.

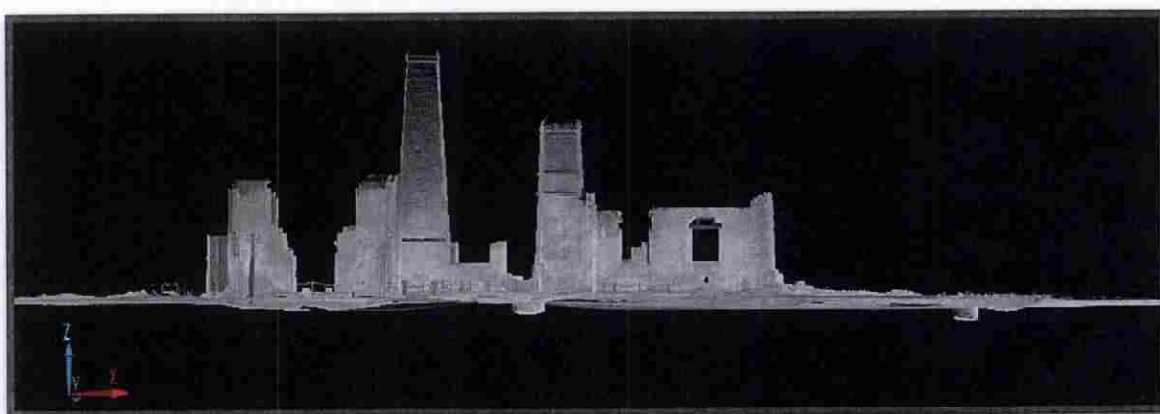


Figure 63. Terrestrial Laser Scanning 3D survey by USF at the Bulow Plantation Historic Ruins State Park consisted of documentation of the extant sugar mill feature including below-surface wells

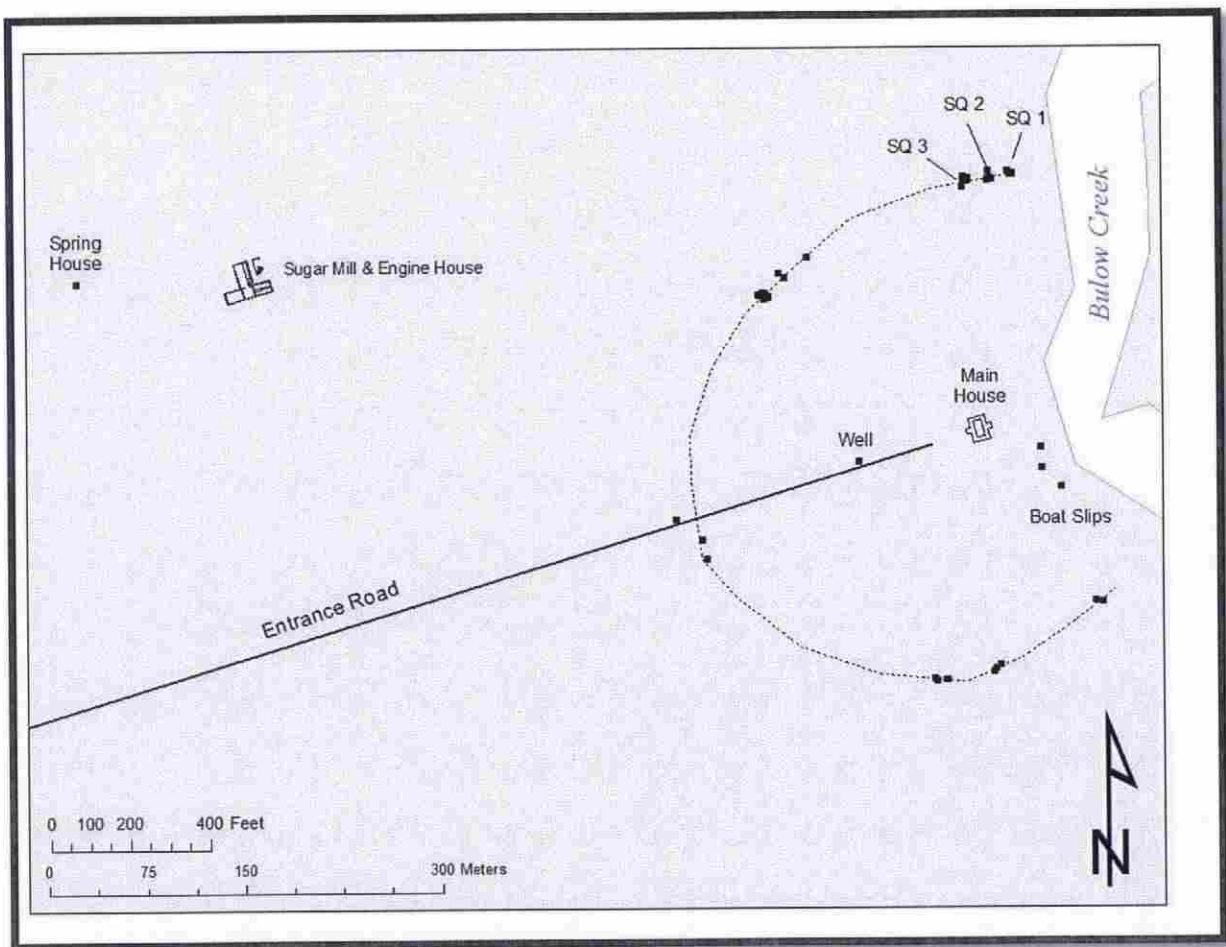


Figure 64. Map of Bulow Plantation, slave quarters (SQ) located with sub-meter GPS are here represented along a line of best fit along with the historic entrance road and other extant ruin features (map credit: Rebecca O'Sullivan, USF).

Results and Discussion

Distance to river or permanent stream, distance to wetlands, relative elevation, soil drainage characteristics, archaeological site density and site significance were matrix factors utilized in the evaluation of archaeological sensitivity at the Bulow Plantation Historic Ruins State Park. Collected sub-meter GPS data was utilized to digitize and update previously recorded site locations and to mark areas of archaeological features encountered during field reconnaissance. Data layers in the GIS modeling that allowed for these analyses included historic maps and documents (Figures 65 and 66), aerial imagery, NOAA 1-ft. LiDAR, National Wetlands Inventory, SSURGO soil data, hydrology, and park-specific data and GPS that was collected as part of this project. Additionally, the FMSF data was used in the model, and assisted with the matrix evaluation in terms of site locations, density, and if the sites were

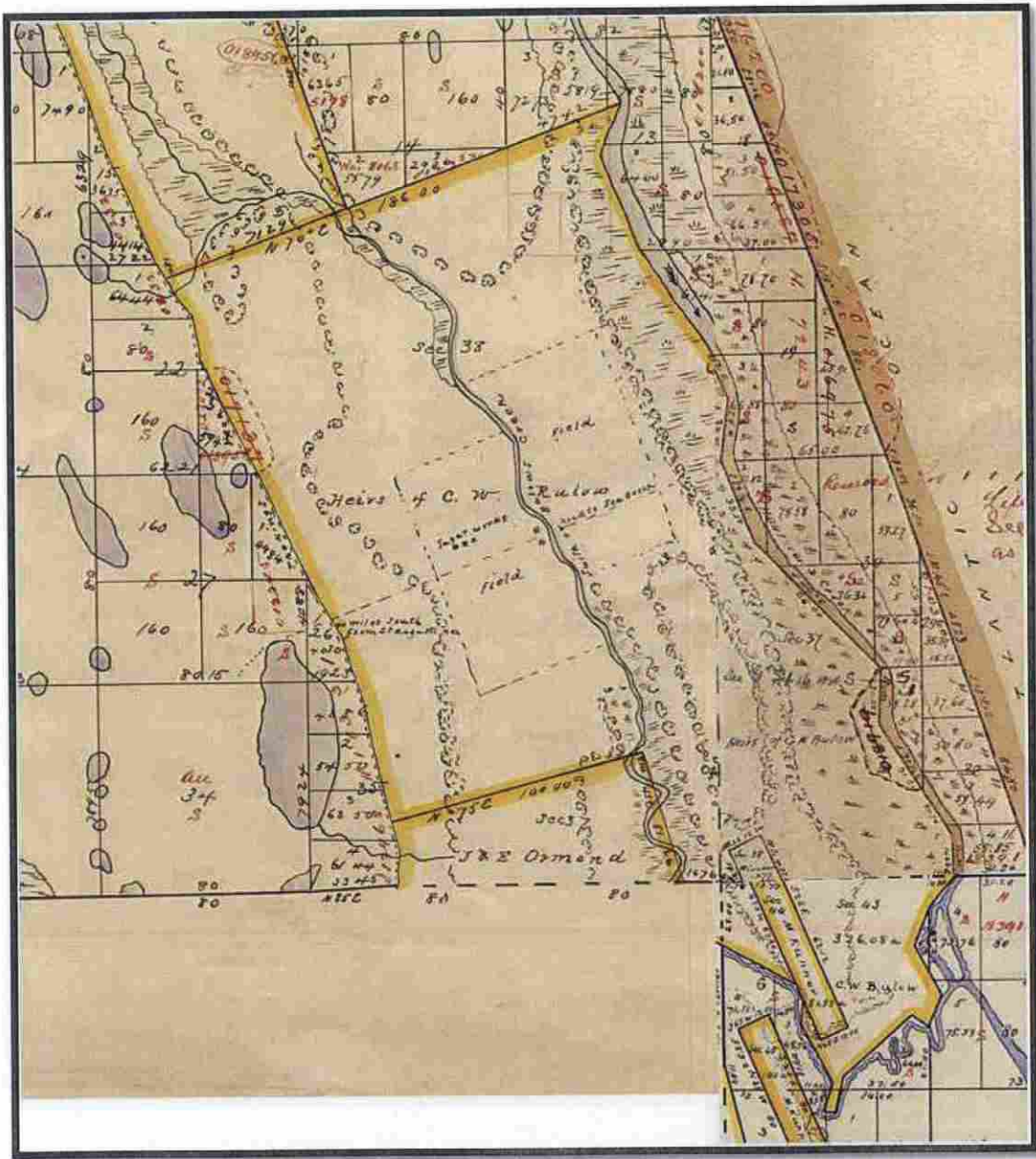


Figure 65. 1850 plat map showing the extent of Bulow's lands, including field lines, roads, and structures (General Land Survey 1850).

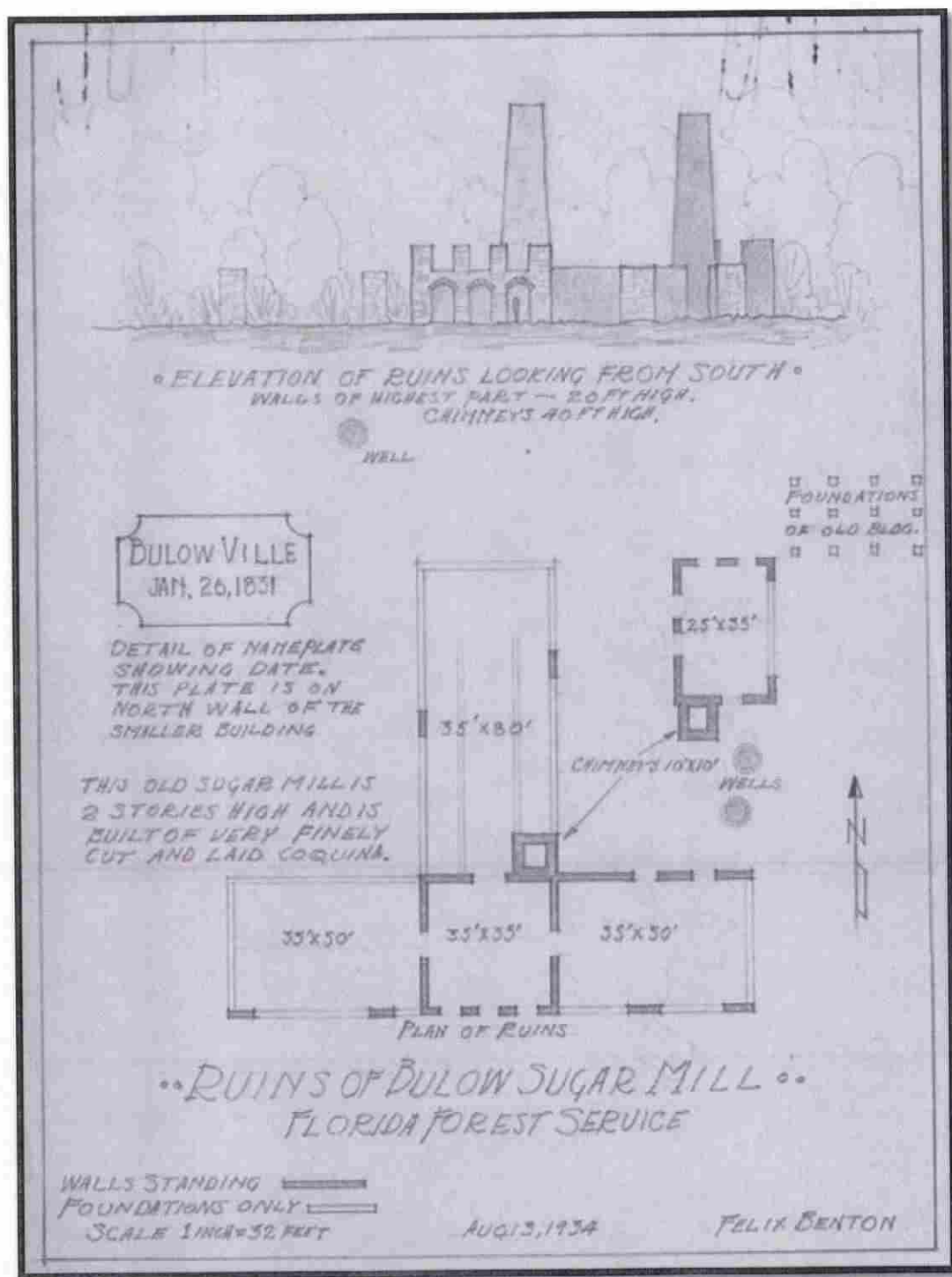


Figure 66. Profile and plan view, respectively, of the remains of the Bulow Plantation sugar mill as drawn in 1931 prior to any known restoration work, provides historical perspective (Benton 1934).

eligible, potentially eligible, or likely eligible for the NRHP, or were representative of an area of site density or significance.

Model Performance

Our archaeological resource sensitivity model for the Bulow Plantation Historic Ruins State Park is shown at a 1: 8,000 scale (Figure 67). When this model is verified using the FMSF polygonal site location data, the model captures 4 out of 5 recorded site loci at least partially, in the designated high sensitivity areas. The model misses one site location, 8FL17, described as a low density prehistoric artifact scatter that was evaluated by the surveyor as ineligible for listing on the NRHP. Expressed as a spatial percentage, our model shows the high archaeological resource sensitivity area at Bulow Plantation Historic Ruins State Park to account for nearly 86% of the land surface area (Table 9). This degree of high sensitivity is due to a large portion of the park being designated as a special resource area and National Register site locale. Nearly all or 96% of the recorded archaeological spatial extents correlate with this high sensitivity area. Using our statistical validation process of $(p[MIS]-p[M]=.10)$, our model represents a 10% improvement over chance of locating archaeological sites within our designated high probability area (see Kvamme 2006:28). This result is due to the fact that so much of the park area is designated under the high sensitivity category. Interestingly, we were able to much better define features within the high sensitivity area through the use of mapping grade GPS, and have demonstrated errors with the FMSF polygonal site location data. These errors include the omission of out-structure locales that are contributing to the plantation landscape (i.e. the spring house, roads and trails, and areas of coquina block scatters), and there are spatial data errors in the area attributed to containing the slave quarters. This error in recording is likely due to use of hand-held GPS, with multipathing and position dilution of precision errors caused in part from the dense canopy and inherent inaccuracies of handheld devices. Our GPS unit, accurate to sub-meter levels, creates a much better understanding for where these ephemeral features are located, and correctly indicates that part of the area lies outside of the NR designated site and resource group. A more than 50 meter shift error was noted in the data for the slave quarter locations, especially in the SE section of the site designated 8FL7C. The model and mapping show these sites and features to be spread over separate park areas (Bulow Creek State Park), although a cohesive unit management plan links these resources. Because LiDAR is available for this park along with Bulow Creek, Addison and Tomoka State Parks, in combination with aerial imagery and GPS ground control and field-truthing, future finds relating to the plantation landscapes and other temporal usage of these lands is possible with largely non-invasive techniques.

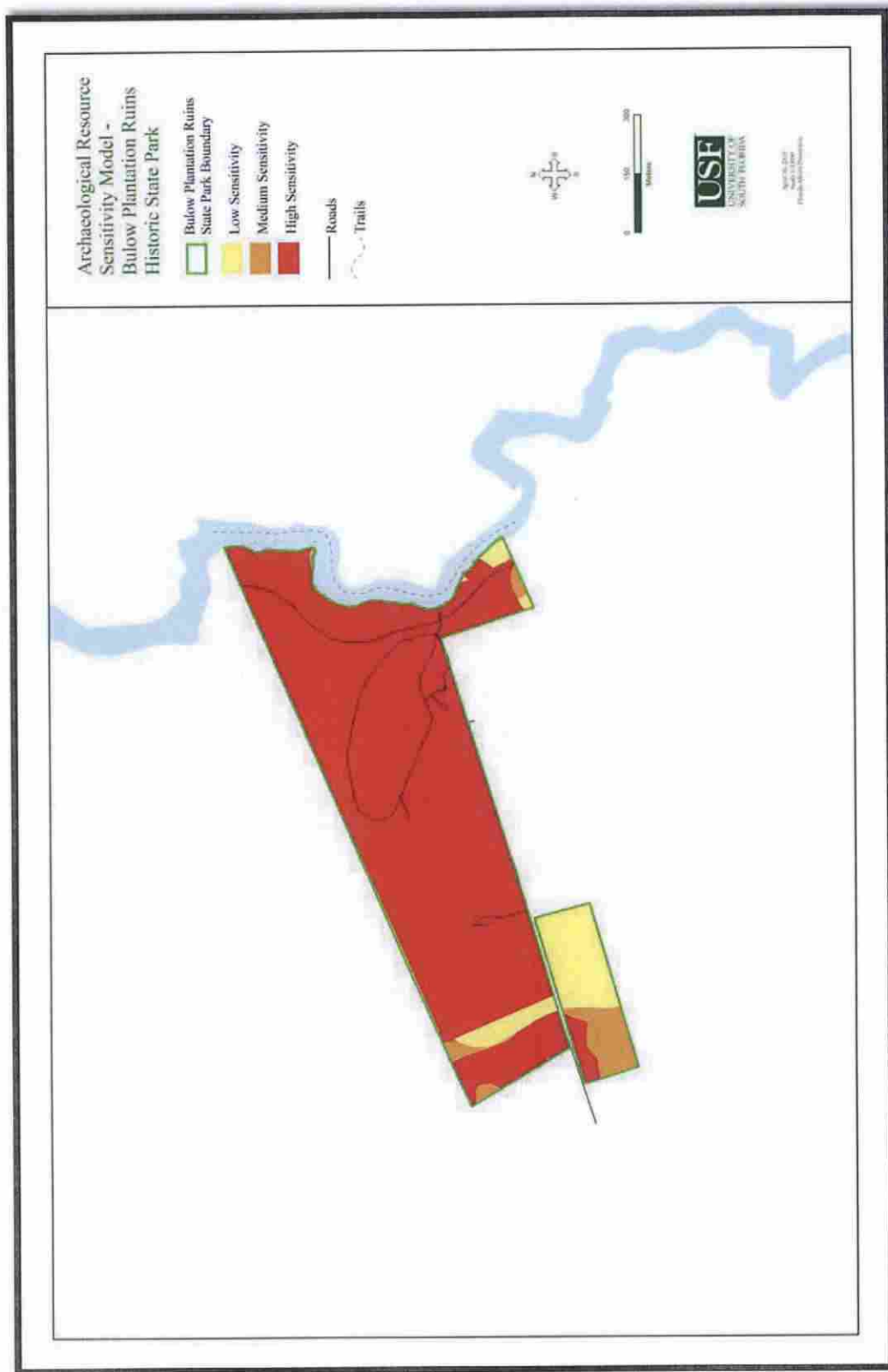


Figure 67. Map showing the archaeological resource sensitivity model developed for Bulow Historic Ruins State Park

Table 9. GIS model performance calculations for Bulow Plantation Historic Ruins State Park

Bulow Plantation Ruins Historic Sensitivity Model	Acres	Percent		FMSF Acres	Percent
High Sensitivity Area	127.04	85.84%		5.29	95.66%
Medium Sensitivity Area	6.80	4.60%		0.00	0.00%
Low Sensitivity Area	14.15	9.56%		0.24	4.34%
Total	147.99	100.00%		5.53	100.00%

De Leon Springs State Park

De Leon Springs State Park is a 621.88 acre parcel located on the western edge of the De Land Ridge, along the St. Johns River Offset and is part of the St. Johns River Basin (Myers and Ewel 1990). Prominent environmental features include Spring Garden creek and lake, a spring run and spring pool, and a variety of natural communities including mesic hammock, upland mixed hammock, shell mound, flood plain forest and seven other varieties plus disturbed and developed areas. The flowing spring and large underwater cavern are among the most prominent environmental features in the park (FDEP 2006a). Park elevations range from 0 to 21 ft above mean sea level according to our LiDAR analysis (Figure 68).

The FMSF shows seven recorded archaeological sites at De Leon Springs State Park (Figure 69). These sites include procurement sites, historic burials, historic refuse, historic homestead, prehistoric habitation, and prehistoric mounds and middens . The temporal span ranges from the early Archaic period to 20th Century times. De Leon Springs was also a tourist attraction and hotel, and has multiple historic period usages. Two recorded sites (8VO30 and 8VO31) have recorded human remains. Site 8VO30 is associated with the main spring area and is a multi-component site that includes defined shell mound, midden, and artifact scatter areas with temporal components from the Orange, Mount Taylor and St. Johns I and II periods from the prehistoric occupation noted (Dunbar 1980). Within the same area, important historic features are also found, including the hotel and buildings from the American territorial period (1821-1845) and a sugar mill (Denson, et al. 1995; Payne and Griffin 2002). Current park buildings are presently around the main spring area, with a park residence structure built on the principle midden, and other historic structures now used by the park also occupying the same area. Other important finds associated with the main spring area include two dugout canoes that were recovered from the same vicinity. Radiocarbon dating revealed that they were among the oldest recovered in Florida, with one dating to 5,140 +/- years and the other dating to 6,050 +/- 60 years old (Blonder 1990; Purdy 1986; Stipp 1991; Tamers 1986). Surveys at De Leon Springs include three park level research surveys, an FDOT road project, and a structural and historical

survey (Adams 1989; Denson et al. 1995; Dickinson 2002; Dunbar 1980; Payne and Griffin 2002). The history of the spring historical occupations including important details on the mill and other historic era structures including the tourist resort and Spring Garden, was reported on in a survey by GARI archaeological firm and also included several new prehistoric finds in the park (Denson et al. 1995).

Our GPS and reconnaissance work at the De Leon Springs State Park included the bounding of the mound and middens associated with 8VO30, marking in historic structures presently utilized as park buildings, taking spatial locations at the sugar mill complex including extant ruin feature locations on the kettle row, water wheel, and foundation elements, and working with park management to visit and record locations of other known cultural resources within the park boundary. We also were able to map several road and trail areas which assist in spatially referencing with historic maps and other data layers in the GIS development (Figure 70). Our collected data show additional features associated with the 8VO5279 shell midden site that were historically mined. Additionally, 8VO31, listed with the FMSF as general vicinity, shows as a large rectangular plot area. Utilizing the LiDAR data, we were able to find more probable and environmentally suitable locations that should now be ground-truthed and tested to confirm (Figure 71). Additionally, site 8VO5277 is incorrectly plotted with its location indicated more accurately using the LiDAR data. This site area was also visited and recorded by the AIST using sub-meter GPS to correlate with the LiDAR location.

Results and Discussion

The archaeological sensitivity model for De Leon Springs State Park includes a variety of environmental and cultural variables that account for the presence of sites through time and space and account for the variability of site types known to occur within the park as demonstrated through previous surveys in and within the regional vicinity to the preserve. Primary factors for cultural site locations in the park relate to soil drainage characteristics, distance to water, and relative elevation. The presence of unique environmental setting characteristics, such as the spring and spring run, the adjacency to associated water features and elevated areas, are all contributory to cultural settlement. At De Leon Springs State park, the environmental and cultural matrix items used in the model analysis included: distance to river or intermittent stream, distance to lake or pond, distance to wetlands, existing or relic spring, relative elevation, soil drainage characteristics, recorded sites with human remains, high likelihood of containing significant sites based on recorded or archival data or oral tradition (survey evals from FMSF = likely, potentially or eligible for the NRHP High likelihood of historic sites or (noted on FMSF or other informant data, and high likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries). GPS data collected with sub-meter instrumentation and LiDAR data were useful in verifying control points on the ground, and

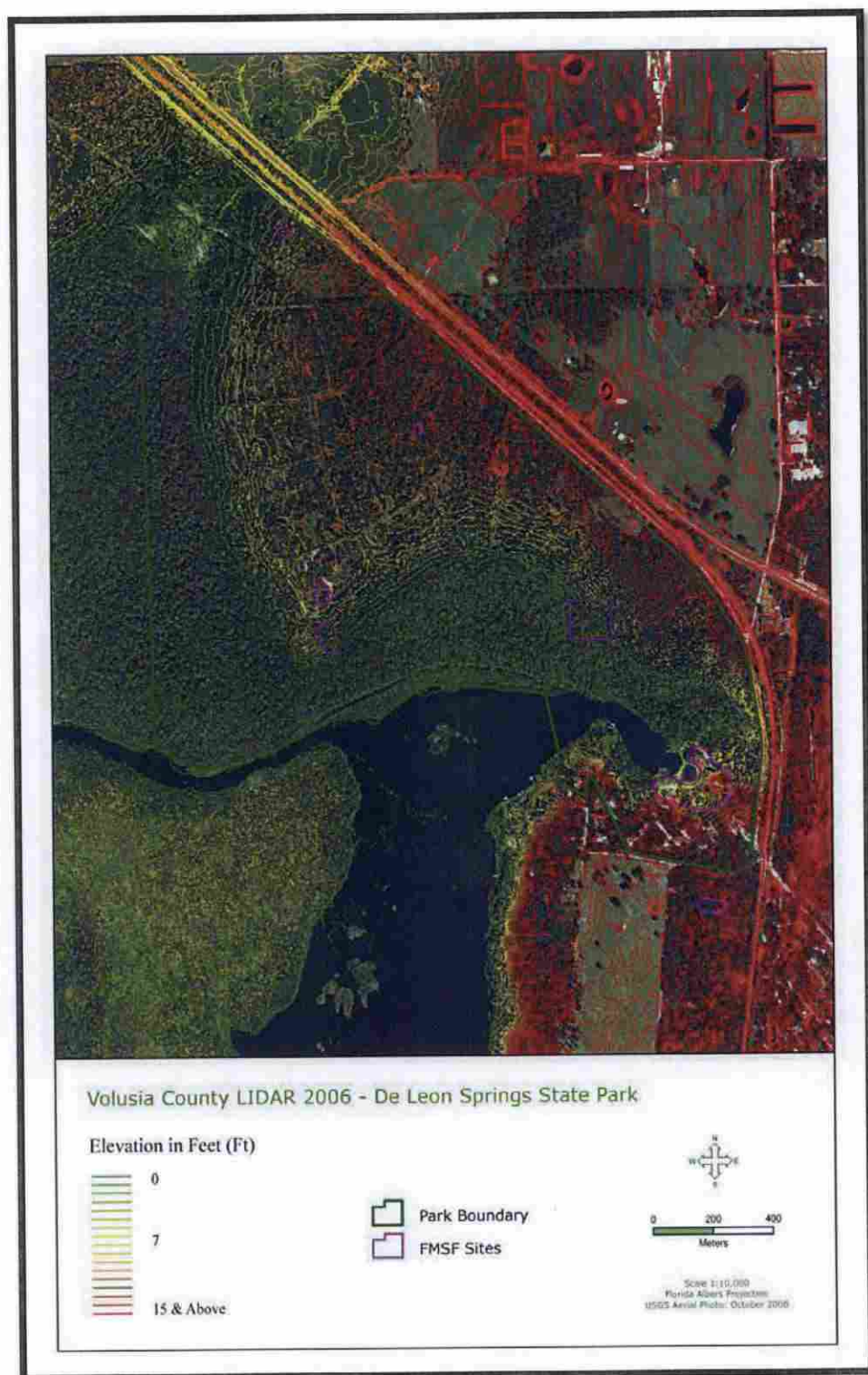


Figure 68. Map showing the archaeological resources as listed on the FMSF in relation to collected LiDAR elevational data for De Leon Springs State Park

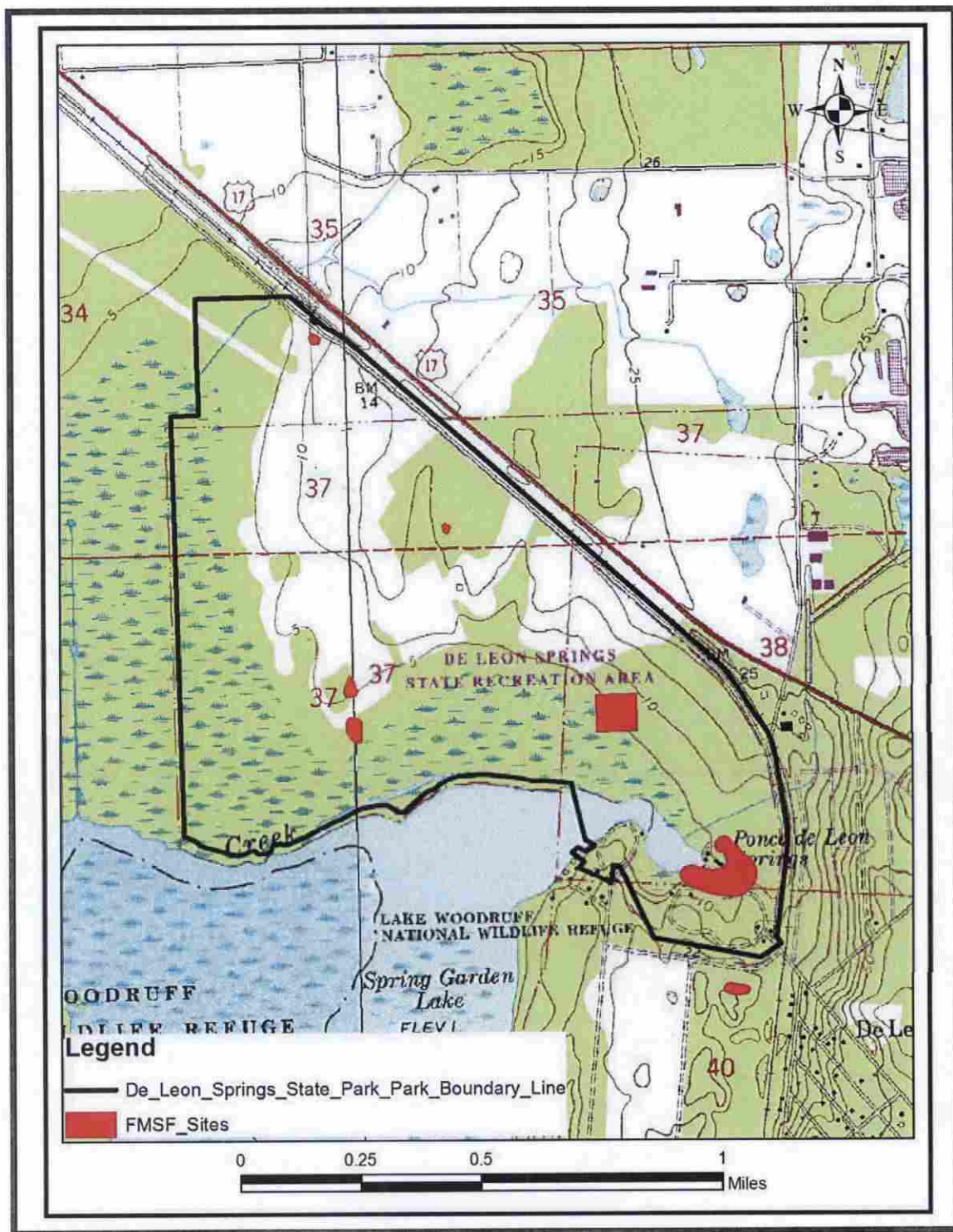


Figure 69. Florida Master Site File data show seven archaeological sites within the De Leon Springs State Park

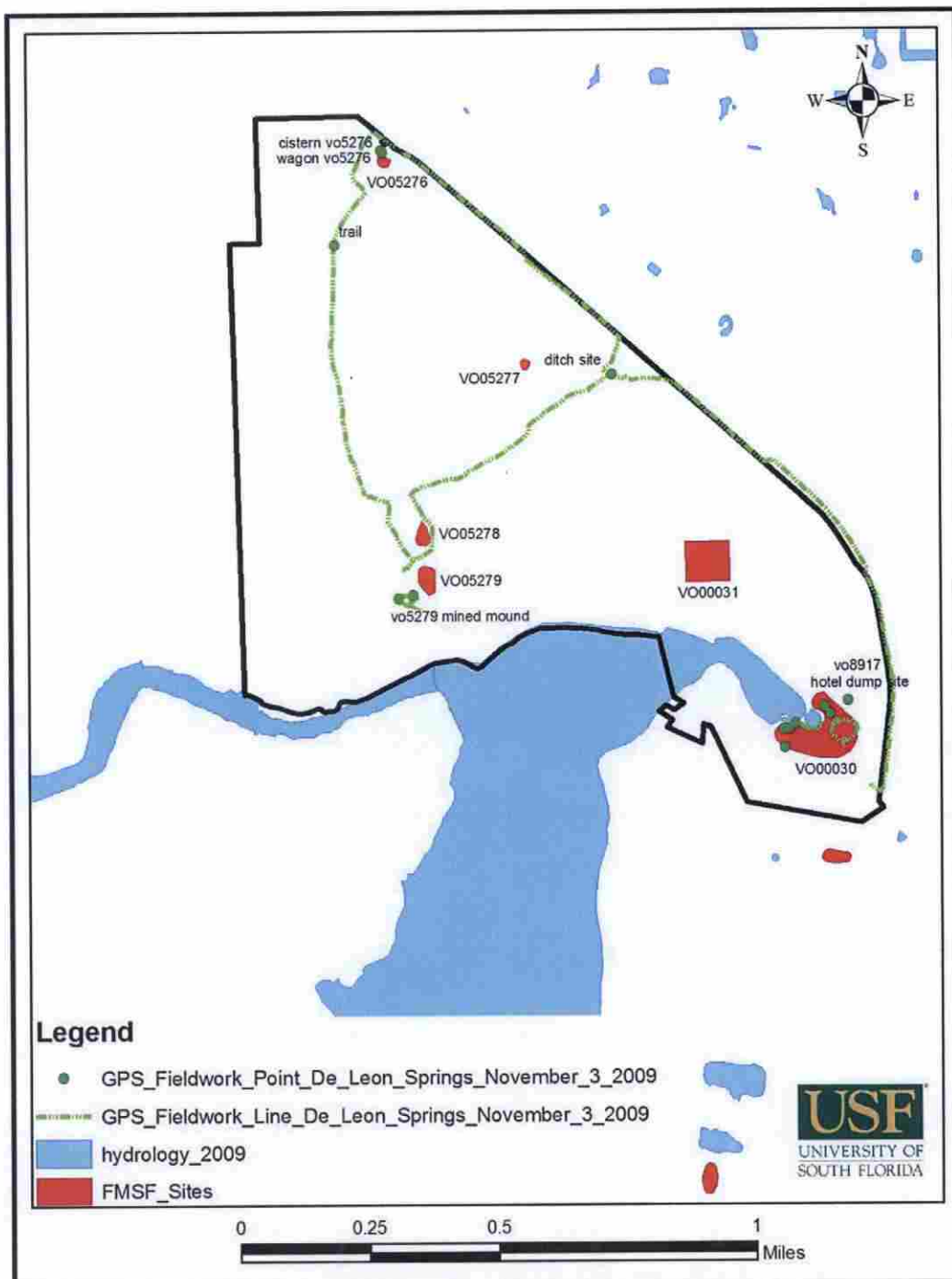


Figure 70. GPS survey data collected at De Leon Springs State Park along with FMSF location data

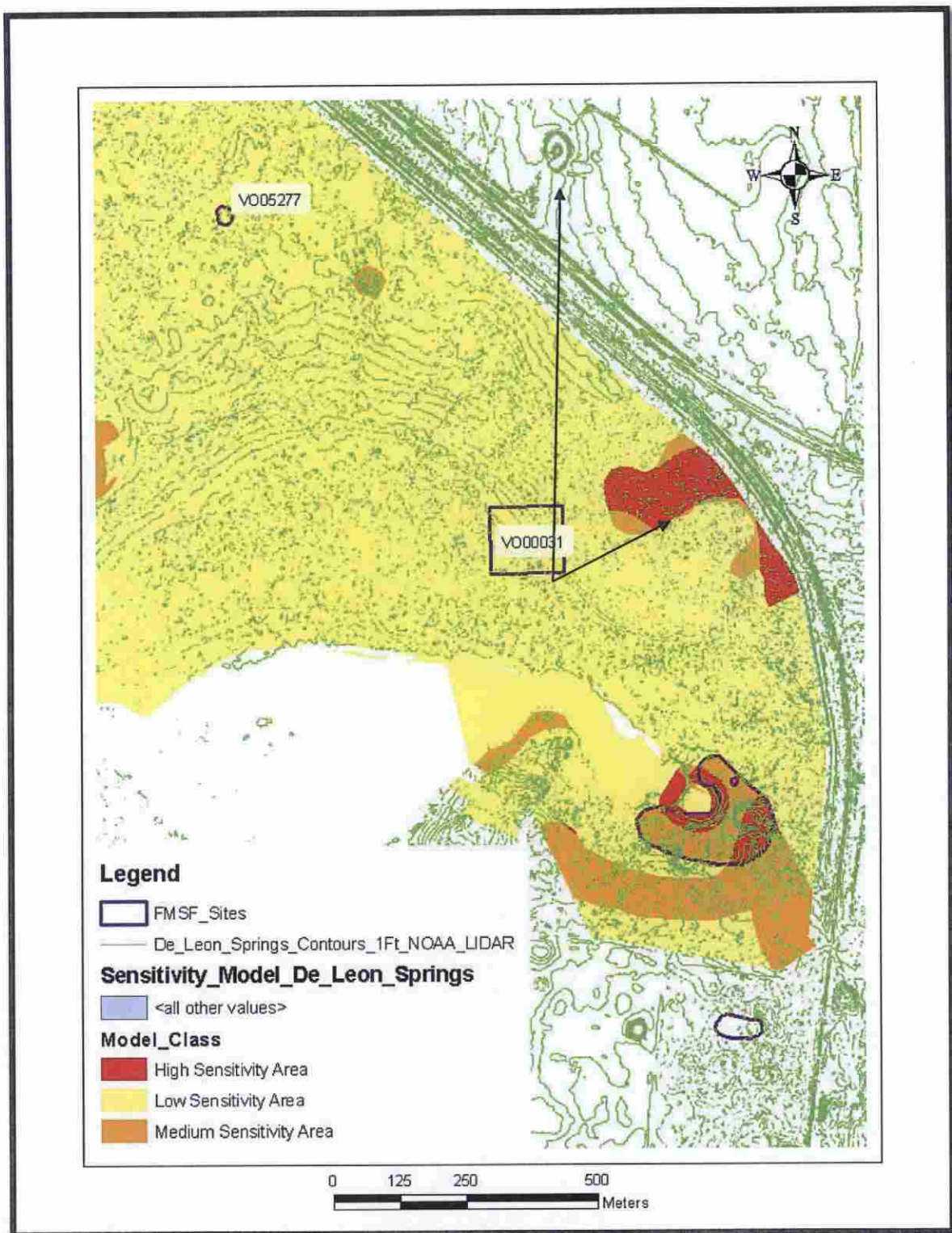


Figure 71. Map showing the archaeological resource sensitivity model developed for De Leon Springs State Park

comparing the data collected against known site spatial locations as listed in the FMSF. These data, along with historical maps and information further clarified pertinent features for sensitivity modeling purposes.

Model Performance

Our archaeological resource sensitivity model for the park is shown at a 1:12,000 scale (Figure 72), but was conducted at and provided at 1:24,000 scale in the geodatabase. When this model is verified using the FMSF polygonal site location data, the model captures 4 out of 7 recorded sites at least partially, in the designated high and medium sensitivity areas. The model misses sites primarily due to their polygonal extent recording on the FMSF showing large and vaguely defined spatial extents. Site 8VO31 is listed with the FMSF as general vicinity and accounts for a large percentage of our low sensitivity area associated with known archaeological features. This site is very likely inaccurately plotted, and is more likely attributable to an area identified as a mound feature from LiDAR indications. Additionally, site 8VO5277 is also likely inaccurately plotted as our field visit to the area indicated on the FMSF showed no indication of any surface scatter discussed in the FMSF for this feature.

Expressed as spatial percentages, the high archaeological resource sensitivity area at De Leon Springs accounts for less than 2% of the land surface area (Table 10), but it has nearly 23% of the recorded archaeological spatial extents correlating with these modeled areas. Using statistics ($p[MIS]-p[M]=.21$), our model represents a 21% improvement over chance of locating archaeological sites within our designated high probability area (see Kvamme 2006:28). Combining the high and medium sensitivity areas shows that 63% of recorded archaeological spatial extents occur within our sensitivity areas, showing a 55% overall improvement over chance. These sensitivity areas can be best refined by confirming through archaeological field survey the proper locations for 8VO31 and 8VO5277, utilizing sub-meter GPS to delineate their plotted position. Other testing and verification with use of the model and remote sensing observations using high resolution aeriels and LiDAR data will prove beneficial for this park.

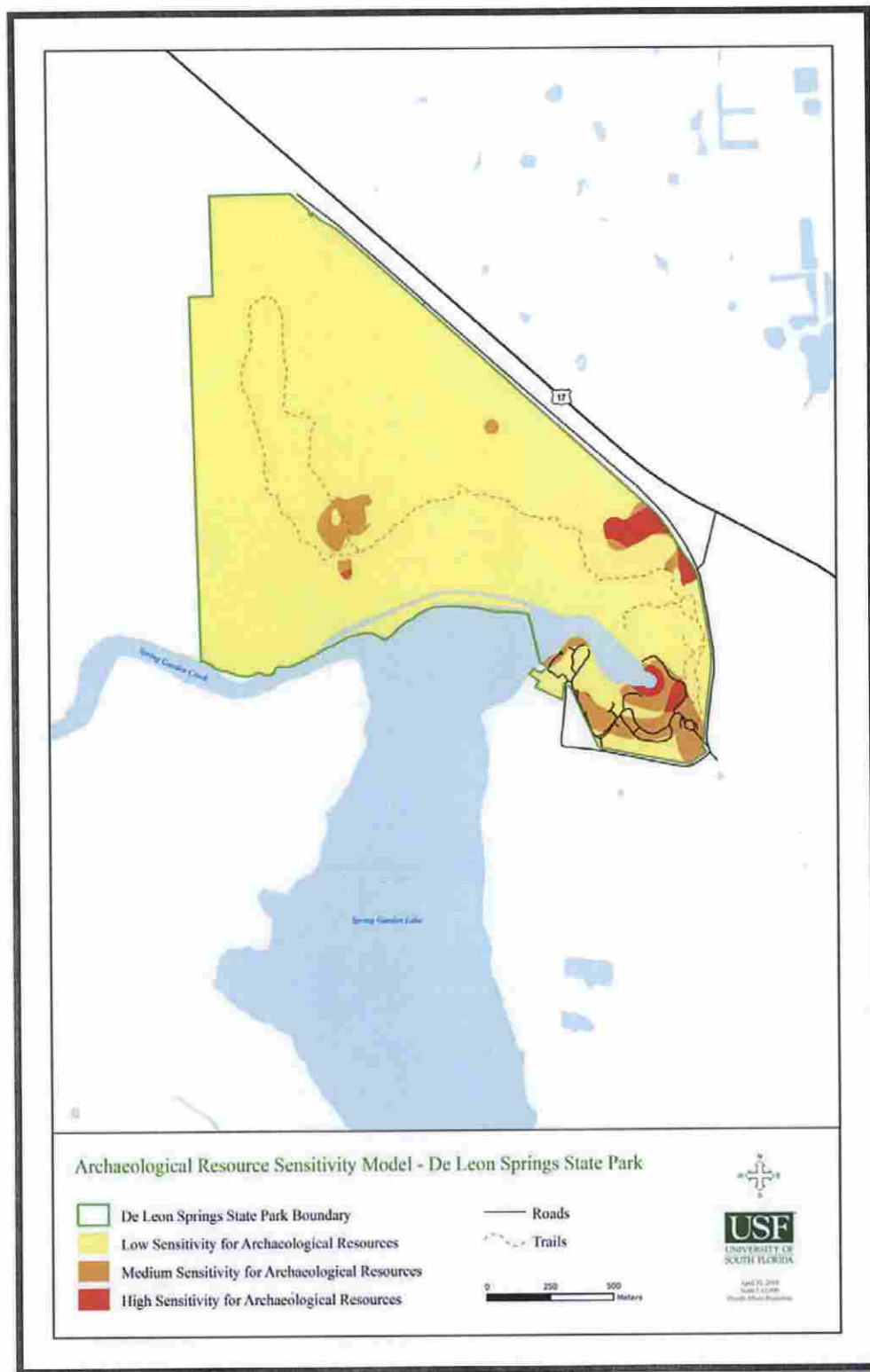


Figure 72. Map showing the archaeological resource sensitivity model developed for De Leon Springs State Park

Table 10. GIS model performance calculations for De Leon Springs State Park

De Leon Springs Sensitivity Model	Acres	Percent		FMSF Acres	Percent
High Sensitivity Area	11.06	1.78%		3.13	23.08%
Medium Sensitivity Area	30.21	4.86%		5.46	40.27%
Low Sensitivity Area	580.61	93.36%		4.97	36.65%
Total	621.88	100.00%		13.56	100.00%

Dunns Creek State Park

Dunns Creek State Park is a 6,208.72 acre parcel with two distinct physiographic regions, being in the Central Lake District and the Eastern Flatwoods-Palatka Anomalies (Myers and Ewel 1990). The highest elevations in the park in the Central Lake District area approach 115 ft. and in the Eastern Flatwoods area elevations are relatively flat and range from sea level to 25 ft. (Figure 73). Soils are extremely diverse with 25 soil types present in the park that range from well-drained to muck soils. The topography is somewhat steep, particularly coming off the sand ridge areas toward Dunns Creek, and the nearby influence from the St. Johns River leads to inundation and periodic flooding across large areas of the park (FDEP 2004b).

The FMSF shows three recorded archaeological sites within the park boundary (Figure 74). These sites include historic building remains, homesteads, historic refuse sites, and prehistoric midden and artifact scatter component sites. The temporal range for recorded site types in the Dunns Creek State Park show a range from the Archaic, Orange, and Mount Taylor periods prehistorically, to the 20th Century (1900s –present). All three known sites have either not been evaluated by the surveyor or the SHPO for NRHP potential, or contain insufficient information for a determination to be made.

Surveys and inquiry at the Dunns Creek include one park wide archaeological project that was funded through the State of Florida CARL program and conducted by Public Lands Archaeological Program through the Bureau of Archaeological Resources (BAR) at the FDHR. The survey located two new sites in the southern most extent of the park (8PU1465 and 8PU1462) and re-located one previously recorded site (8PU723). The two newly recorded sites consisted of a bottle dump, and building remains from an historic homestead that had a prehistoric low-density artifact scatter component (Dunbar and Glowacki 2008). The previously recorded site 8PU723, is also a homestead location that was built upon a prehistoric midden feature. This site, called Piney Bluff Landing is located at the edge of Dunns Creek on a large bend in the river system (FDEP 2004b). Portions of the prehistoric midden were historically mined for shell, but intact stratigraphy is present at this large, up to 7-acre site. Artifacts and

midden materials are found eroded into Dunns Creek (Dunbar and Glowacki 2008). The CARL survey of the property and re-survey of the 8PU723 site led to new boundaries being updated in the FMSF based on the recorded size and extent of the midden as noted from surface exposure of artifacts and testing at the site. The BAR report noted the potential for other such midden sites along the course of Dunns Creek, given the right soil and elevation setting. Other potential site predictor factors mentioned by BAR archaeologists for this park included steep ravine areas that might be associated with procurement and campsite locations, and areas with higher elevations and well drained soils that might be suitable for habitation-type site locales. From the historic period there are reportedly other homesteads on this large park property but have not been located, and the potential for site types such as those associated with early agro-industries, particularly cattle, turpentine, and timber is known (Dunbar and Glowacki 2008; FDEP 2004b). Early historic period settlements and land grants are associated with the Dunns Creek area, including those from British, Spanish, and Territorial Periods (Figure 75).

Additionally, a survey of near-shore archaeological resources was conducted adjacent to Dunns Creek State Park on Lake Crescent, and characterizations of those sites and the environmental region can be found in that survey (Sassaman 2003a). During this 2002-03 survey, the Piney Bluff Landing Site (8PU723) was visited and a surface collection of artifacts was made. Pottery of St. Johns wares and Orange fiber-tempered wares have been collected at different times from this multi-component site. During the later BAR survey, diagnostic artifacts included pottery and Pinellas Point lithic remains. It is thought that the site might have affiliation with the Utina Timucuan who lived in the region during the St. Johns II period of site occupation at Piney Bluff Landing (Dunbar and Glowacki 2008:7).

Our site visit to Dunns Creek and GPS work included recordation of spatial locales of the three previously recorded archaeological sites on the property (Figure 76). The 8PU723 Piney Bluff Landing site was located with a centroid GPS position, but no attempts were made to update the FMSF boundary information since it was based on subsurface testing. Within this same vicinity there is a 1950s era house that is scheduled for demolition, and discussed in the park's management plan (FDEP 2004b). Scattered around the house is midden material from the Piney Bluff Landing site. Another historic homestead is found as part of a component of the 8PU723 site. Referred to as the Goat Farm house by locals, it is intrusive on the prehistoric component of the large midden site.

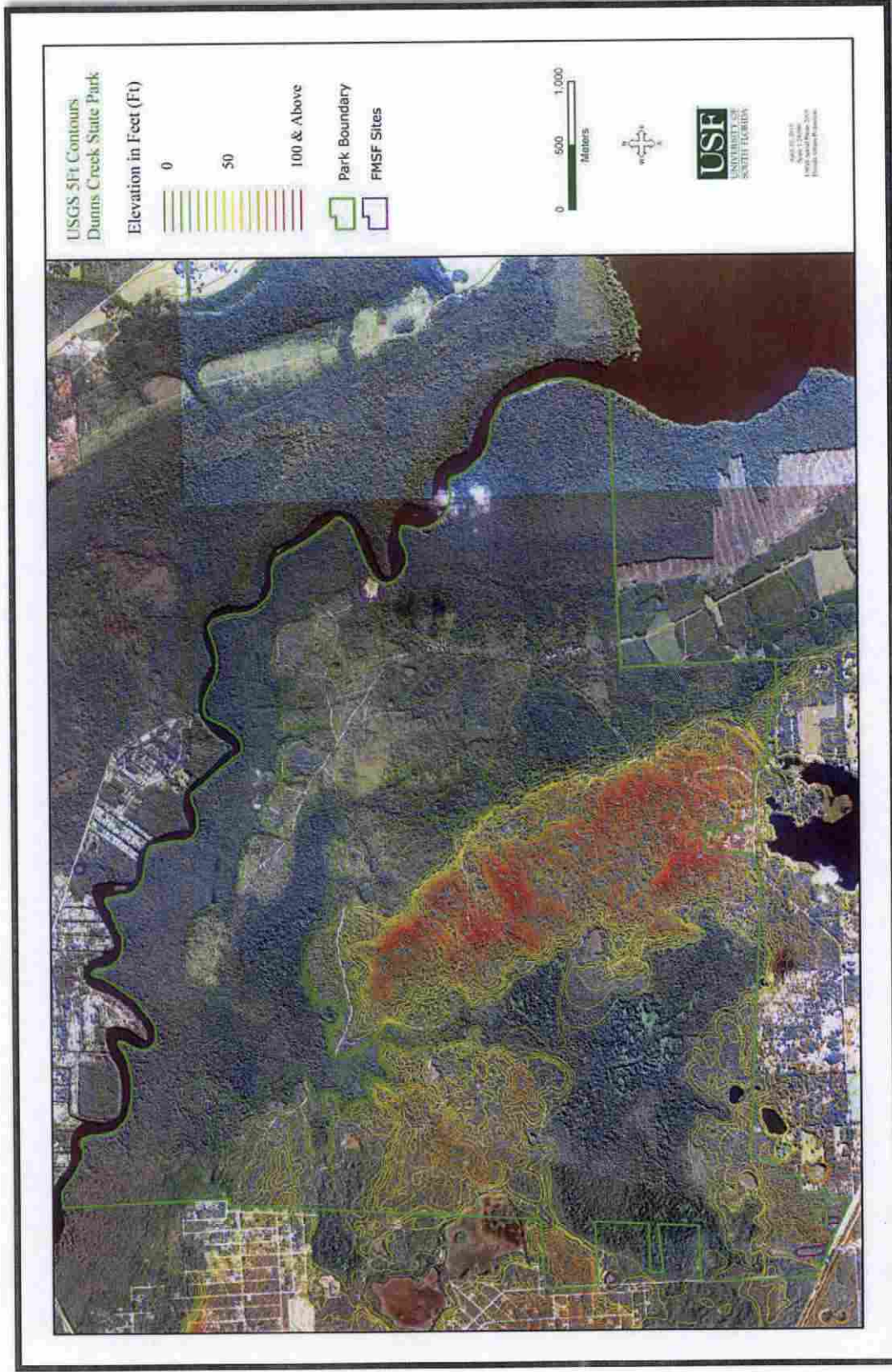


Figure 73. Elevation data for the Dunns Creek State Park area

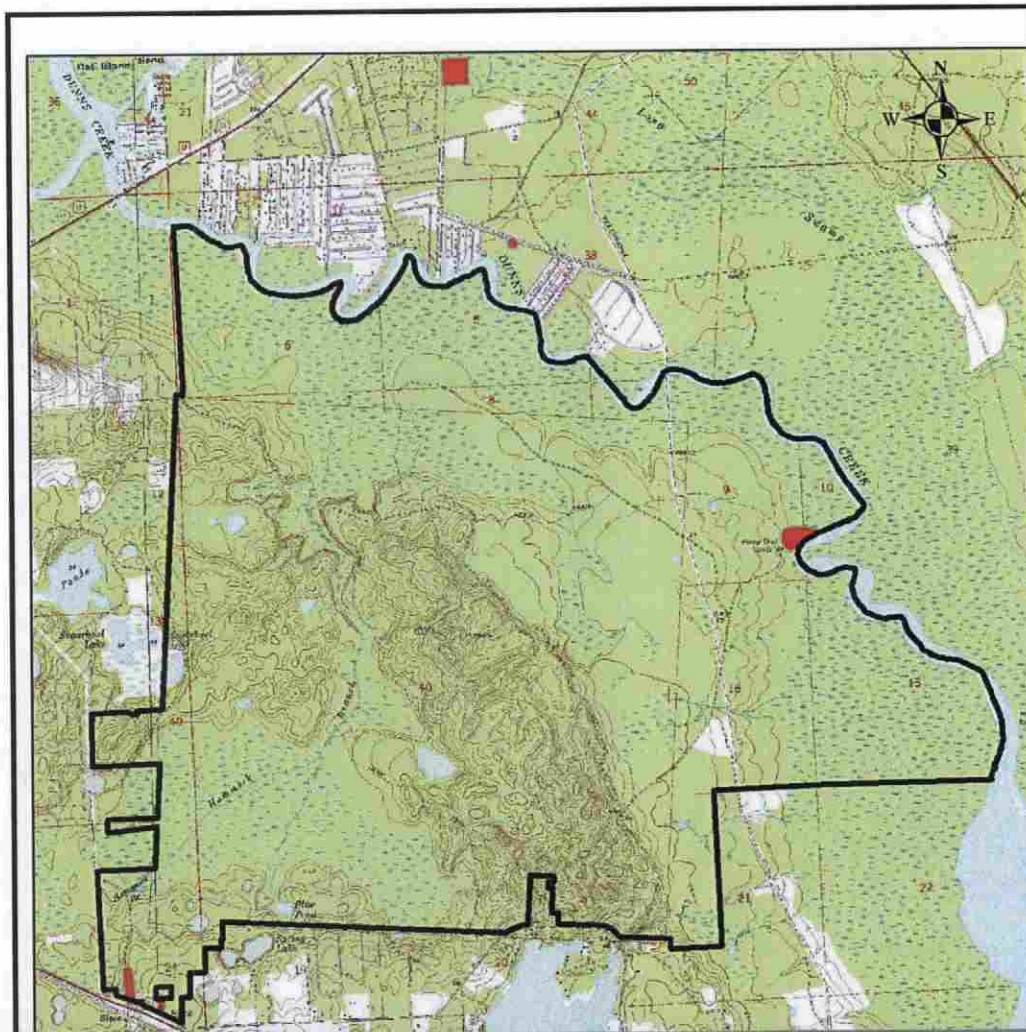


Figure 74. Florida Master Site File data showing recorded archaeological sites within the Dunn's Creek State Park

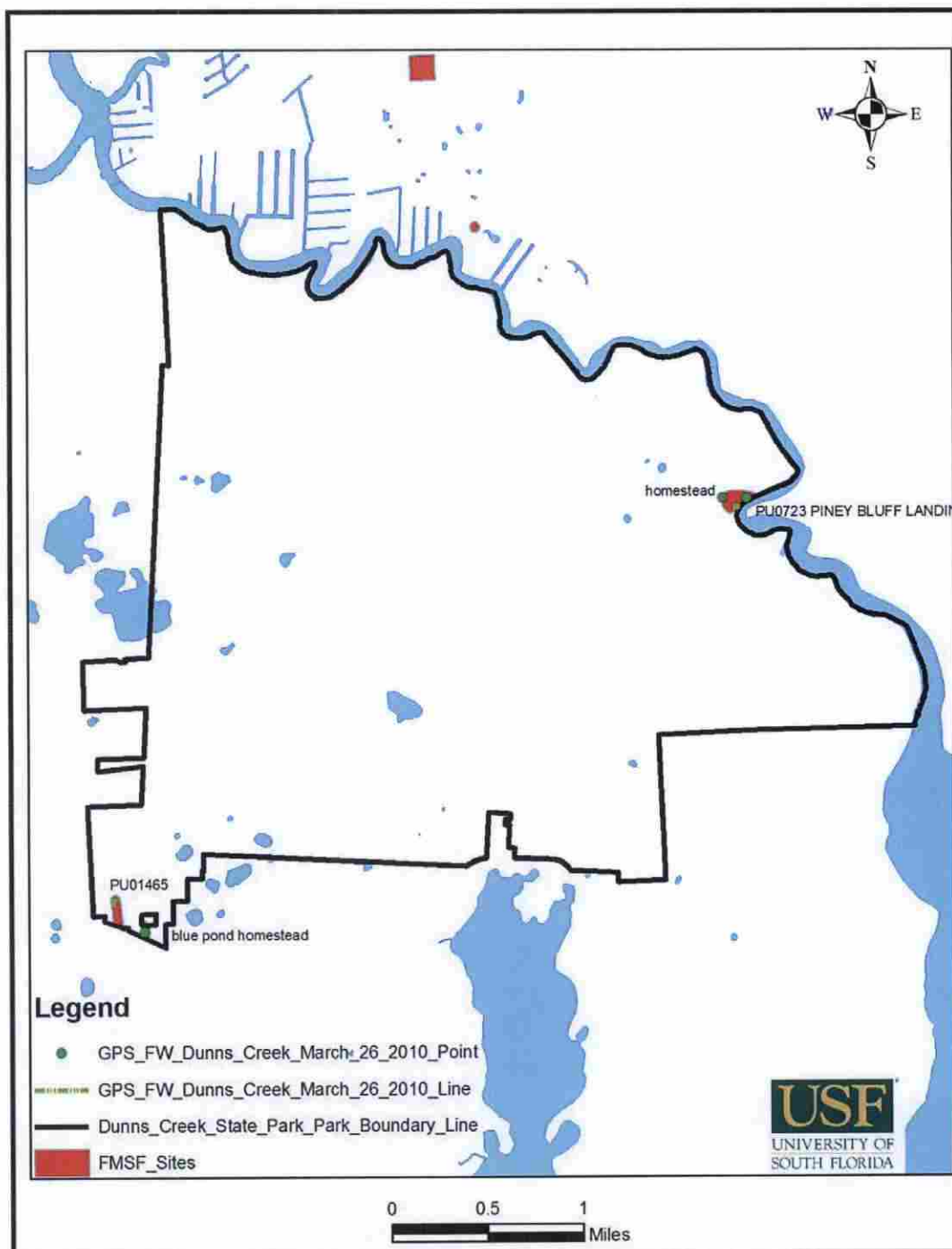


Figure 76. GPS survey data collected at Dunns Creek State Park and the FMSF location data

Results and Discussion

The archaeological sensitivity model for Dunns Creek State Park includes a variety of environmental and cultural variables that account for the presence of sites through time and space and account for the variability of site types known to occur within the park as demonstrated through previous surveys in and within the regional vicinity to the preserve such as soils, elevation, steep ravine areas, adjacency to the Dunns Creek hydrologic features, and known historic land grant and settlement areas (Dunbar and Glowacki 2008). Primary factors for cultural site locations in the park used in our matrix evaluation relate to soil drainage characteristics; distance to riverine and permanent stream and water bodies including ponds, lakes and wetlands; and relative elevation. GPS data collected with sub-meter instrumentation along with the FMSF data including field notes, surveys of the park, and surveys of the adjacent regional areas, were helpful in refining and creating our matrix model. These data, along with historical maps and information further clarified pertinent features for sensitivity modeling purposes.

Model Performance

Our archaeological resource sensitivity model for the park is shown at a 1:24,000 scale (Figure 77). When this model is verified using the FMSF polygonal site location data, the model captures all three of the recorded sites at least partially, in the designated high and medium sensitivity areas. The model misses portions of these sites primarily due to their polygonal extent recording on the FMSF which may not accurately reflect the true, on-the-ground spatial extents.

Expressed as spatial percentages, the high archaeological resource sensitivity area at Dunns Creek accounts for less than 6% of the land surface area (Table 11), but it has 29% of the recorded archaeological spatial extents correlating with these modeled areas. Using statistics ($p[MIS]-p[M]=.23$), our model represents a 23% improvement over chance of locating archaeological sites within our designated high sensitivity area (see Kvamme 2006:28). Combining the high and medium sensitivity areas shows that 84% of recorded archaeological spatial extents occur within our sensitivity areas, showing a 53% overall improvement over chance. These sensitivity areas can be best refined by refining boundary locations through further archaeological field survey, use of sub-meter GPS, and aerial and LiDAR data. Additionally, the model created can prove useful for developing potential testing areas for Phase I archaeological survey over targeted portions of the park that have high and medium sensitivity correlative environmental data. The model is also useful for on-going park management and potential for cultural resource impact evaluation.

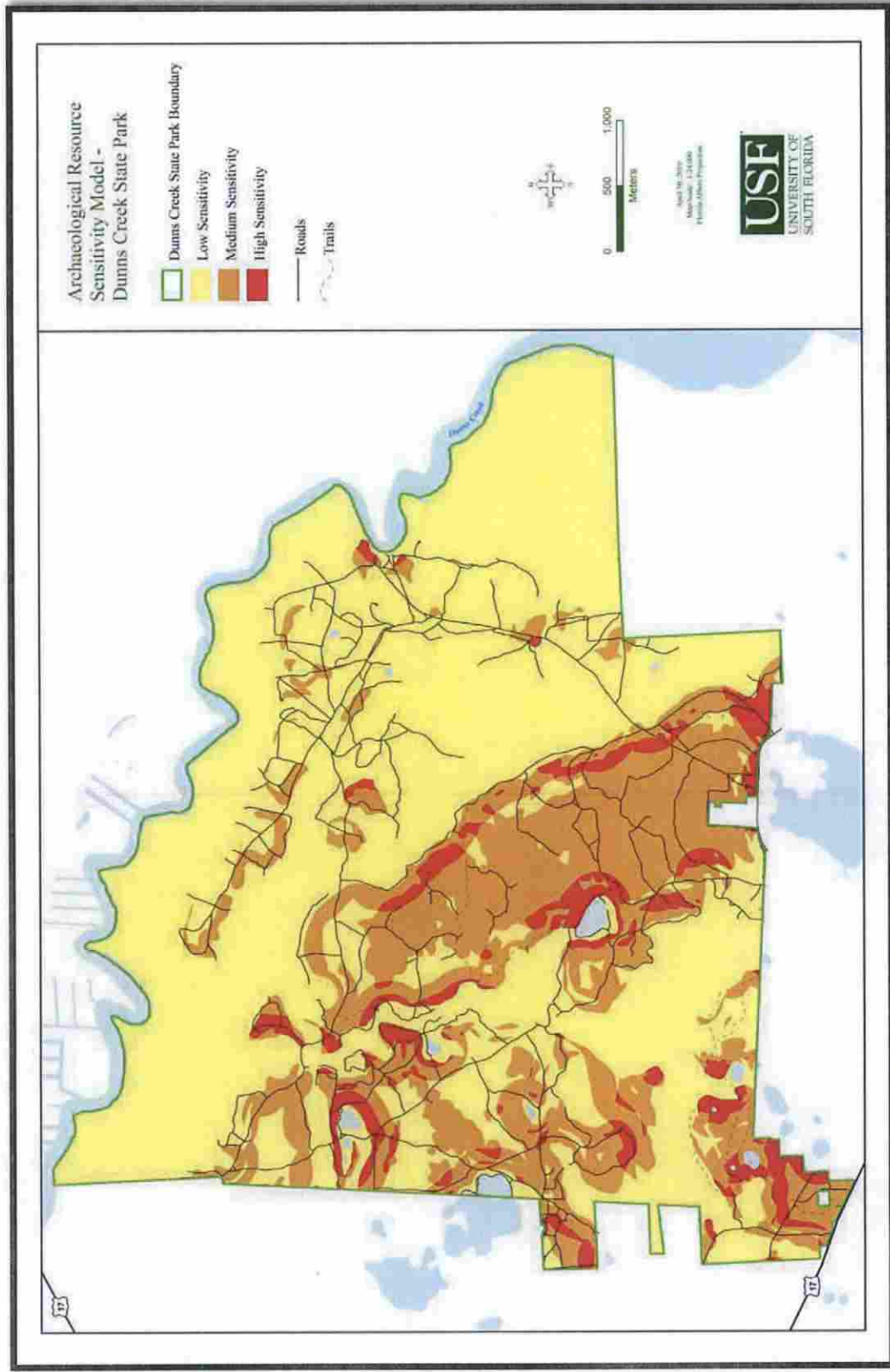


Figure 77. Map showing the archaeological resource sensitivity model developed for Dunns Creek State Park

Table 11. GIS model performance calculations for Dunns Creek State Park

Dunns Creek Sensitivity Model	Acres	Percent		FMSF Acres	Percent
High Sensitivity Area	342.52	5.52%		3.88	29.00%
Medium Sensitivity Area	1,582.63	25.49%		7.42	55.00%
Low Sensitivity Area	4,283.58	68.99%		2.14	16.00%
Total	6,208.72	100.00%		13.43	100.00%

Fort Mose Historic State Park

The Fort Mose Historic State Park has recorded archaeological features relating to the first free Black community and residential community that is a National Register site also known as Gracia Real de Santa Teresa de Mose. The FMSF records for this site are under 8SJ40. Within the boundary of the park, other features associated with Fort Mose are recorded on the FMSF, including a linear alignment (SJ5257), and an historic artifact scatter related to an historic road segment (SJ5238) (Figure 78). The site was listed on the NR in 1994, and became a National Landmark in 1995. The site was part of a northern defense line established for the colonial town of Spanish St. Augustine. The site locale is multi-component, with prehistoric occupations from the Archaic, Orange, Transitional and St. Johns periods and extending into British colonial, Second Spanish, Florida Patriots, and the Black Community that dates from 1752-1753 (NPS 1994) .

The site of Fort Mose was originally recorded on the FMSF in 1951 by John Goggin of the University of Florida, who began an investigation of the area. Other archaeological work at the Fort Mose Historic State Park includes a project by Charles Fairbanks, who first conducted limited excavations in 1971 (Spencer 1971). There were a series of field schools, with Florida State University and later University of Florida. These field schools involved Kathleen Deagan, who participated in the FSU and with the UF projects in 1976 and 1987, and 1988 (Deagan 1991; Marron 1988; NPS 1994). Additionally, at least six surveys have been conducted in the park for monitoring of construction and infrastructure activities.

The park is characterized by low relief, except in areas that form tree islands along Robinson Creek that are made up of anthropogenic debris from historic and prehistoric occupation. Marsh areas and Robinson Creek and the Tolomato River are prominent bounding features for the location. High elevations only extend to 7 ft. above mean sea level (Figure 79). The land area around the park was historically altered by Henry Flagler's dredge operations, and salt marsh features today predominate where agricultural fields once historically were located

(Marron 1988; NPS 1994). Today's fort location is associated with the second construction of the fort during the Spanish era (1752-1763), with the first site of Fort Mose nearby, established in 1738 as an early warning post for the city of St. Augustine for any overland attack by the British.

Our GPS work included taking control points and linear data along the present-day boardwalk which is the only overlook available to the site area. The boardwalk feature intersects a linear alignment feature that is on the FMSF (Figure 80).

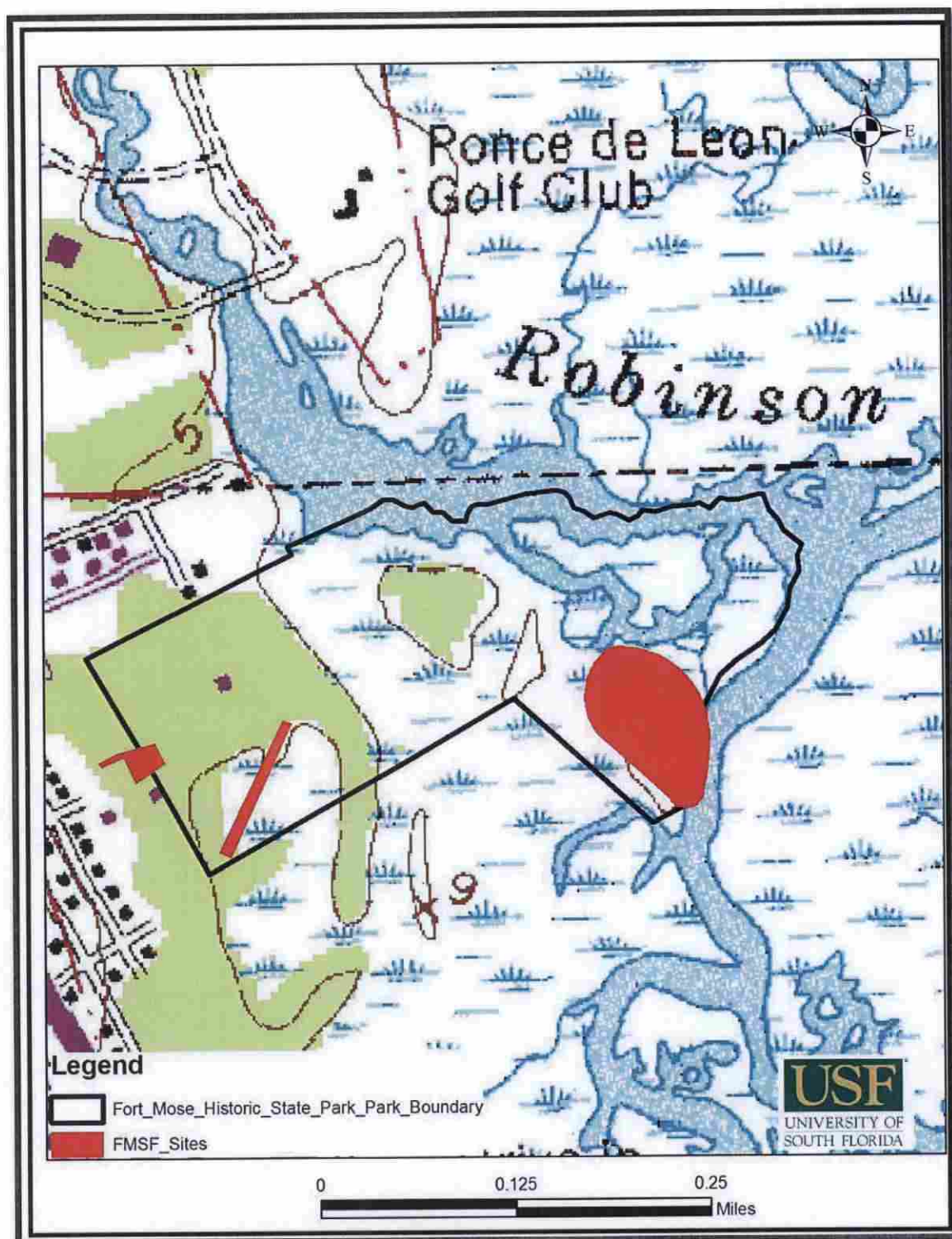


Figure 78. Florida Master Site File data showing recorded archaeological sites within the Fort Mose Historic State Park

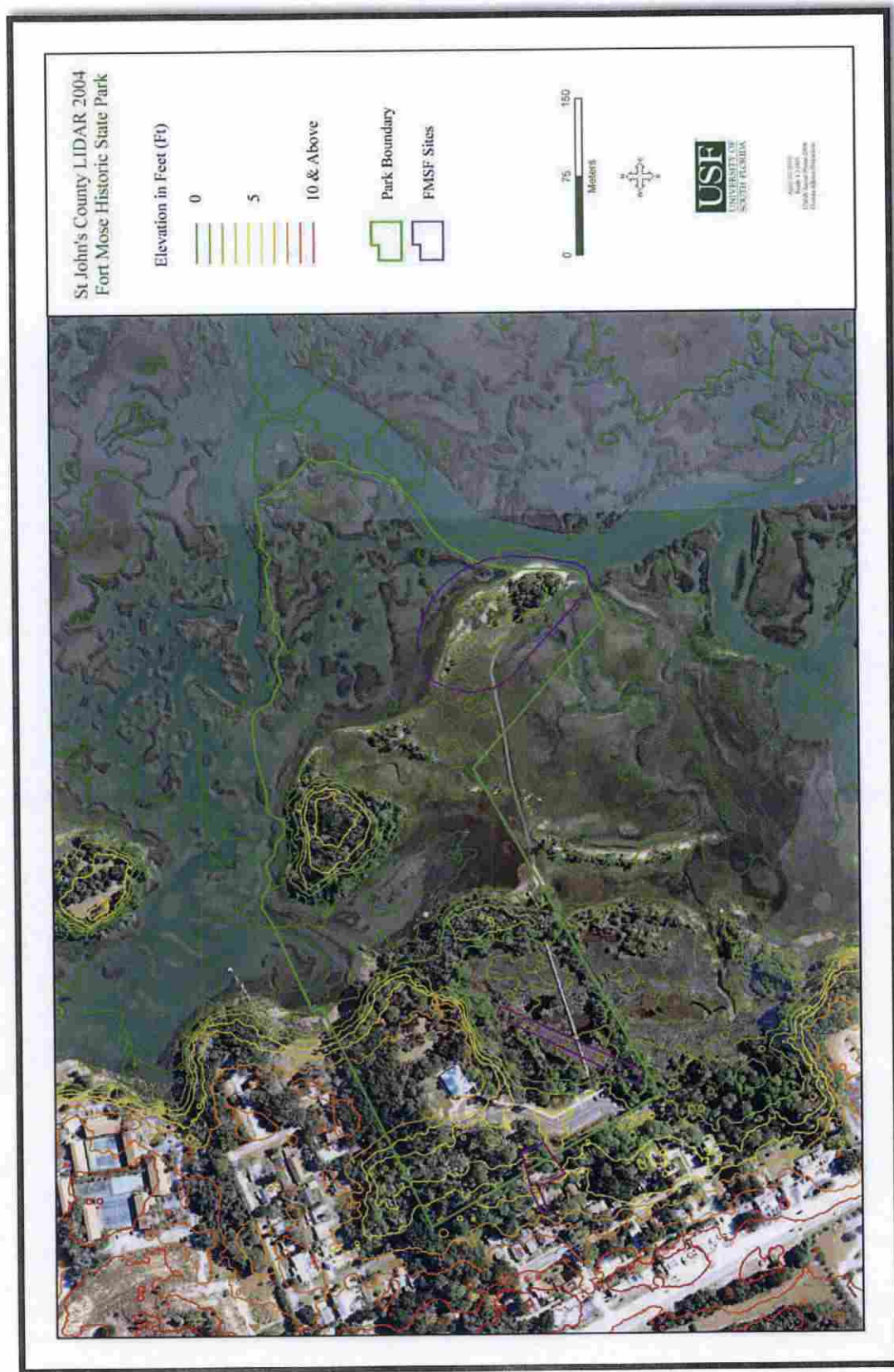


Figure 79. LiDAR elevation data for the Fort Mose Historic State Park area

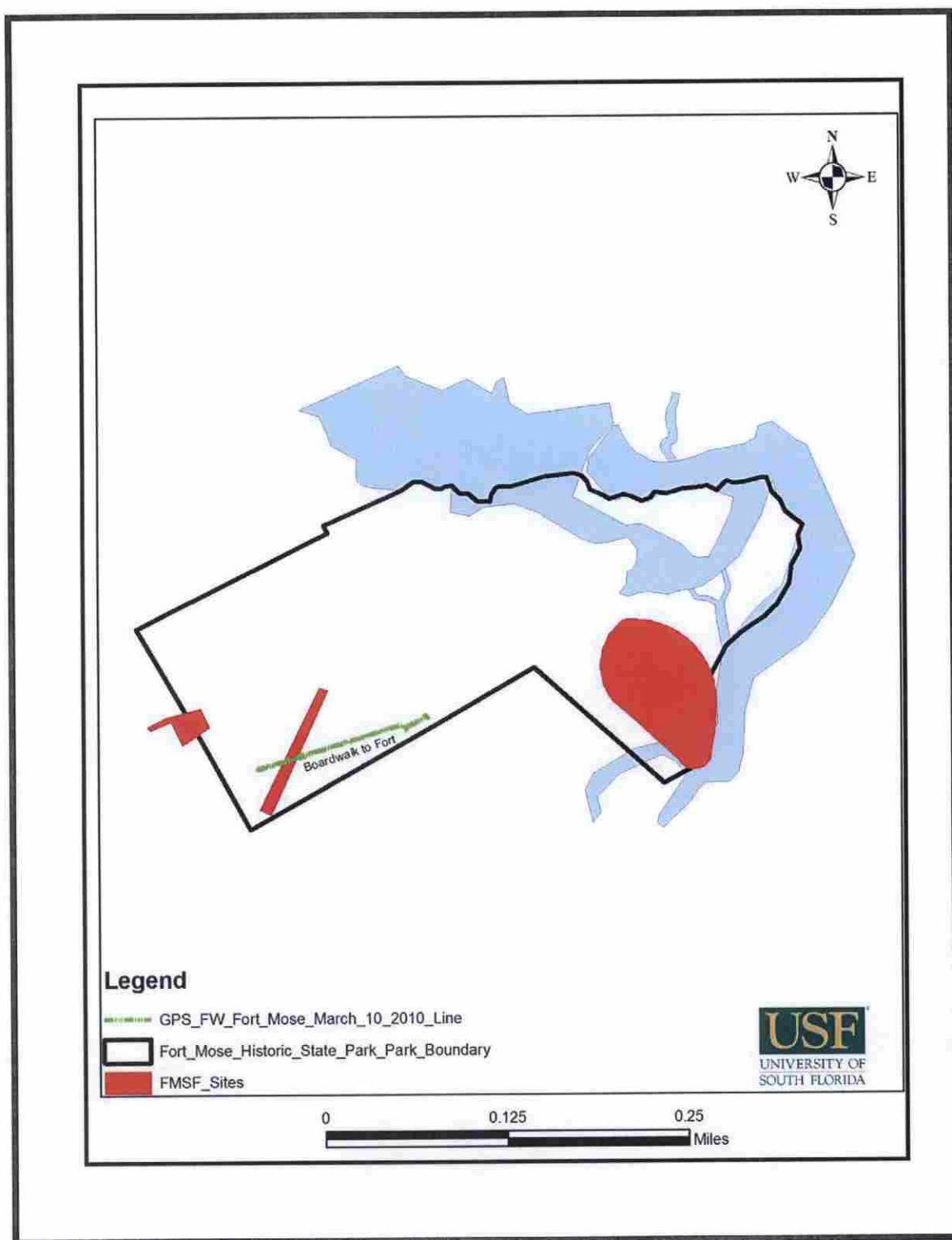


Figure 80. GPS survey data collected at Fort Mose Historic State Park showing the FMSF location data

Results and Discussions

The archaeological sensitivity model development for Fort Mose Historic State Park included factors that took in a variety of environmental and cultural variables that account for the presence of sites through time and space and account for the variability of site types known to occur within the park as demonstrated through previous surveys and recorded archaeological sites as listed on the FMSF. The matrix evaluation included the factor that the Fort Mose Historic State Park location has adjacency to lagoon, estuary, embayments, bayous or oceans. Other factors were distance to wetlands, relative elevation, and soil drainage characteristics. Primary for this park was the presence of significant historic and prehistoric resources as determined through the NRHP and National Landmark status. Additionally, the high likelihood of containing historic and prehistoric features as noted on the FMSF and other archival and informant information was a factor. Data layers utilized include aerial LiDAR, aerial imagery, GPS collected data, and environmental layers such as the National Wetlands Inventory, hydrology, and SSURGO soil information. Additionally, historical maps and references are included in the geodatabase park folder models, and provide important spatial information for areas within present park boundaries and just beyond current boundaries (Figures 81 and 82).

Model Performance

Our archaeological resource sensitivity model for the park is shown at a 1:3,000 zoomed in viewable scale (Figure 83), but for consistency is also provided in the geodatabase digital documents at 1:24,000 scale for which the model was performed. When this model is verified using the FMSF polygonal site location data, the model captures 1 of the 3 recorded site locales within the park's boundary, with the fort location fully represented in the high sensitivity area. Additionally, high and medium sensitivity areas are found in the western portion of the park boundary. The Fort Mose Museum Historic Artifact Scatter (SJ5238), falls within a low cultural sensitivity area for our model. This designation is largely due to the fact that it is in an area of poor soil drainage characteristics. The site also is listed as having insufficient information for NRHP evaluation, so no matrix model points could be reasonably assigned. Additionally, this appears to be a scatter associated refuse disposal (American Preservation Consultants 2006), and therefore may be associated with environmental areas not suitable for habitation choice. The other site locale that plots in our low sensitivity area is SJ5257, a linear feature that is possibly a railroad alignment, and not evaluated for the NRHP due to insufficient information (American Preservation Consultants 2006). This alignment falls within an area that is largely inundated with poor soils and elevation and is crossed by the present-day boardwalk.

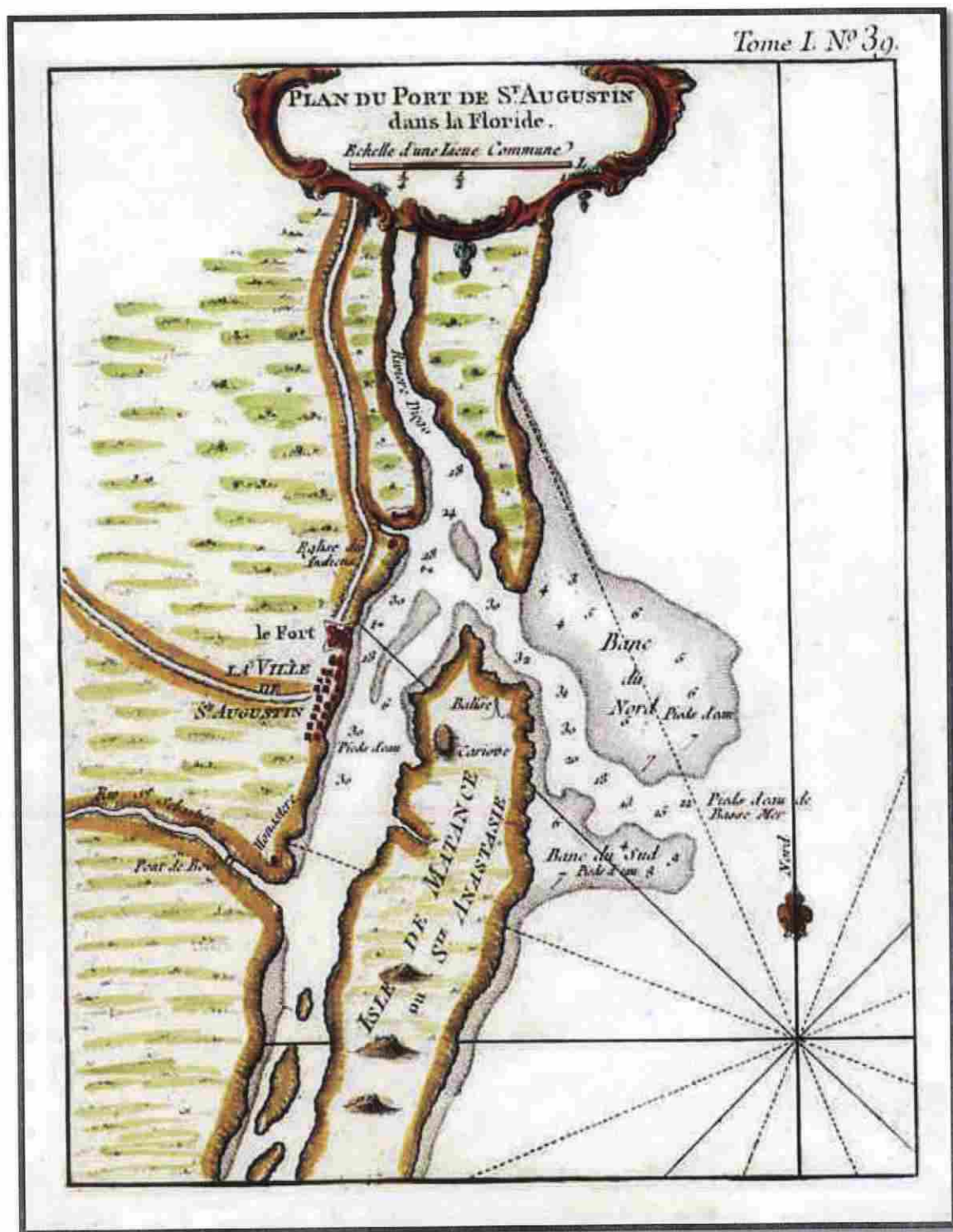


Figure 81. Plan Du Port De St. Augustin dans la Floride No. 39, 1764 Jacques Nicolas Bellin, Le petit atlas maritime. Downloaded from Maps ETC, on the web at <http://etc.usf.edu/maps> [map #f3587]

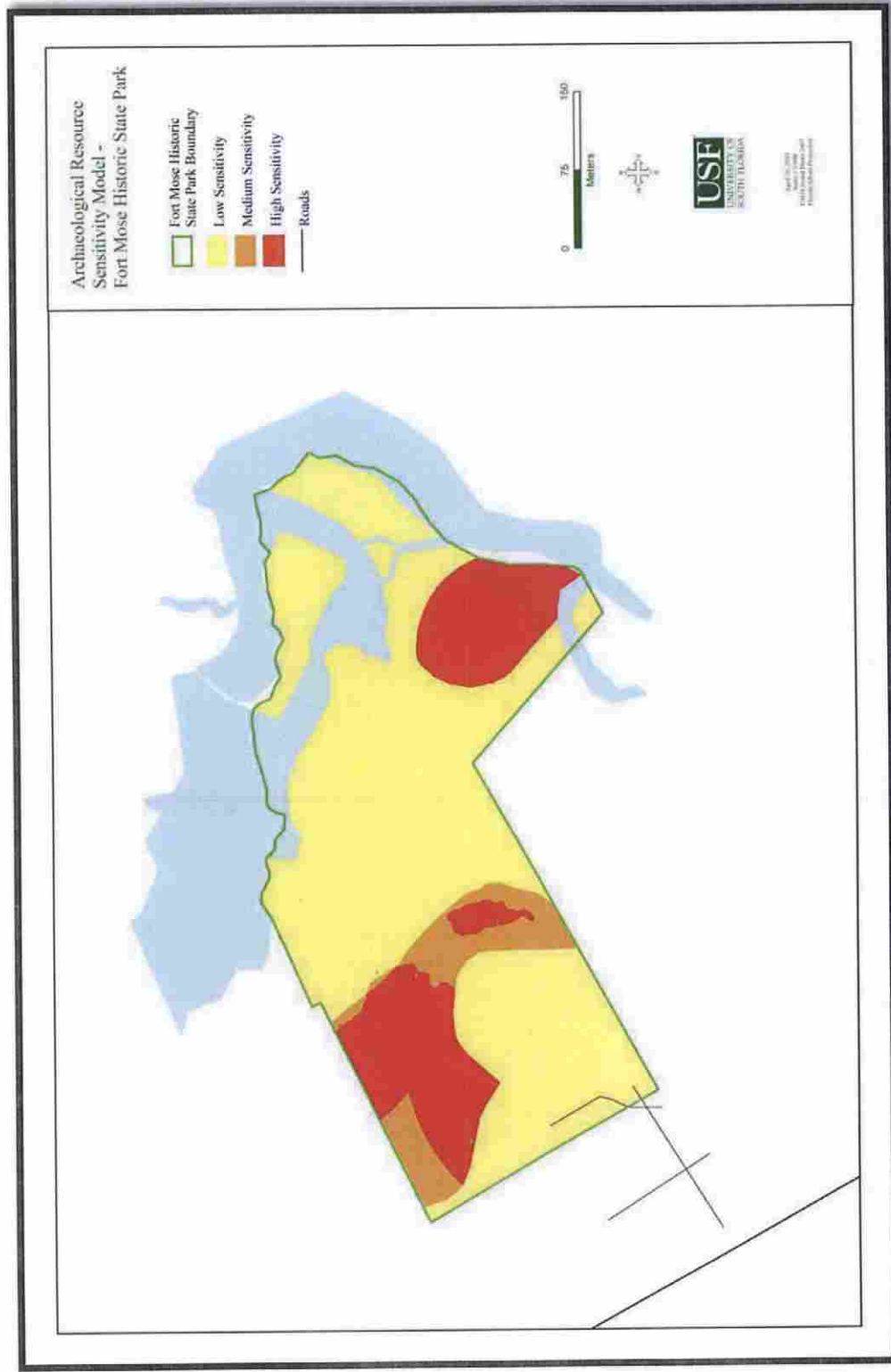


Figure 83. Map showing the archaeological resource sensitivity model developed for Fort Mose Historic State Park

Expressed as spatial percentages, the high archaeological resource sensitivity area at Fort Mose accounts for approximately 19% of the land surface area (Table 12), but has nearly 86% of the recorded archaeological spatial extents correlating with these modeled areas. Using statistics ($p[MIS]-p[M]=.67$), our model represents a 67% improvement over chance of locating archaeological sites within our designated high sensitivity area (see Kvamme 2006:28). Our model also locates other areas not currently containing site locales identified on the FMSF, as being high and medium archaeological sensitivity areas. The identification of these sensitivity areas can prove useful for park management and operational activities.

Table 12. GIS model performance calculations for Fort Mose State Park

Fort Mose Historic Sensitivity Model	Acres	Percent		FMSF Acres	Percent
High Sensitivity Area	7.83	18.94%		3.36	85.71%
Medium Sensitivity Area	2.78	6.72%		0.00	0.00%
Low Sensitivity Area	30.74	74.34%		0.56	14.29%
Total	41.35	100.00%		3.92	100.00%

Gamble Rogers Memorial State Recreation Area at Flagler Beach

Gamble Rogers Memorial State Recreation Area is a park is a 134.18 acre parcel located on the Atlantic coast. The majority of the park is located on a barrier island bounded to the east by the Atlantic Ocean and to the west by the Intracoastal Waterway known as Smith Creek. Other prominent ecotonal boundaries include the intercoastal to estuarine tidal marsh area in the southwestern portion of the park property (FDEP 2006b). Topography at the park ranges from sea level to a high of approximately 15 ft above mean sea level (Figure 84). The park is within the defined Eastern Flatwoods District (Brooks 1981). Soils include types that are excessively and somewhat poorly drained as well as others with poor drainage characteristics.

The FMSF shows one recorded archaeological site within the park boundary (Figure 85). The Life Saving Station site aka House of Refuge (8FL263), is located near the east entrance and park campground of Gamble Rogers Memorial Recreation Area. Today, there are no extant architectural remains associated with this site that had functions as a house of refuge for shipwreck survivors in 1869, was a life saving station in 1884, and served as an air warning site during WWII and as a measure of watch for German submarines. Other associated buildings included a radar reporting station that was historically part of this building complex (FDEP 2006b). Archaeological evaluation of the site indicate that there may be subsurface intact

features and artifacts associated with this historic occupation area (Newman 2005a). The site contains insufficient information for NRHP evaluation.

There have not been any archaeological surveys that have included sub-surface sampling at the Gamble Rogers Memorial Recreational Area, but CARL archaeologists have visited the park and documented locations and looked for surface artifact scatters related to the 8FL263 site area (Newman 2005a). Our GPS and reconnaissance survey at this park did identify one surface scatter area of prehistoric ceramics (8FL897), finding three aboriginal ceramic sherds of the St. Johns variety, both plain and check stamped. We marked in the location of this low density artifact scatter, and will submit a FMSF site location form. The new site is located approximately 240 meters to the south of the 8FL263 location, and falls within an area identified by our model as having high archaeological sensitivity just upland of the coastal dune system (Figure 86).

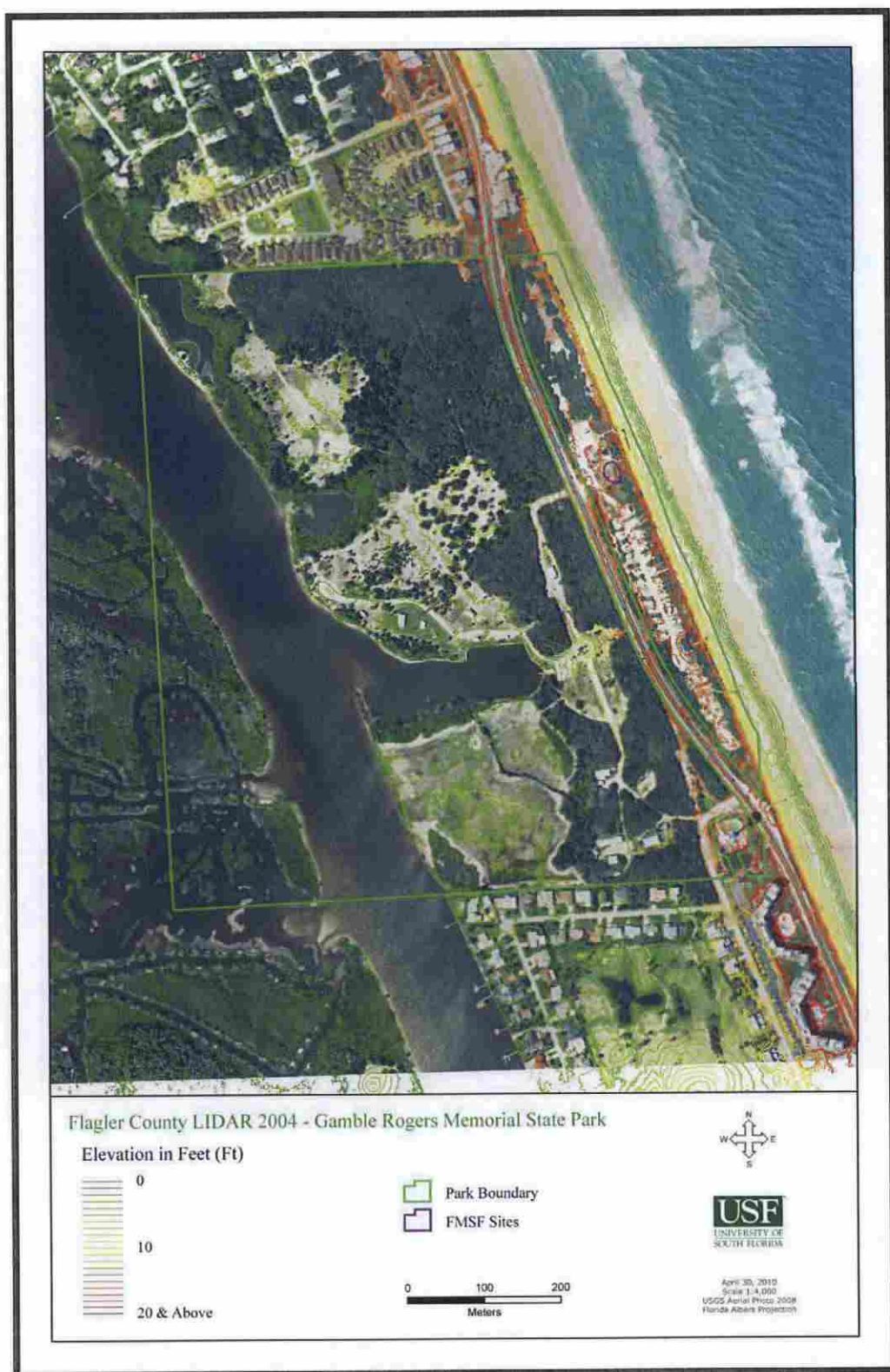


Figure 84. LiDAR Elevation contour map for the Gamble Rogers State Park area

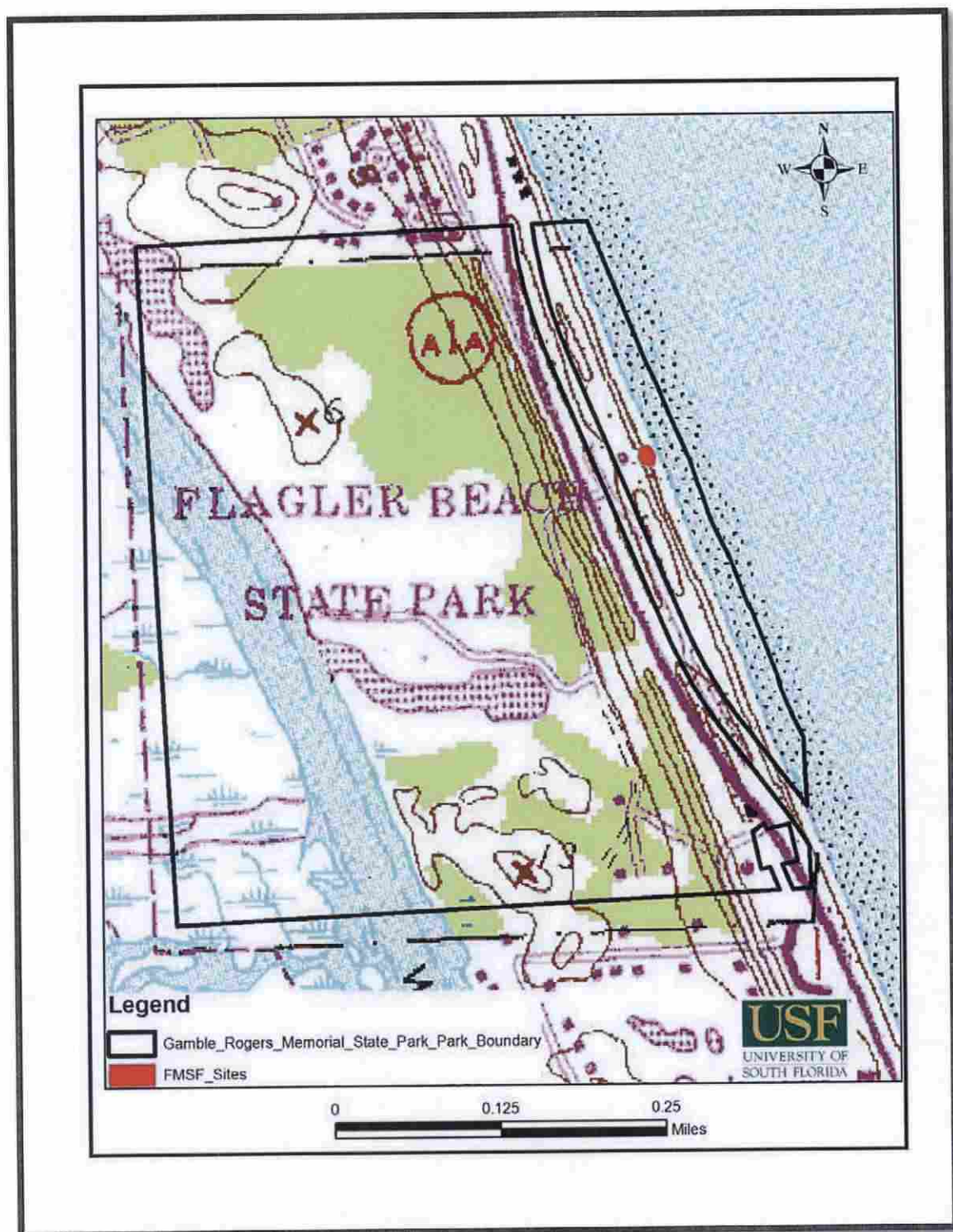


Figure 85. Florida Master Site File data showing location of FL263 in the Gamble Rogers Memorial State Park

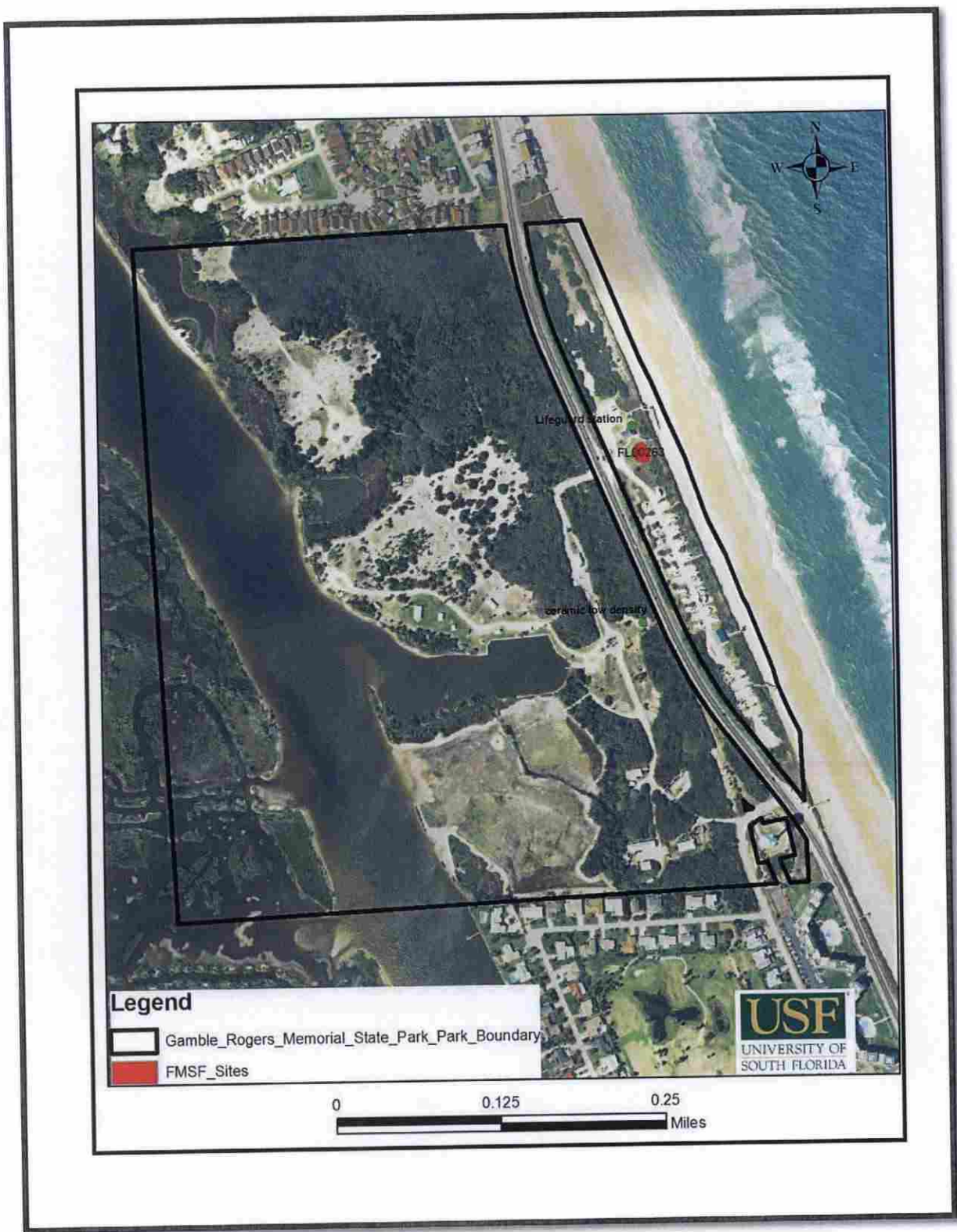


Figure 86. GPS survey data collected at Gamble Rogers State Park showing locations of cultural resources along with the recorded FMSF location data

Results and Discussion

The archaeological sensitivity model for Gamble Rogers Memorial State Park includes a variety of environmental and cultural variables that account for the presence of sites through time and space based on surveys and information within the regional vicinity to the park location. Primary factors for cultural site locations used in our model matrix within the park relate to soil drainage characteristics, distance to water (streams, lagoons, estuarine resources, coastal areas, streams, and lakes and ponds), presence of stable riverine islands, and relative elevation. Historical landform data, areas of higher elevated dune and ridge systems that are conducive to settlement areas for prehistoric and historic peoples, were also considered. Systematic, professional survey in this park could assist with further refining the model. In particular, available 1ft. LiDAR data, included as part of this modeling effort, can be used to isolate discrete extant elevated locations and greatly refine a Phase 1 field survey of the park. Use of direct discovery methods combined with field verification and field testing can greatly enhance our understanding of the past and is complimentary to sensitivity modeling efforts (Kvamme 2006). Historical record search and photographic studies of the structures related to the one known site (8FL263) would assist in the delineation of this resource and in any archaeological survey for sub-surface resources.

Model Performance

Our archaeological resource sensitivity model for the Gamble Rogers Memorial Recreational State Park is shown at a zoomed-in view of a 1:4,000 scale but is also provided at the 1:24,000 scale in the geodatabase park folder files (Figure 87). When this model is verified using the FMSF polygonal site location data, the model captures 1 out of 1 recorded sites in the designated high archaeological sensitivity area. The previously unrecorded low-density prehistoric ceramic scatter we encountered during our GPS reconnaissance work also is found to fall within the area of high archaeological sensitivity. Because there has never been a professional archaeological survey in the Gamble Rogers Memorial Recreational Area State Park, the model performance cannot be evaluated fairly against the FMSF data, with the exception of the one known site area (Table 13). Instead, it would be recommended to test and refine these sensitivity areas by conducting a Phase 1 archaeological field survey that combines field verification with use of the model and direct remote sensing observations using high resolution aeriels and LiDAR data. The model will prove useful for management activities and can be utilized in conjunction with day-to-day activities and unit management planning.

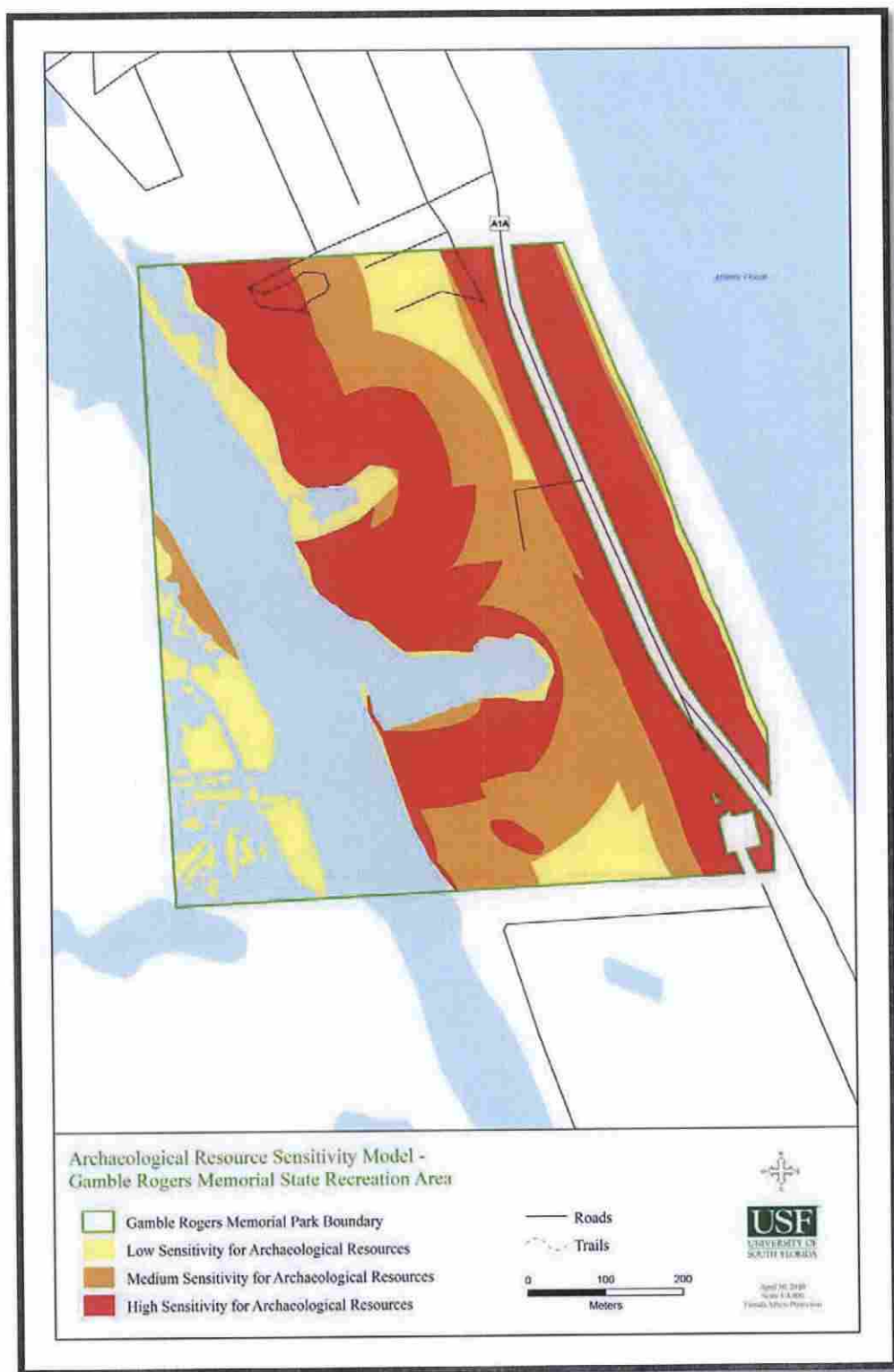


Figure 87. Map showing the archaeological resource sensitivity model developed for Gamble Rogers State Park

Table 13. GIS model performance calculations for Gamble Rogers Memorial Recreational State Park

Gamble Rogers Memorial Sensitivity Model	Acres	Percent		FMSF Acres	Percent
High Sensitivity Area	49.28	36.73%		0.11	100.00%
Medium Sensitivity Area	27.31	20.35%		0.00	0.00%
Low Sensitivity Area	57.59	42.92%		0.00	0.00%
Total	134.18	100.00%		0.11	100.00%

Haw Creek Preserve State Park

The Haw Creek Preserve State Park is managed as part of the Tomoka Basin GeoPark, which also includes Addison Blockhouse Historical State Park, Bulow Creek, and Bulow Historical Ruins State Park. The preserve is part of a floodplain system of lowlands that surround Crescent Lake and Haw Creek, and includes shoreline areas for Green Bay and Dead Lake, and has stream bodies of Haw and Little Haw Creek, and the outlet of Gator Slough from Mud Lake (FDEP 2003b). Elevations on the preserve are relatively low and range from 5 to 10 feet above mean sea level (Figure 88).

There are no recorded archaeological sites located within the Haw Creek Preserve according to the FMSF data (Figure 89). The lack of recorded sites is likely attributable to the fact that there has been no systematic sub-surface archaeological surveys conducted at the preserve. A nearby survey in 2002 of the Crescent Lake region of Flagler and Putnam Counties recorded 14 new archaeological sites in and around the marginal edges and near-shore environments of this lake system (Sassaman 2003a). Based on the results of surveys in the St. Johns Basin region, a full range of site types and temporal associations are probable for this area, including prehistoric Paleo and Archaic occupations and landuse, and later regional culture site types and locations. First Spanish Period, British Period, Second Spanish Period, Territorial, and Seminole sites are also possible in this area (Goggin 1952; Milanich 1994; Sassaman 2003a). Historic site types probable for the Haws Creek Preserve relate to homesteads, refuse sites, and agro-industry sites especially relating to timber, turpentine, and cattle.

Results and Discussion

Archaeological sensitivity modeling for the Haw Creek preserve took into account a number of environmental and cultural matrix evaluation measures, including factors such as relative elevation, distance to water features (ponds, lakes, wetlands, rivers and permanent streams),

soil characterization and drainage features, and the likelihood for areas known from historic resources to be associated with agro-industry and historic sites. Data layers in the modeling that were important to these determinations included LiDAR (only available for approximately 50% of the park boundary) and contour elevation data, historic maps and documents, aerial imagery, historical maps and references, and environmental layers such as the National Wetlands Inventory, hydrology, and SSURGO soil information.

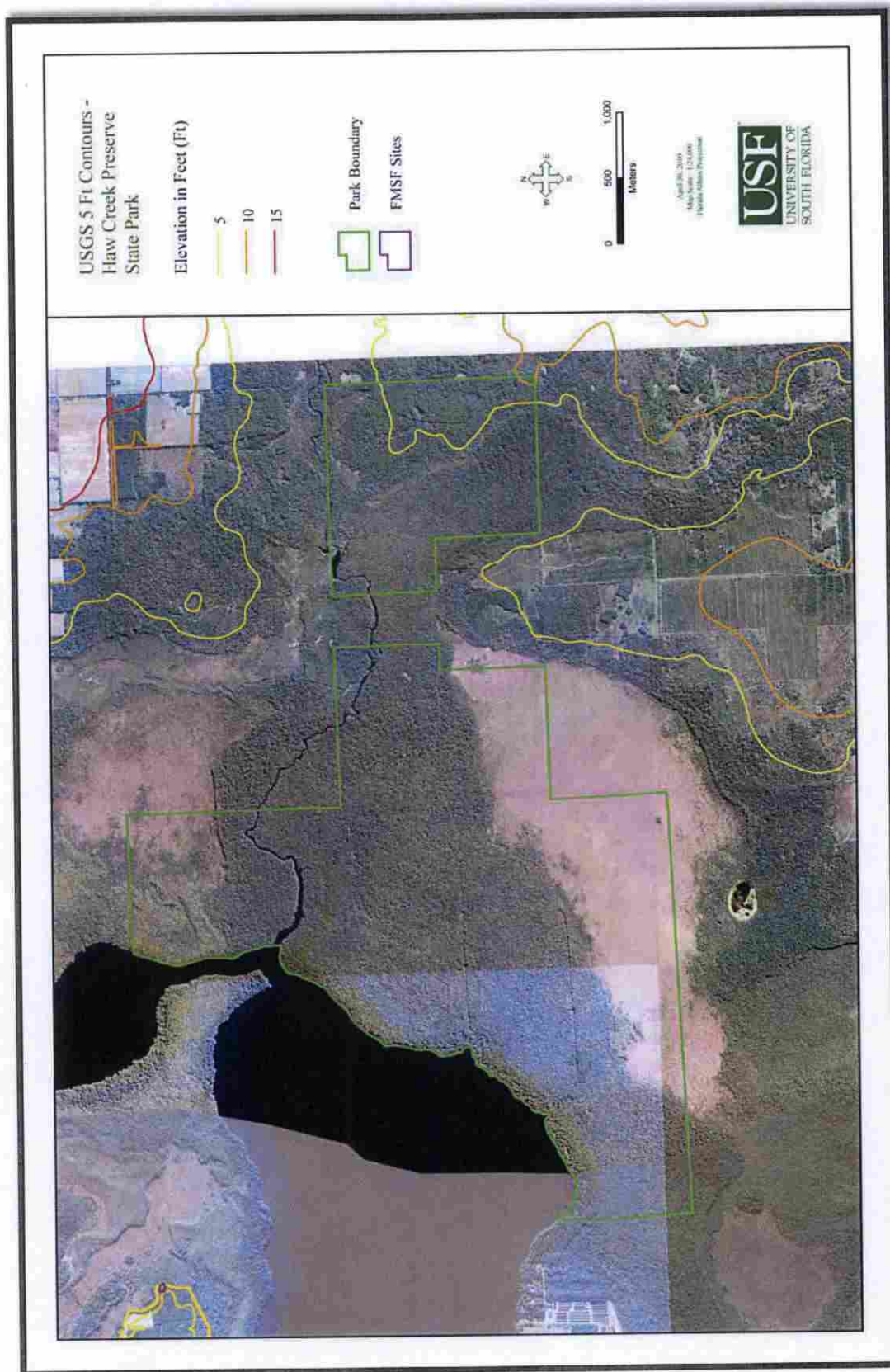


Figure 88. Elevation contour map for the Haw Creek Preserve State Park area

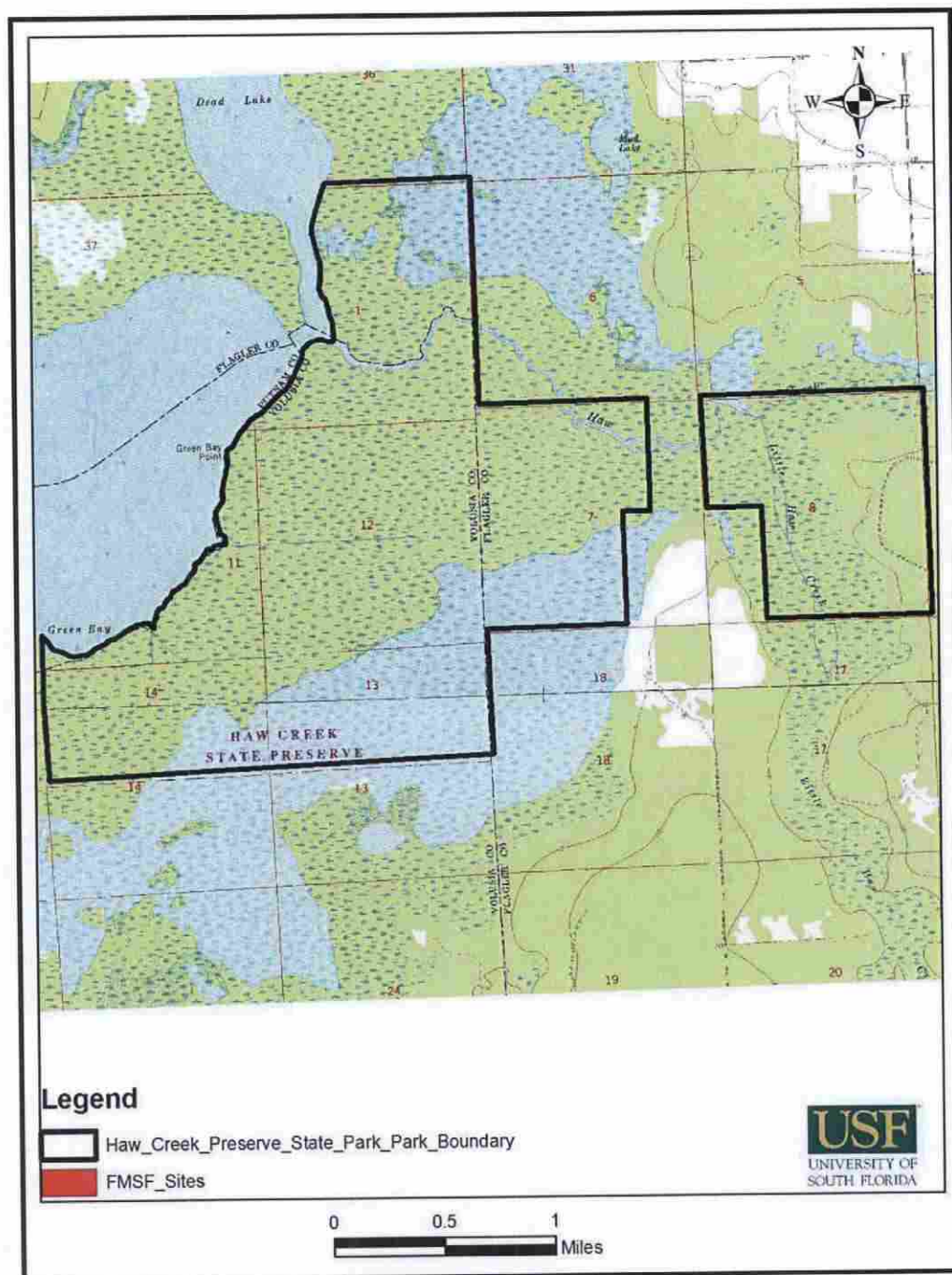


Figure 89. Florida Master Site File data showing no recorded archaeological sites lie within the Haw Creek Preserve State Park boundary

Model Performance

The Haw Creek Preserve archaeological sensitivity model is presented at a 1:24,000 scale (Figure 90). Because there are no known archaeological sites at the Haw Creek Preserve we are not able to verify the model using the FMSF polygonal site location data. Examination of the developed model shows that of this large preserve (3,061.66 acres), only a small percentage is designated as high and medium sensitivity areas. These areas account for only slightly more than 3% of the total acreage, and are primarily associated with areas that are not inundated or associated with flood plain soils or seasonal flooding (Table 14). Because this preserve has never been surveyed, this sensitivity model can serve as a foundation for future Phase I archaeological testing and can assist with current management for cultural resource potential areas. The large amount of low sensitivity area associated with the model relates to the poor soil quality and inundation. High sensitivity areas are attributable largely to topography and better soil drainage characteristics in proximity to wetland and hydrologic features. Timber and turpentine industry type sites are likely for this preserve, especially in the areas designated by the high and medium sensitivity.

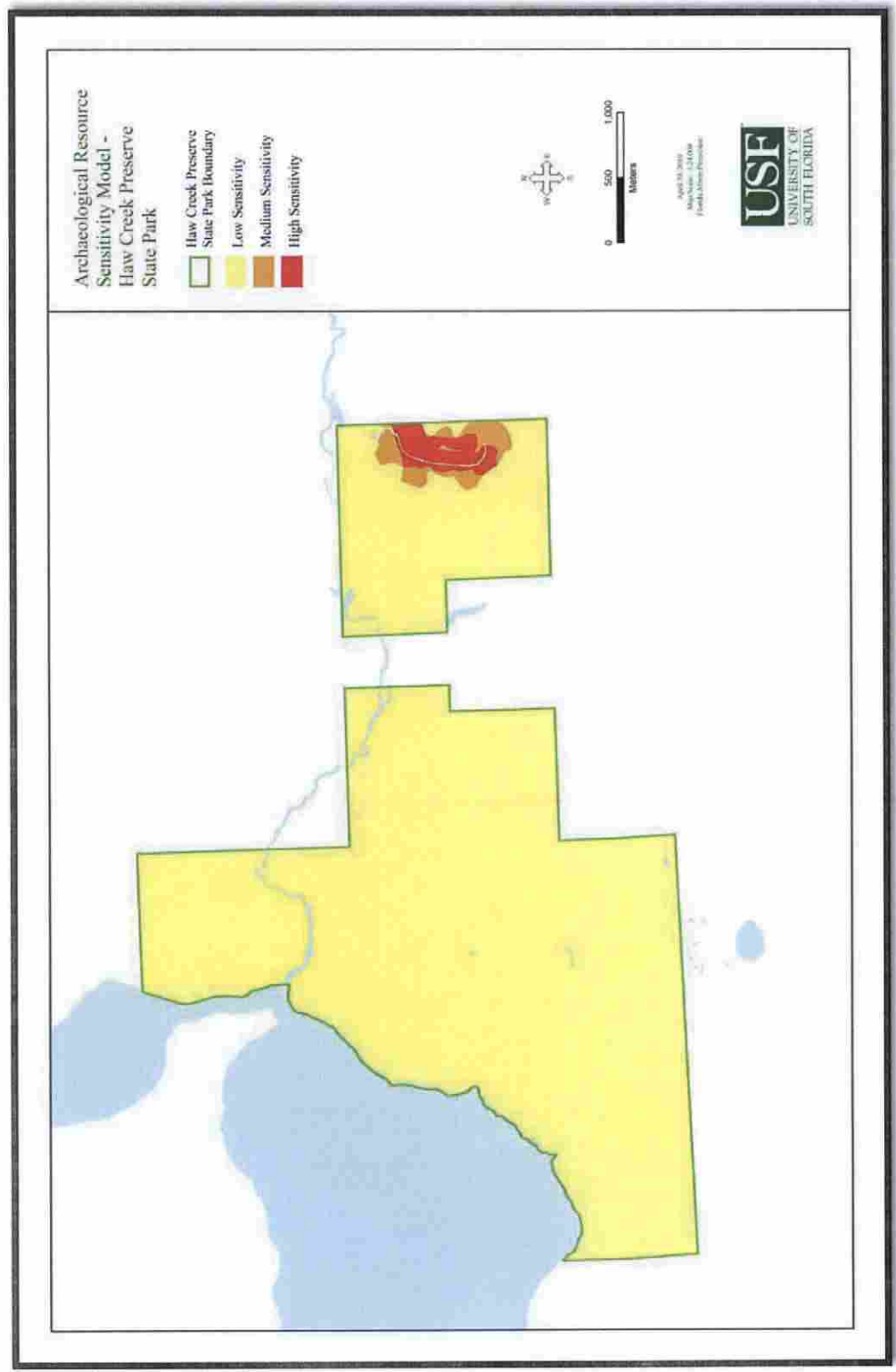


Figure 90. Archaeological Resource Sensitivity Model for Haw Creek State Park

Table 14. GIS model performance calculations for Haw Creek Preserve State Park

Haw Creek Preserve Sensitivity Model	Acres	Percent		FMSF Acres	Percent
High Sensitivity Area	45.98	1.50%		NA	0.00%
Medium Sensitivity Area	48.36	1.58%		NA	0.00%
Low Sensitivity Area	2,967.31	96.92%		NA	0.00%
Total	3,061.66	100.00%		0.00	0.00%

Hontoon Island State Park

Hontoon Island State Park is a 1,648.27 acre parcel with diverse natural and cultural features. The park is located within the Atlantic Coastal Lowlands physiographic zone. The entire area of Hontoon Island is contained within the St. Johns River Valley physiographic subzone, with elevations ranging from 15 to less than 5 feet above mean sea level (Brooks 1981; Myers and Ewel 1990) (Figure 91). The park is surrounded by St. Johns River to the east, north, and south, and Snake Creek and Hontoon Dead River run to the west (FDEP 2005a).

The FMSF shows 14 recorded archaeological sites that have polygonal extents that fall within the Hontoon Island State Park boundary (Figure 92). These sites include a burial mounds, shell ridges, middens, prehistoric campsites, artifact scatters and prehistoric habitation sites (Figure 90). Seven mound sites contain human remains (8VO214, 8VO215, 8VO35, 8VO202, 8VO2600, 8VO7493, 8VO7494), and three sites are evaluated by the recorder as being likely eligible for the NRHP (8VO214, 8VO215, 8VO202) and one site is listed as preservation recommended (8VO8315). The recorded sites have temporal ranges from the Middle Archaic, Orange, St. Johns period, Mt. Taylor, Deptford, and historic periods.

Archaeological surveys and inquiry into the area date back to antiquarians and early archaeologists in Florida's history, with Jeffries Wyman and C.B. Moore working at area mounds and middens in the late 19th century (Milanich 1994). A synthetic understanding of the region including Hontoon Island was written by Goggin (1952), who became a pioneer in this region (Weisman 2002a). Ripley Bullen performed salvage archaeological work in the 1950s, showing the tremendous preservation of organic artifacts that are found in peat and muck areas during dredging near the Thursby Midden (8VO35)(Bullen 1955). Barbara Purdy of the University of Florida showed that the Hontoon Island Shell Midden (8VO202) contained intact deposits and well-preserved organic material, writing her now famous book on wet-site archaeology in

Florida (Purdy 1990). The peat and muck of these wetland areas serve as preservers of even fragile organic based items such as wood and bone. For example, in 1955, a dragline operation at Hontoon Island, near the Thursby Mound (8VO35), uncovered a 12-foot-tall owl totem carved from pine (Bullen 1955)(Figure 93). Other finds from the wetlands include bone pins and awls and a wooden canoe paddle. The FDHR examined a portion of the adjacent Blue Spring Park along with Hontoon Island as part of a published report (Dunbar, et al. 1978). Ken Sassaman continued the subsurface understanding of 8VO202 that Purdy began, showing intact midden deposits still exist despite shell mining of the site in the 1930s and has conducted several field schools and reconnaissance work in the Hontoon area (Sassaman 2003b). A reconnaissance survey of the island has revealed the high potential for additional site discovery along the margins of the island (FDEP 2005a). This island edge hypothesis is reflected in our archaeological sensitivity modeling for this park. Other academic research projects, focused primarily on Hontoon Island, provide significant details into the settlement pattern and lifeways of prehistoric populations in the area (Purdy 1990; Purdy 1981; Randall and Sassaman 2009; Sassaman 2003b; Sassaman and Anderson 1996), as do previous environmental and cultural characterizations, and predictability model criteria that have been developed for this area (Austin 1989; Goggin 1952; Madry, et al. 2001; Sassaman, et al. 2000).

Our site visit and GPS work at Hontoon Island included interviews with park staff concerning management issues and concerns, and the presence of any new areas of sensitivity or cultural finds. Because this park has been the subject of so much archaeological research by academic interests, the mapping for this park, including the polygonal boundaries of its cultural site locations are well recorded. Our GIS work included calculating centroid locations and analyzing the boundaries of recorded features (middens, mounds and ridges) against the available LiDAR data. The LiDAR data also proves beneficial for locating other features that are known but difficult to locate. The park's unit management plan discusses the difficulties in locating five spoil piles from the St. Johns dredging projects located on the eastern side of Hontoon Island. These five spoil piles pronounced on the LiDAR data and because it is georeferenced, clearly delineates and allows assessment of their locations (Figures 94 and 95).

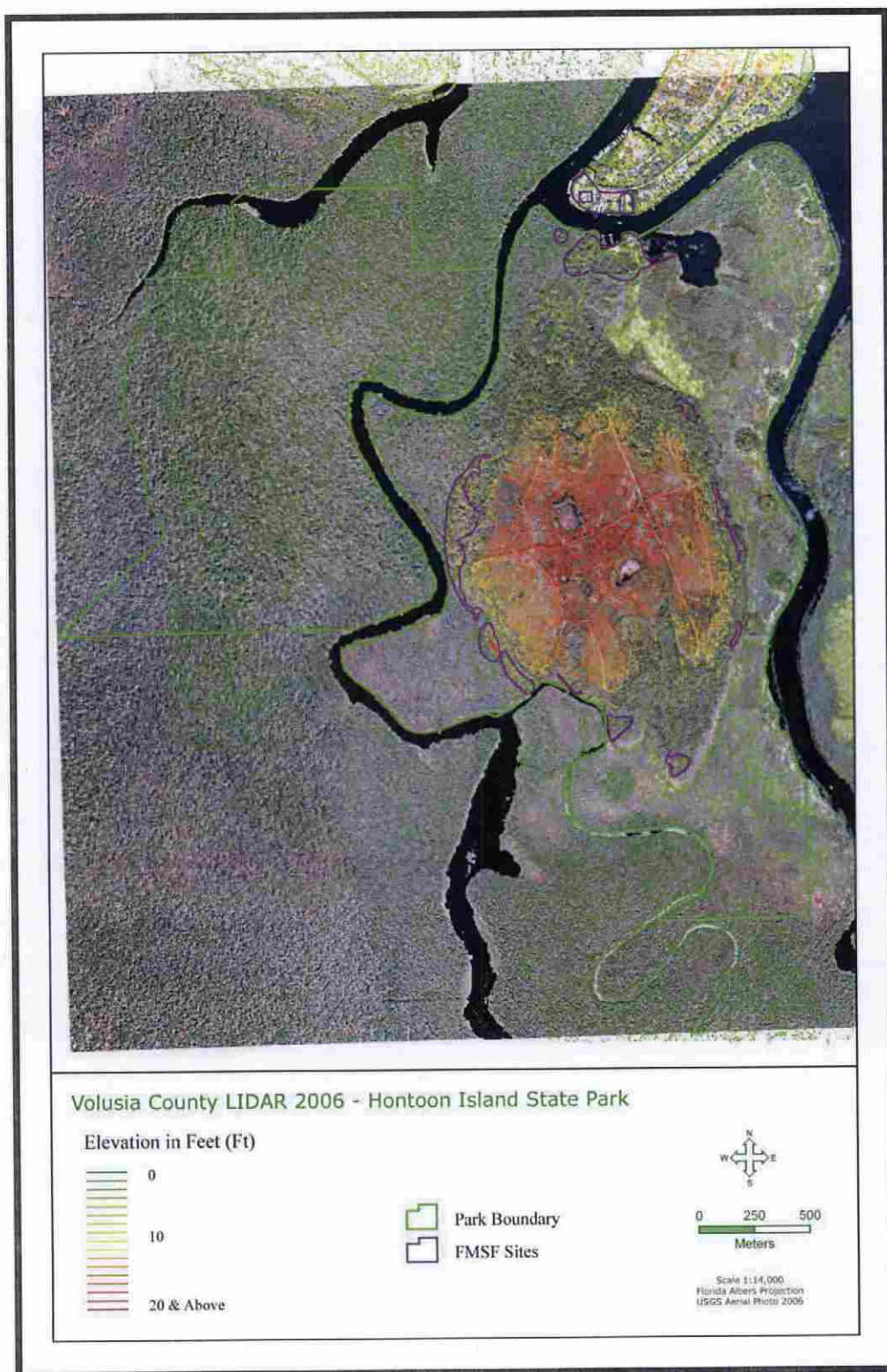


Figure 91. LiDAR data for the Hontoon Island State Park area

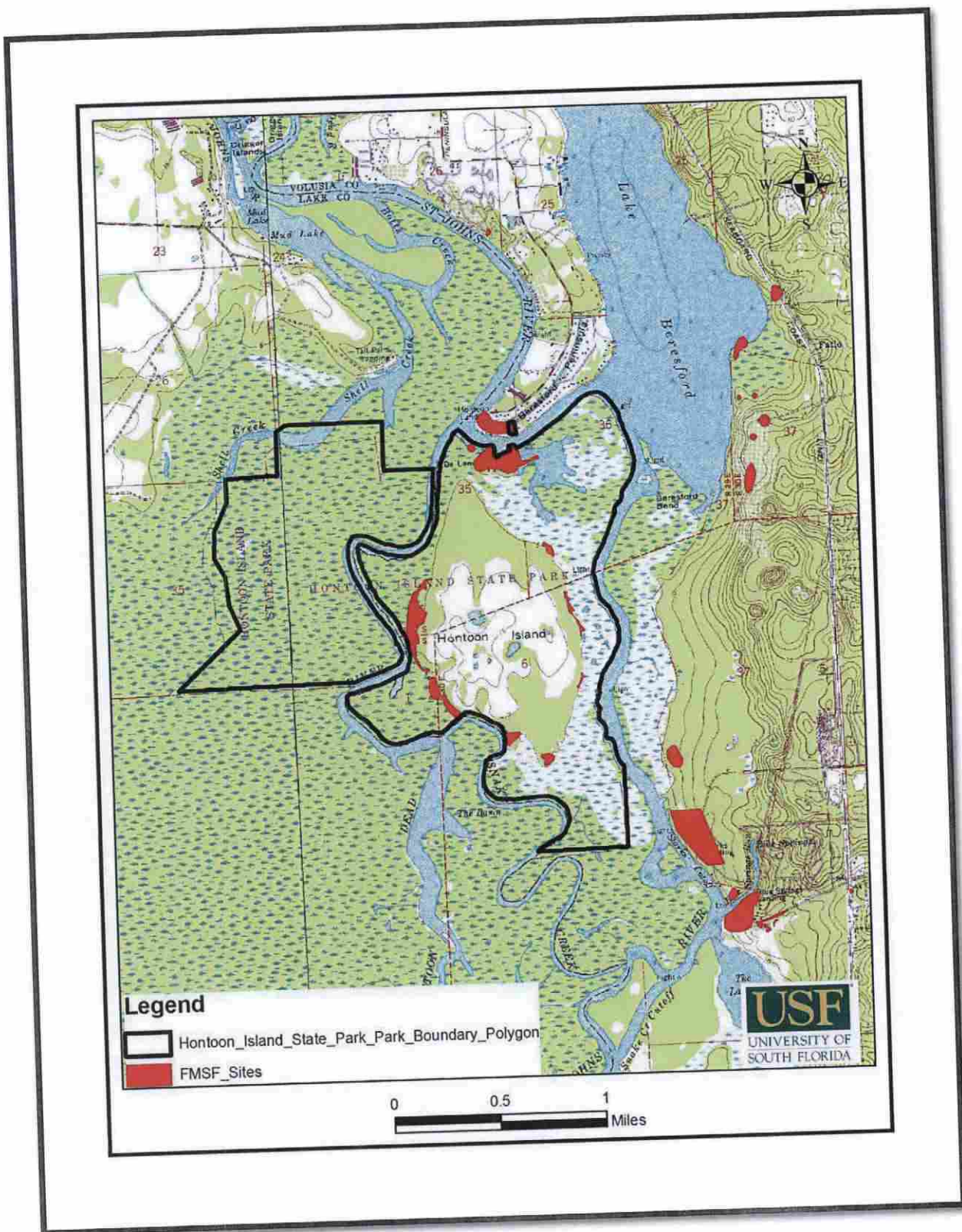


Figure 92. Florida Master Site File data for sites within the Hontoon Island State Park

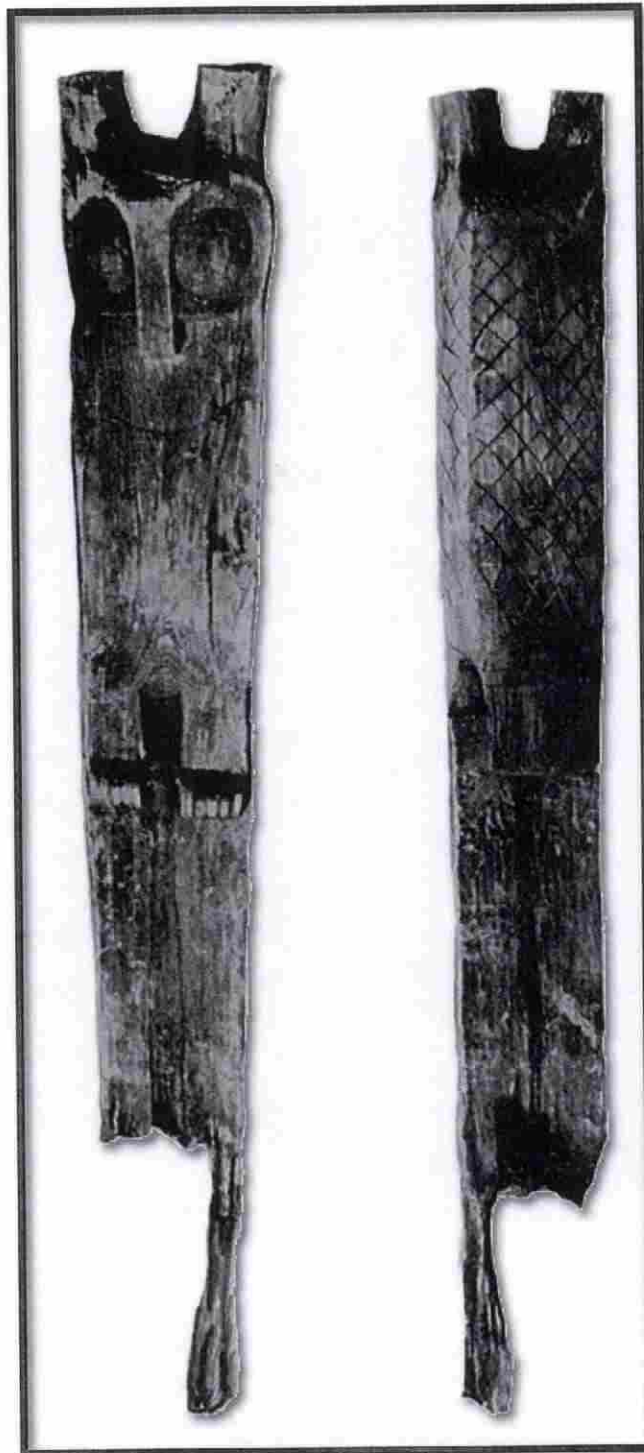


Figure 93. 12-ft. wooden owl totem found near Hontoon Island and Blue Spring State Park's Thursby Mound (8VO35) by a dredge (Bullen 1955:63)

Results and Discussion

The archaeological sensitivity model for Hontoon Island State Park includes a variety of environmental and cultural variables that account for the presence of sites through time and space and account for the variability of site types known to occur within the park as demonstrated through previous surveys in and within the regional vicinity to the preserve. Primary factors for cultural site locations in the park relate to soil drainage characteristics, distance to water, and relative elevation. The presence of unique environmental setting characteristics, such as the adjacency to the St. Johns River and associated streams, wetland and water features, relative elevation areas, and known significant archaeological resources, are all contributory to the cultural settlement matrix evaluations utilized. At Hontoon Island State Park, the environmental and cultural matrix items used in the model analysis included: distance to river or permanent stream, distance to intermittent stream, distance to lakes and ponds, distance to wetlands, relative elevation, soil drainage characteristics, recorded sites with human remains, high likelihood of containing significant sites based on recorded or archival data or oral tradition (survey evaluations from FMSF = likely, potentially or eligible for the NRHP). These data, along with details from previous archaeological survey and research in the area further clarified pertinent features for sensitivity modeling purposes. Our archaeological resource sensitivity model for the park is shown at a 1:24,000 scale (Figure 96).

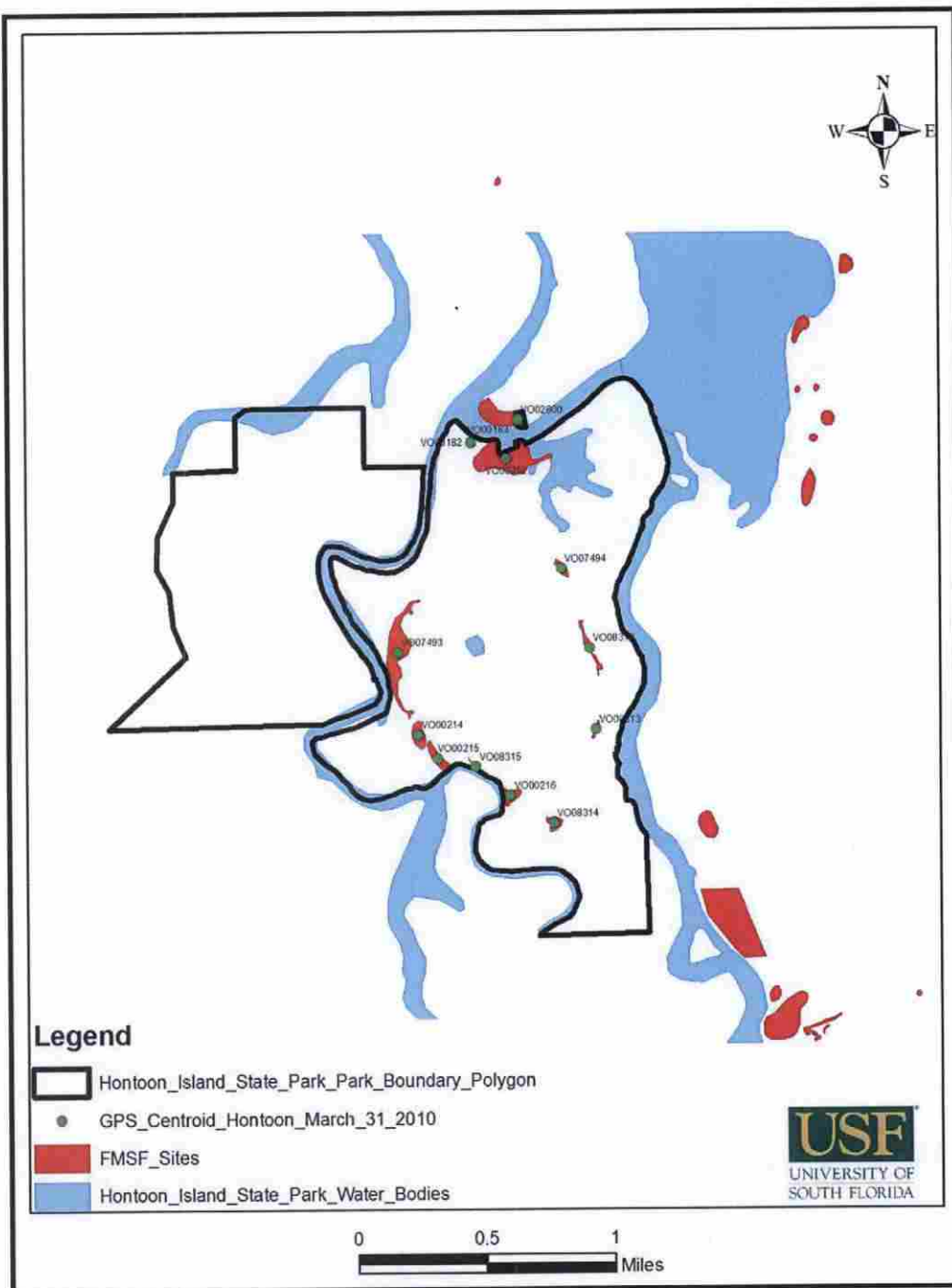


Figure 94. GPS/GIS survey using centroid FMSF locations at Hontoon Island State Park

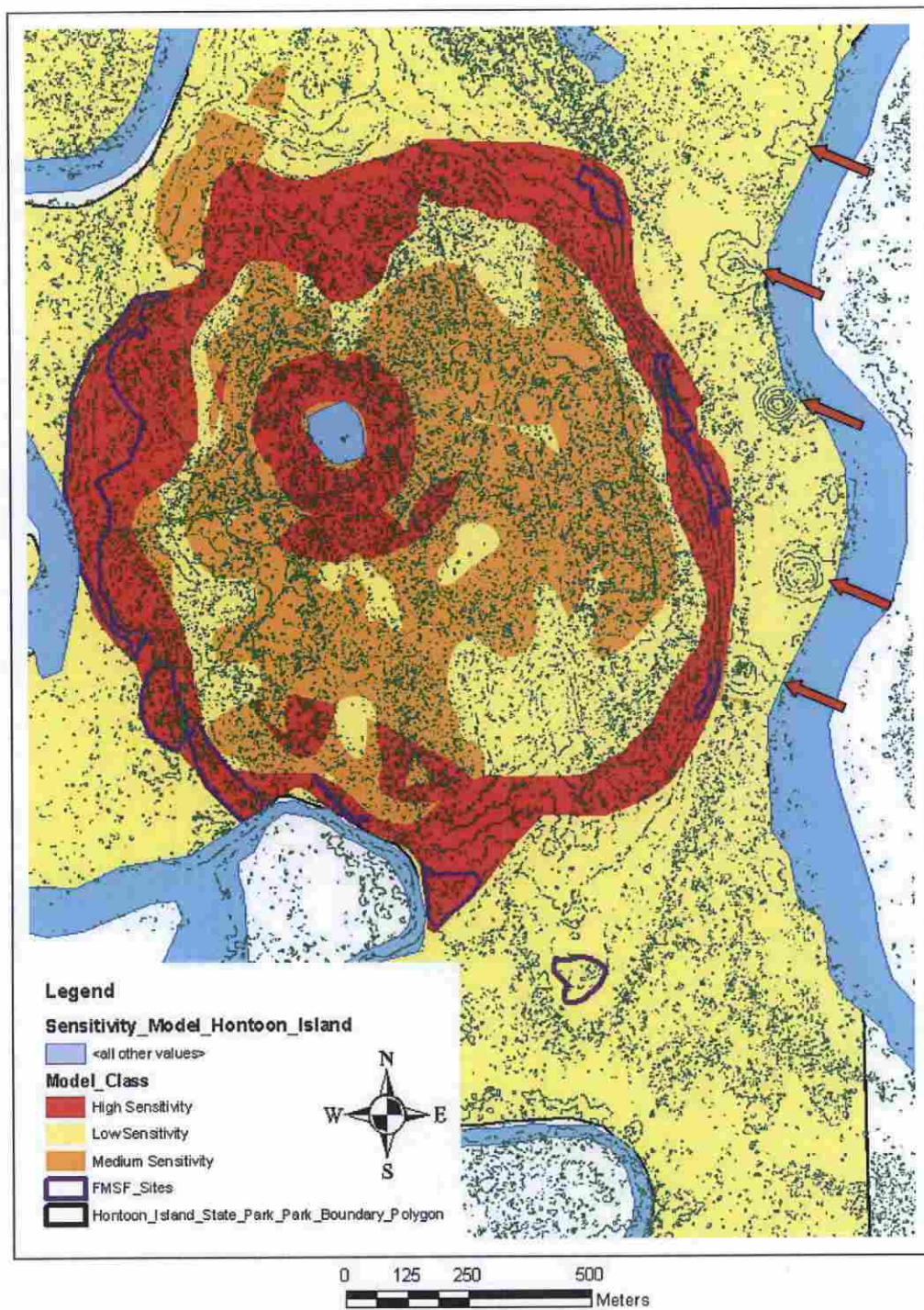


Figure 95. 1-ft. LiDAR data used to show elevation features such as mounds and middens and historic spoil pile locations to the east of the island along the water edge (red arrows)

Model Performance

When our archaeological sensitivity model for Hontoon Island State Park is verified using the FMSF polygonal site location data, the model captures 11 out of 14 recorded sites, at least partially, in the designated high and medium sensitivity areas. The model misses sites due to site location choices other than those defined in the environmental model matrix and because of slight variances in polygonal boundary truthing. Additionally, sites with no evaluation by the field recorder or the SHPO for NRHP eligibility or those lacking sufficient information, receive no matrix evaluative points that might help overcome environmental factors such as poor soil drainage characteristics. Expressed in spatial percentages, the high archaeological resource sensitivity area modeled at Hontoon Island State Park accounts for less than 10% of the land surface area (Table 15), but it has nearly 66% of the recorded archaeological spatial extents correlating with these modeled areas. Using statistics ($p[MIS]-p[M]=.56$), our model represents a 56% improvement over chance of locating archaeological sites within our designated high probability area (see Kvamme 2006:28). Combining the high and medium sensitivity areas shows that 81% of recorded archaeological spatial extents occur within our sensitivity areas, showing a more than 61% overall improvement over chance.

At Hontoon Island, there are some portions of the polygonal extents from the FMSF data that fall within the lower sensitivity area. In part, this is representative of digitization errors with site extent mapping with the FMSF, and the LiDAR data available for this park is very useful for better delineating mound and midden extents and elevated features, such as the aforementioned dredge spoil piles. Our model does not detect three known site locations as being in high or medium sensitive locations. Sites 8VO8314, 8VO182 and 8VO183 all fall within low sensitivity areas of our model. 8VO182 and 8VO183 (Hontoon Island Mounds A and B) are shown to be in co-location in an area that has a poor model score for soils (-30 score). LiDAR data for this mound area does not distinguish the elevation (likely due to the dense canopy here), and so no delineation of the mounds were made for our model. Additionally, these mounds are missed by the model because the FMSF data shows these sites have not been evaluated for the NR by either the recorder or the SHPO, and so no scores in our model are assigned to these locations. The South Hontoon Midden site (8VO8314), similarly is located in an area of poor drainage, is not readily discernable in extent using the LiDAR data, and has been evaluated by the recorder as having insufficient information to determine eligibility for the NRHP. These types of midden locations, lacking distinguishable environmental characteristics in our matrix, are much harder to predict with a model of this type and some are missed due to their location choice, which may not correlate with environmental variables.

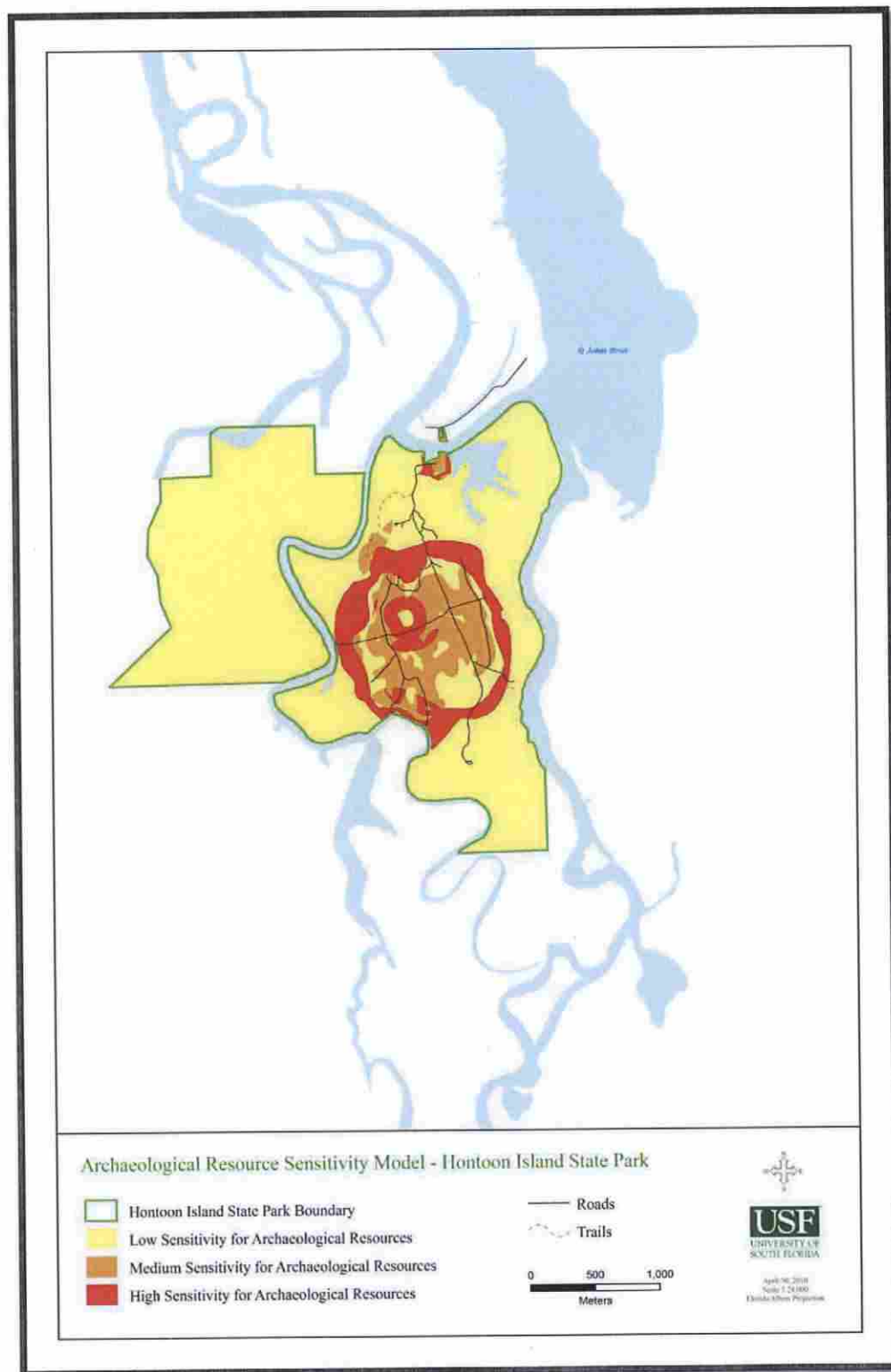


Figure 96. Map showing the archaeological resource sensitivity model developed for Hontoon Island State Park

Table 15. GIS model performance calculations for Hontoon Island State Park

Hontoon Island Sensitivity Model	Acres	Percent		FMSF Acres	Percent
High Sensitivity Area	164.63	9.99%		26.85	65.62%
Medium Sensitivity Area	163.31	9.91%		6.01	14.69%
Low Sensitivity Area	1,320.32	80.10%		8.06	19.69%
Total	1,648.27	100.00%		40.92	100.00%

Indian River Lagoon Preserve State Park

The Indian River Lagoon Preserve State Park is a 569.36 acre parcel that lies within the mid-peninsular Atlantic Coastal Ridge province (Brooks 1981) that is characterized by relict beach ridges and discontinuous highlands (White 1970). Elevation is relatively flat over the Inlet Grove portion of the preserve, with a range in elevation from 0 to 10 ft. above mean sea level (Figure 97). Historic alteration of the topography in the preserve has caused substantial changes, especially in the Inlet Grove parcel. Road construction, drainage ditching and mosquito ditches and impoundments, borrow pits and berms are all evident alterations through time. Mullet Creek islands were completely altered by the dredging of channels in the 1950s, including the creation of new land and islands (Figure 98). Natural community types in the preserve include hydric hammock, estuarine tidal swamp and disturbed ruderal (FDEP 2004c; Myers and Ewel 1990).

There are two archaeological sites recorded with the FMSF as being within the Indian River Lagoon preserve boundary, 8BR121 and 8BR2316 (Figure 99). The prehistoric shell midden site 8BR121 originally recorded by Irving Rouse (Rouse 1951) is listed as general vicinity with the FMSF. The site is described by Rouse as a shell midden on the east side of the Indian River, 12.6 miles from the Melbourne Bridge. The site is plotted off an inlet area of Mullet Creek, a location that Rouse likely would have been more specific about. And, although Rouse states that the dense midden had been scavenged for its shell resources, he states that there remained an area of about one-acre with four to six feet of shell. The site is evaluated by the SHPO as ineligible for the NRHP. Archaeological surveyors recently tried to relocate the site within the area listed with the FMSF, and found no sub-surface or surface indication of the midden within the defined area (Driscoll and Jones 2008). The Citrus Barge Dock 8BR2316 is a recently discovered site area that contains building remains from the 20th Century (Driscoll and Jones 2008). The site was evaluated by the surveyors as ineligible for listing on the NRHP.

Besides the preserve-level survey that was conducted to locate cultural resources (Driscoll and Jones 2008), there have been other surveys conducted within the area or close-by to the preserve boundary. A pre-GIS predictability model for six selected areas including the Indian River Lagoon region found seven new archaeological sites and re-visited 75 previously recorded sites (Bense and Phillips 1990). Factors in the area found to be associated with site location and settlement patterning were elevational crest areas associated with dune lines along the ocean areas, relative elevation, and lagoon and river resource exploitation areas (Bense and Phillips 1990). Many of these locations were first identified in the seminal work surveying Indian River archaeology by Irving Rouse. To the north of the Indian River Lagoon preserve, CARL archaeologists conducted site assessment and archaeological survey at the Archie Carr Sea Turtle Refuge property in Brevard County (Newman and Glowacki 2003).

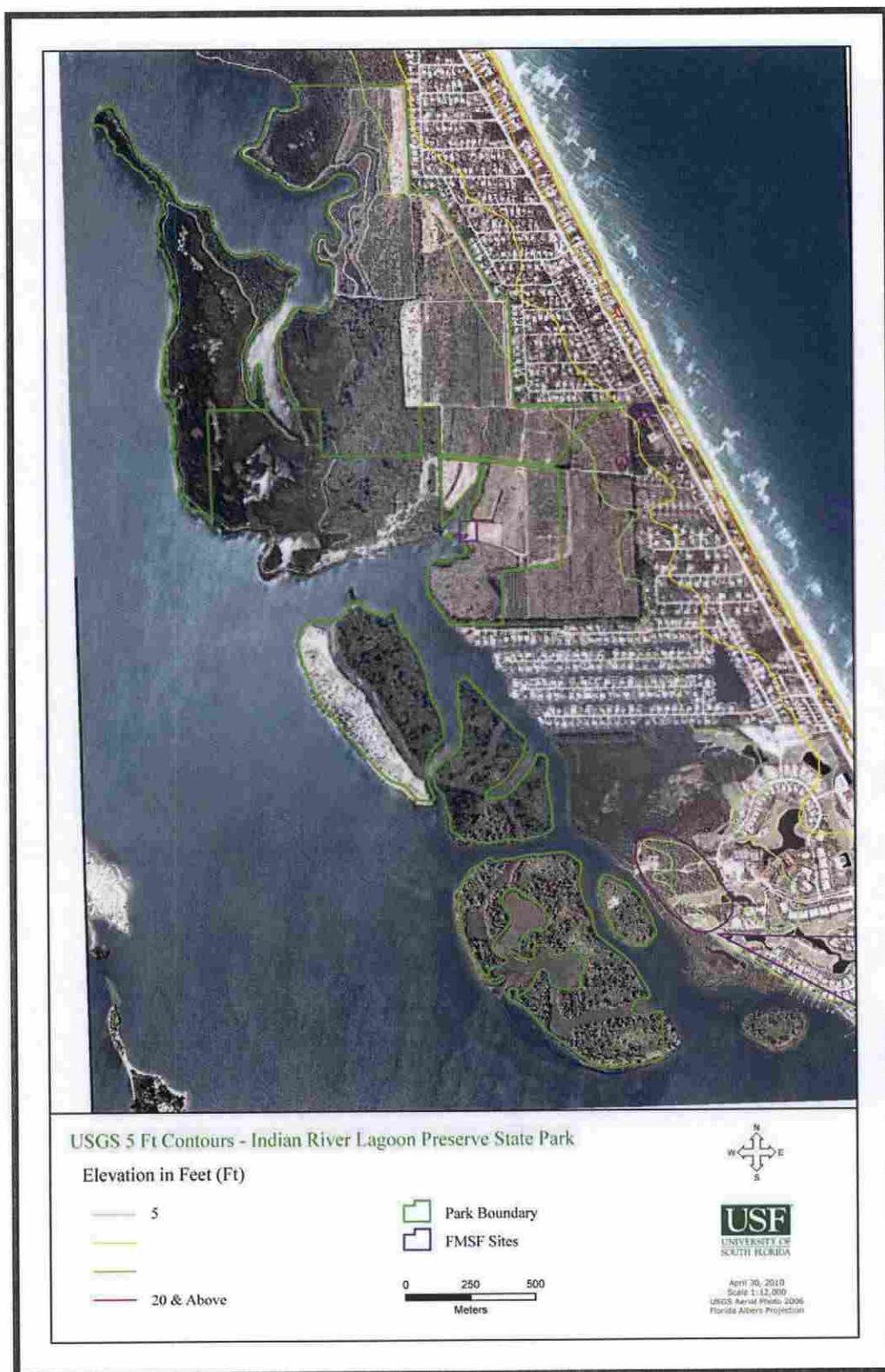


Figure 97. Contour elevation data for Indian River Lagoon Preserve State Park area

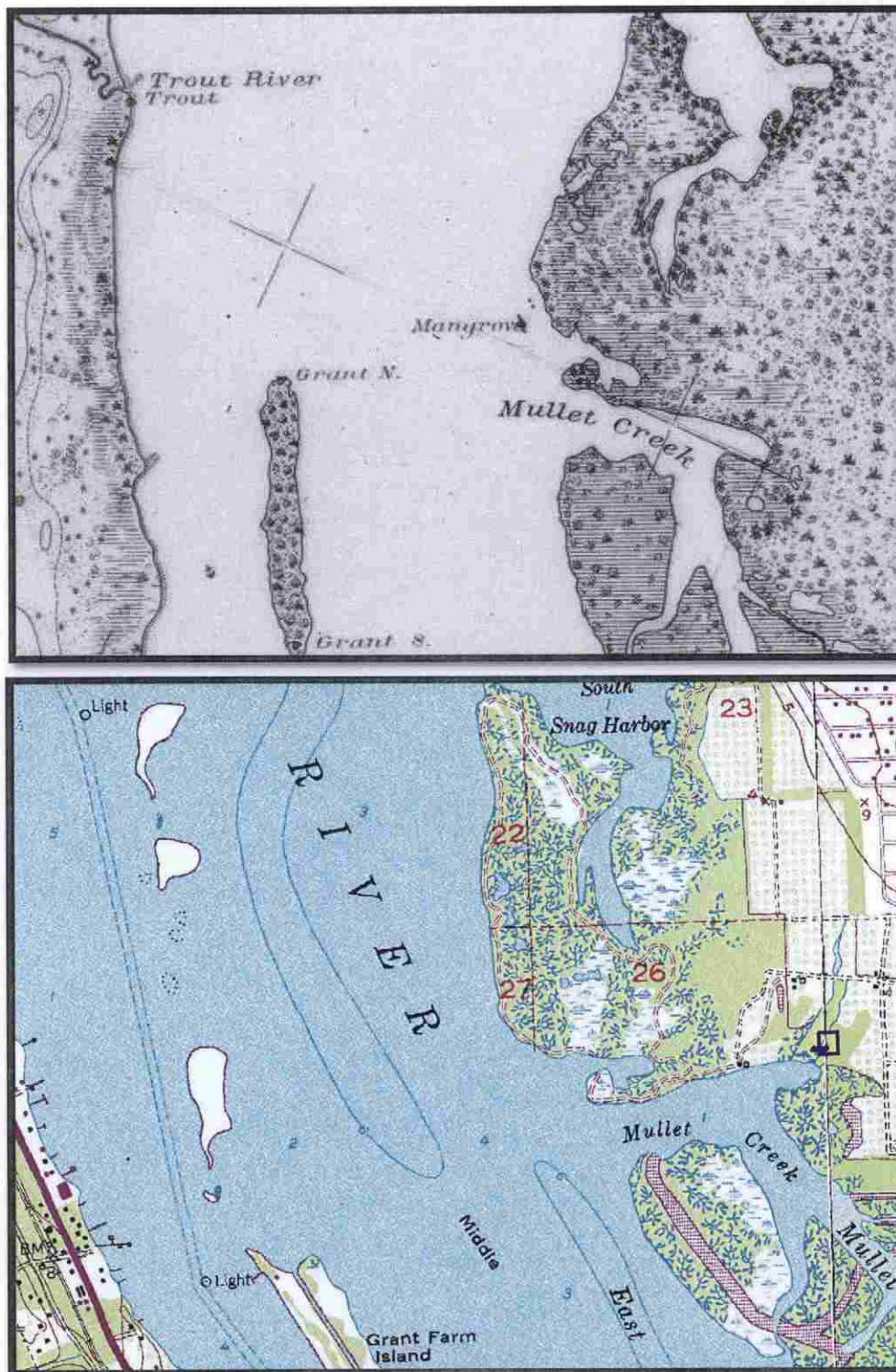


Figure 98. 1879 US Coastal Survey map showing the Mullet Creek portion of today's Indian River Lagoon Preserve State Park compared to the modern USGS topographic map

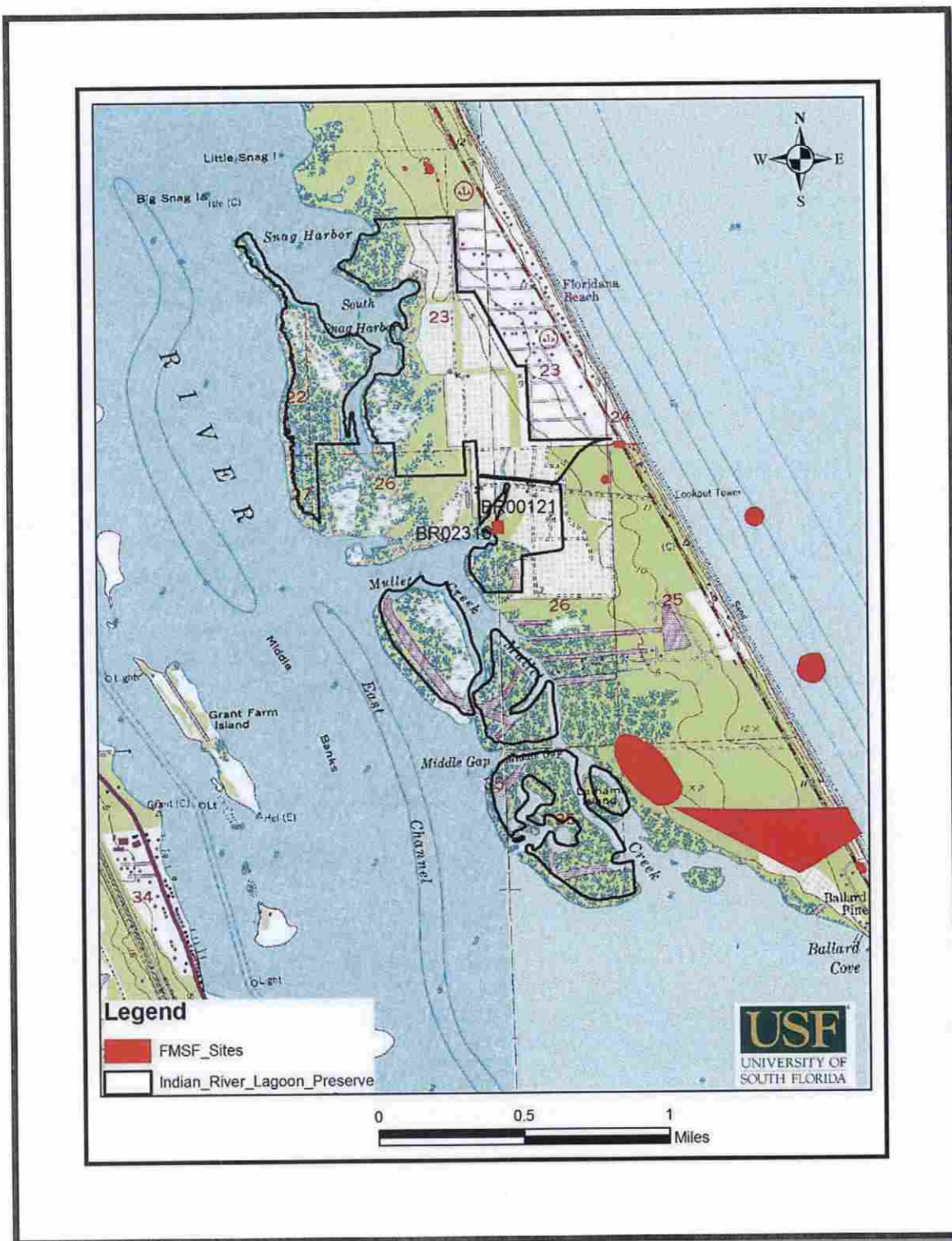


Figure 99. Florida Master Site File data showing archaeological sites within the Indian River Lagoon Preserve State Park

Results and Discussion

Archaeological sensitivity modeling for the Indian River Lagoon Preserve took into account a number of environmental and cultural matrix evaluation measures, including factors such as relative elevation, distance to water features (ponds, lakes, wetlands, rivers and permanent streams), soil characterization and drainage features, and the likelihood for areas known from historic resources to be associated with agro-industry, such as citrus, farmsteads and homesteads, and other historic sites. Data layers in the modeling that were important to these determinations included LiDAR and contour elevation data, historic maps and documents such as US Coastal Survey maps and GLO maps, aerial imagery, and environmental layers such as the National Wetlands Inventory, hydrology, and SSURGO soil information. Historic land grants and homestead features and landform alterations were digitized and georeferenced and considered as part of the modeling for this preserve (Figures 100 and 101). Many of these homestead features identified as sensitivity areas in our model, have not been located through archaeological survey and are not listed on the FMSF.

Model Performance

The Indian River Lagoon Preserve archaeological sensitivity model is presented at a 1:12,000 scale (Figure 102) for zoomed-in viewing, but is provided in the geodatabase at 1:24,000 scale of analysis. The model captures both recorded archaeological sites within the medium sensitivity areas. Small percentages of the site polygonal boundaries contain low sensitivity defined portions. Site 8BR121 is general vicinity and is likely not plotted correctly. No indication of the site exists today, and it is likely that land alterations occurred after the site was recorded by Irving Rouse (1951). The 8BR2316 site is described as a citrus barge dock, but is plotted with a large polygonal extent that may not be reflective of the true spatial boundary of the site. The model captures most of the site polygonal extent within the medium sensitivity area. Examination of the developed model shows that this preserve has 33 percent of its 569 acres as high sensitivity areas. These areas do not have any recorded sites associated. The medium sensitivity areas account for 12 percent of the total property and have over 70 percent of the recorded archaeological site polygonal extents associated (Table 16). Expressed in spatial percentages and using statistics ($p[MIS]-p[M]=.58$), our model represents a 58% improvement over chance of locating archaeological sites within our designated in the medium sensitivity area (see Kvamme 2006:28). Because no recorded sites are located in the high sensitivity areas modeled, we are unable to provide validation for these areas modeled Citrus and farming industry type sites are likely for this preserve, especially in the areas designated by the high and medium sensitivity and associated with historic map locations depicting land grants and homesteads.



Figure 100. Historic map showing T29S R38E S23 from 1896 survey by the General Land Office BLM. In the west-central portion of Section 23 on a narrow peninsula is a structure and field belonging to R.A. Conklin.

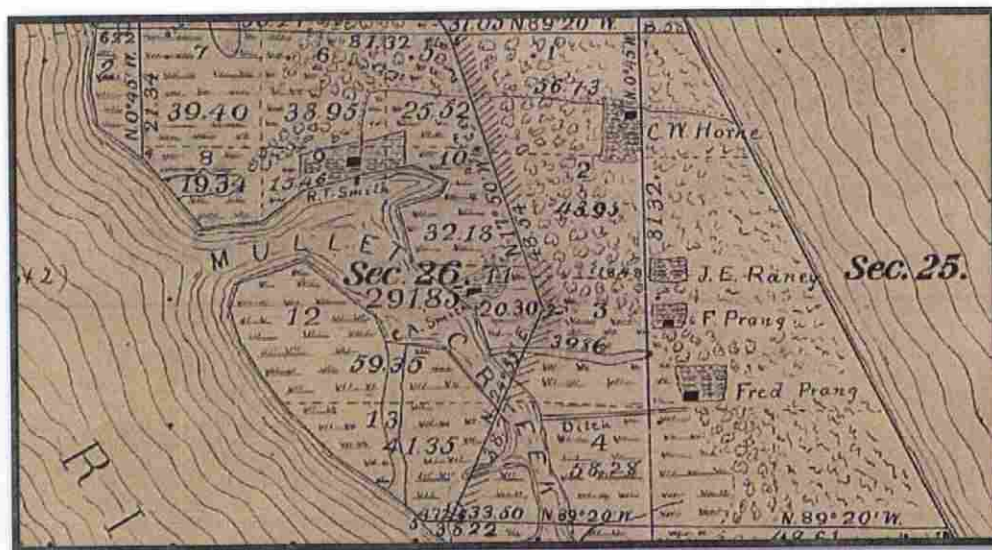


Figure 101. Historic map showing T29S R38E S25 and S26 from 1896 survey by the General Land Office BLM. Section 26 contains, from east to west and north to south, a field and similar centrally located structure labeled C.W. Horne. North of the Horne homestead is a road or trail running from the Atlantic coastline westerly and southerly to a homestead belonging to R.T. Smith. The Smith property sits on the northern shore of Mullett Creek. South and east from the R.T. Smith property is the C.A. Smith Homestead, located on the eastern shore of Mullett Creek. South of the C.A. Smith homestead, a ditch extends from Mullett Creek eastward, crossing into Section 25 which contains three additional homesteads. Section 25 is outside of the park boundary.

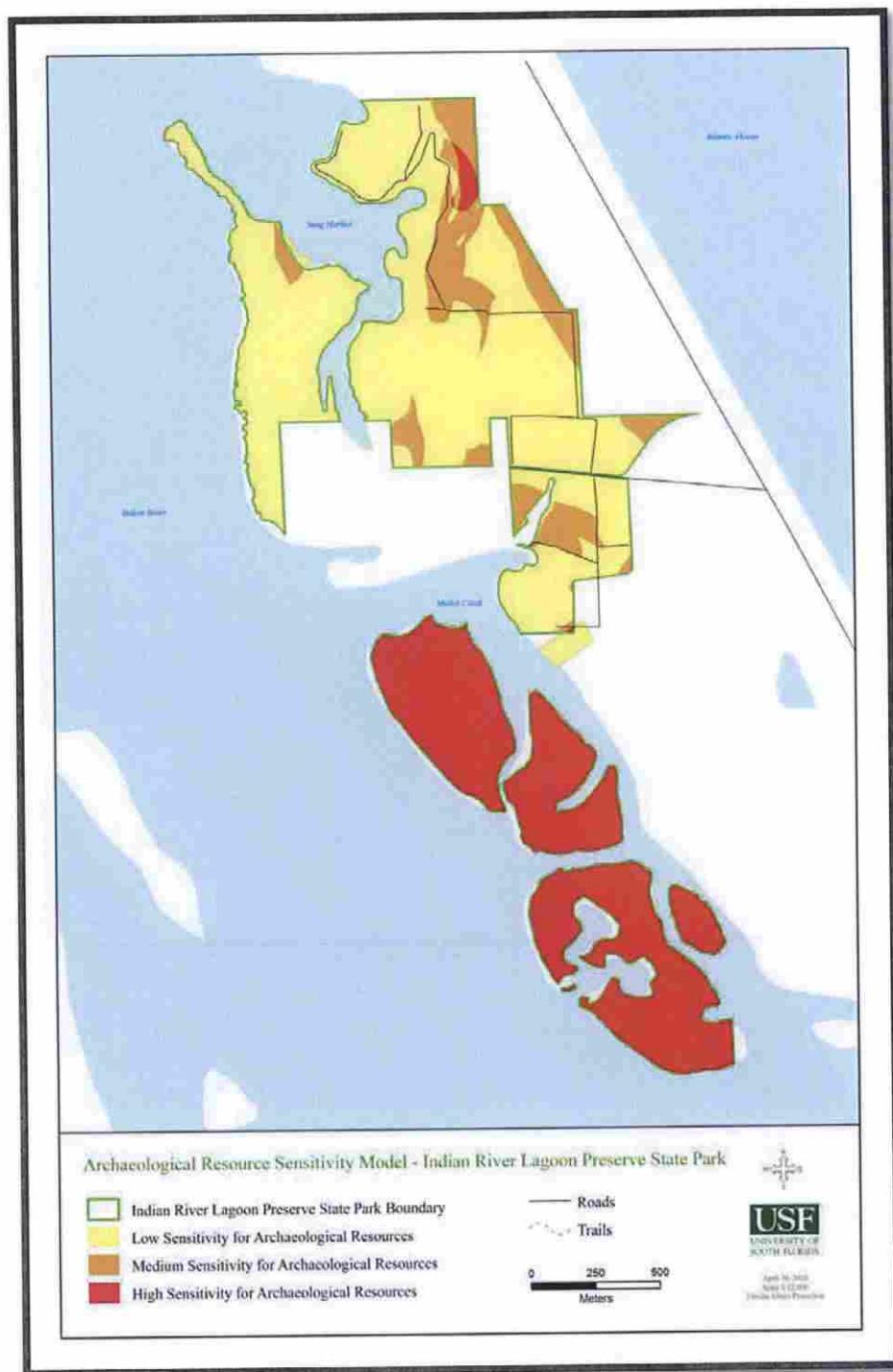


Figure 102. Map showing the archaeological resource sensitivity model developed for Indian River Lagoon Preserve State Park

This sensitivity model can serve as a foundation for future archaeological testing and can assist with current management for cultural resource potential areas. The large amount of low sensitivity area associated with the model relates to the poor soil quality and inundation. High sensitivity areas are attributable largely to topography and better soil drainage characteristics. Additionally site boundaries that fall within the low sensitivity area are likely due to improper plotting on the FMSF, especially relating to the 8BR121 site that is shown as a large, roughly square polygonal extent on the FMSF GIS layer.

Table 16. GIS model performance calculations for Indian River Lagoon Preserve State Park

Indian River Lagoon Sensitivity Model	Acres	Percent		FMSF Acres	Percent
High Sensitivity Area	190.85	33.00%		0.00	0.00%
Medium Sensitivity Area	66.93	12.00%		0.73	70.20%
Low Sensitivity Area	311.58	55.00%		0.31	29.80%
Total	569.36	100.00%		1.04	100.00%

Kissimmee Prairie Preserve State Park

The Kissimmee Prairie Preserve State Park is a large 53,802.10 acre tract that is located on the east side of the former Kissimmee River, currently called the C-38 Canal, south of Lake Kissimmee and north of Lake Okeechobee. The preserve is in a relatively flat area, called the Osceola Plain, which slopes from east to west towards the river. Elevation ranges from about 70 ft along the eastern boundary to 40 ft in some areas adjacent to the river (Figure 103). The preserve lands consist of extensive open prairie, numerous wetland and depressional features, ponds, lakes, swales, sloughs and hammocks, and extensive marsh areas adjacent to the river (FDEP 2005b). The preserve falls within the Eastern Flatwoods District physiographic division (Brooks 1981) and lies within an area that is characterized as seasonally flooded lowlands of river swamp and grassland prairies that are underlain by lagoon sand deposits (Brooks 1981; FDEP 2005b; Myers and Ewel 1990). Hydrologically and environmentally, there have been considerable changes to the historic landscape of the region, with the once meandering Kissimmee River canalized for flood control by the Army Corp of Engineers in the 1960s. Historic aerials from the late 1940s and historic maps and surveys provide a good source of information that better reflects the historic landscape. The extensive floodplain marshes in the preserve were not as impacted as other areas in terms of biodiversity, but these historic alterations did potentially impact the cultural landscape.

This preserve falls within the Okeechobee Basin Cultural Region (Milanich 1994). The area around Lake Okeechobee and Kissimmee Prairie was occupied and utilized by prehistoric and historic populations during the full sequence of Pre-Columbian and historical cultural periods. The preserve has an historic history linked to Florida's Cracker Cattlemen and early agro-industry and cattle operations. There are 19 recorded archaeological sites, resources, and structures within the present-day preserve boundary as listed on the FMSF (Figure 104). Surveys and research into the archaeological and historic landscapes of the preserve started with CARL archaeologists in the late 1990s and early 2000s (Memory, et al. 2002; Newman 1998). The CARL survey and visits found 12 new sites and re-located and assessed 7 old ones. Site diversity includes prehistoric middens, historic homesteads, cattle facilities and dip vats, building remains and historic refuse areas, historic travel corridors and trails and railway resource groups. The temporal range is from the Belle Glade prehistoric occupations (700 BC to AD 1700) to historic 20th Century sites. A total of 11 of the 19 recorded sites, features, and locations are historic-period sites, seven are prehistoric or have prehistoric components, and one is an historic structure (Memory, et al. 2002).

Synthetic approaches and modeling for the Kissimmee River Valley areas prove useful in understanding the settlement and resource utilization within the region as are previous GIS models conducted in the Okeechobee Basin (Austin 1996; Austin and Collins 2003). The occupational history in the region spans from Paleoindian to historic sites with emphasis on cattle ranching and agro industries with possible Seminole era sites and travel corridors (Carr and Stelle 1993). Other relevant archaeological work conducted in the vicinity includes two surveys across the Kissimmee River that examined the location and boundary of Fort Kissimmee (8HG15), showing that the fort location falls outside the preserve boundary near an old river crossing and trail system (Austin and Piper 1986; Stevens 1997). Additionally, GLO survey mapping in the region from 1859, show the Fort Kissimmee location on the west bank of Kissimmee River in section 19, and the trail location that crosses areas of the preserve and historically led to the fort location (Figure 105). Fort Kissimmee is across the river in Section 19, outside of the park boundary, in the Avon Park Air Force Bombing Range. Our review of historic maps found Sections 21 and 22 are unremarkable for cultural resources. Section 23 contains a segment of a road "from Fort Kissimee to Fort Capron." The road passes through sections 29, 28, 27, 26, through 23, and terminates in Section 24. The road is entirely within park property, and linked a chain of forts from the Indian River to the Manatee River that were built at the request of settlers as a means of protection from the remaining Seminoles in the area (Memory et al. 2002; Newman 1998).

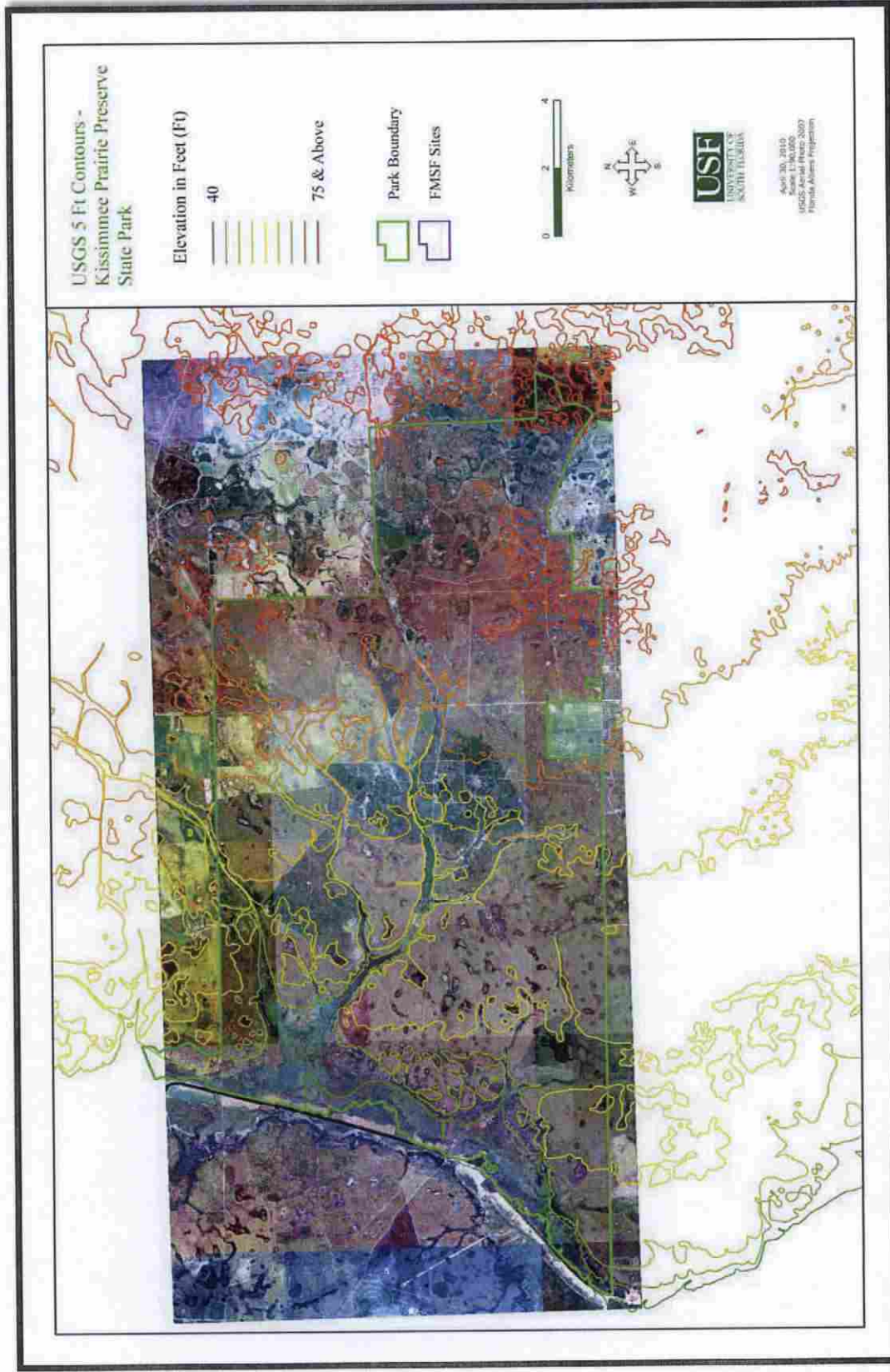


Figure 103. Contour elevation data for Kissimmee Prairie Preserve State Park

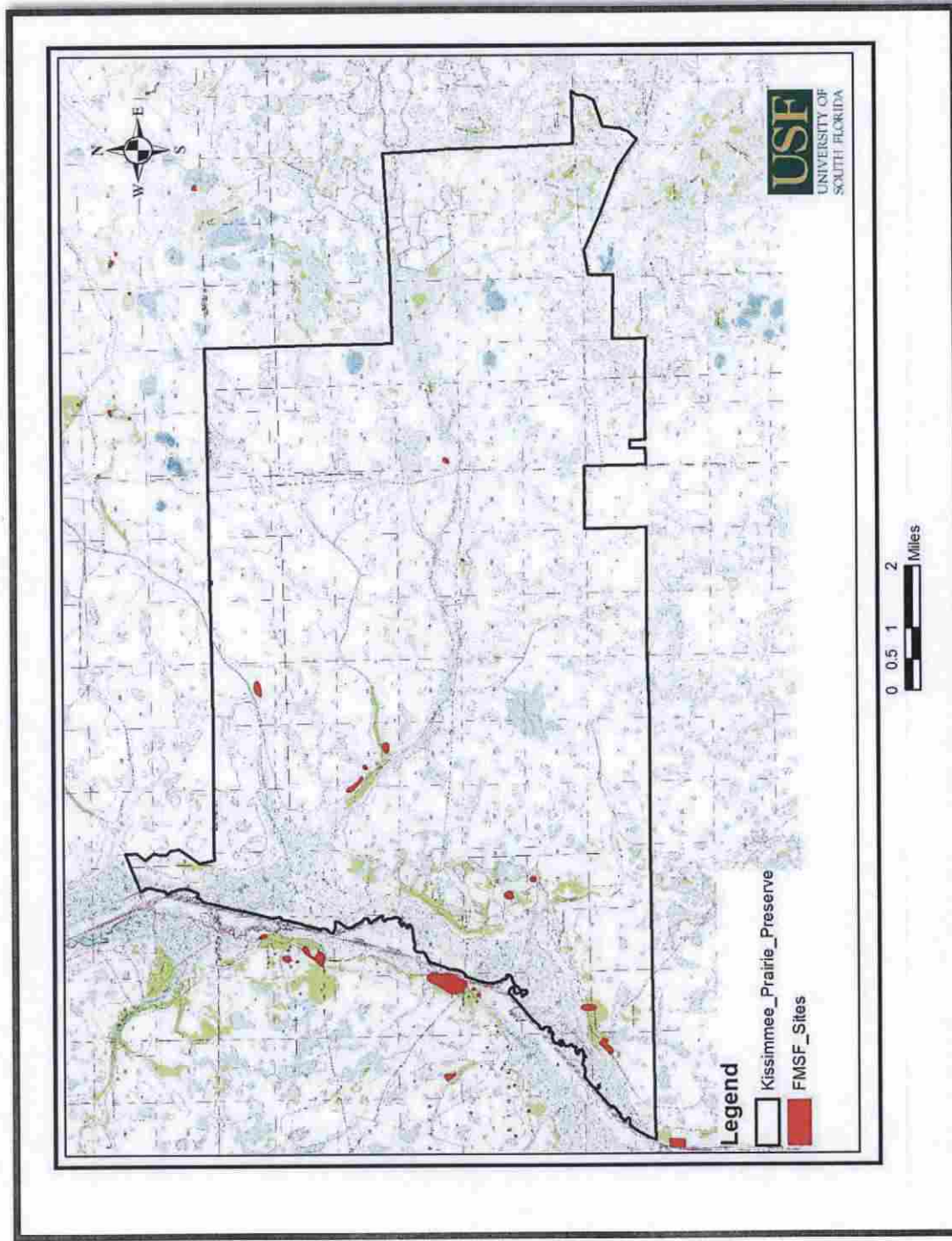


Figure 104. Florida Master Site File data showing archaeological sites within the Kissimmee Prairie Preserve State Park

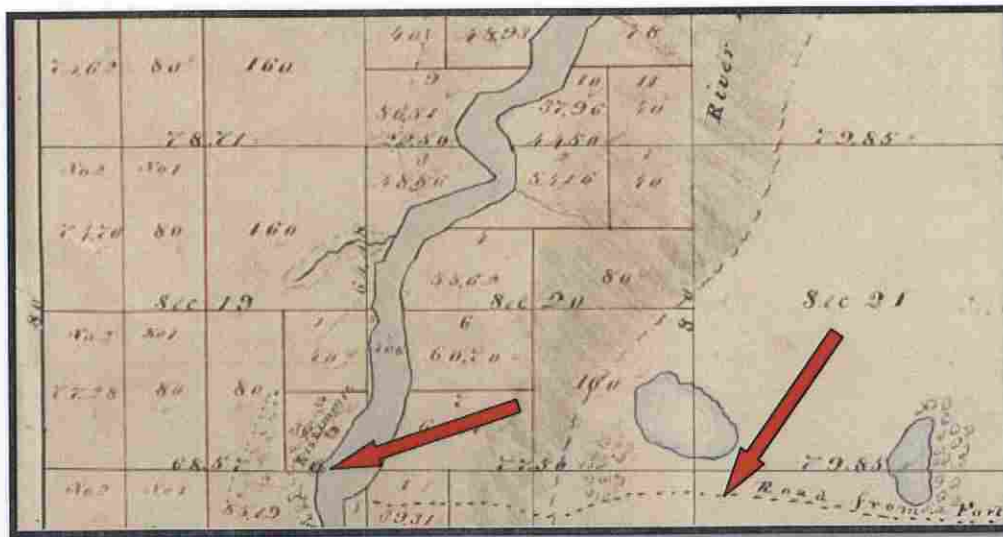


Figure 105. General Land Office Survey map from 1859 From T33SR32E that shows Fort Kissimmee and trail corridor (red arrows)

Another linear feature that crosses the present-day preserve from north to south is the 8OB243 resource group location. This feature is the South Florida and Gulf Railroad Line and is documented as a surviving remnant of the rail line that ran through Kissimmee Prairie from approximately 1916 until 1923 when the tracks were dismantled (FDEP 2005b; Memory et al. 2002).

Our visit to the preserve included the collection of sub-meter level GPS data taken on accessible site locations. These locations help with control points used for referencing historic maps and in evaluating FMSF data. We also had discussion with rangers on archaeological site conditional assessments and occurrence of cultural resources within the preserve boundary, and important environmental features (Figure 10).

Results and Discussion

The archaeological sensitivity model development for the Kissimmee Prairie Preserve State Park included factors that took in a variety of environmental and cultural variables that account for the presence of sites through time and space and account for the variability of site types known to occur within the park as demonstrated through previous surveys in and within the regional vicinity to the preserve. A primary factor for cultural site locations in this park included historic and prehistoric utilization of the Kissimmee River and its biodiversity associated with marshlands and hammocks. Land alteration including the massive dredging and channelizing of the Kissimmee River has impacted the hydrology of the area, and dry prairie and hammocks within the preserve exist today that would not have represented the historic or pre-settlement landscape. There are nearly 2,000 acres of inundated areas on this large preserve, and numerous wetland and depressional water features occur in the preserve bounded area. The poor soil drainage and seasonal and year-round flood plain areas are negative settlement factors and create large expanses of low sensitivity areas in our model. Early aerials and General Land Survey Office maps and other historical maps were of benefit in checking both landform configurations and in reviewing land use, cultural feature location, and modification through time. This included the examination of trails and travel corridors, military fort locations, and early agro-industry and cattle ranching sites. Professional surveys that included investigation into the historical contexts of sites within the park boundary and in adjacent areas across the Kissimmee River, were also useful (Austin and Collins 2003; Austin and Piper 1986; Memory et al. 2002; Newman 1998; Stevens 1997).

Matrix factors utilized for model evaluation included distance to wetlands, distance to ponds or lakes, relative elevation, soil drainage characteristics, and presence of flood plain and zone areas. Digitizing historic features from early survey of the region in our GIS allowed for modeling and location confirmation of linear resources. Our archaeological resource sensitivity model for the park is shown at a 1: 90,000 zoomed-out viewable scale (Figure 107), but is provided at a 1:24,000 scale in the park geodatabase.

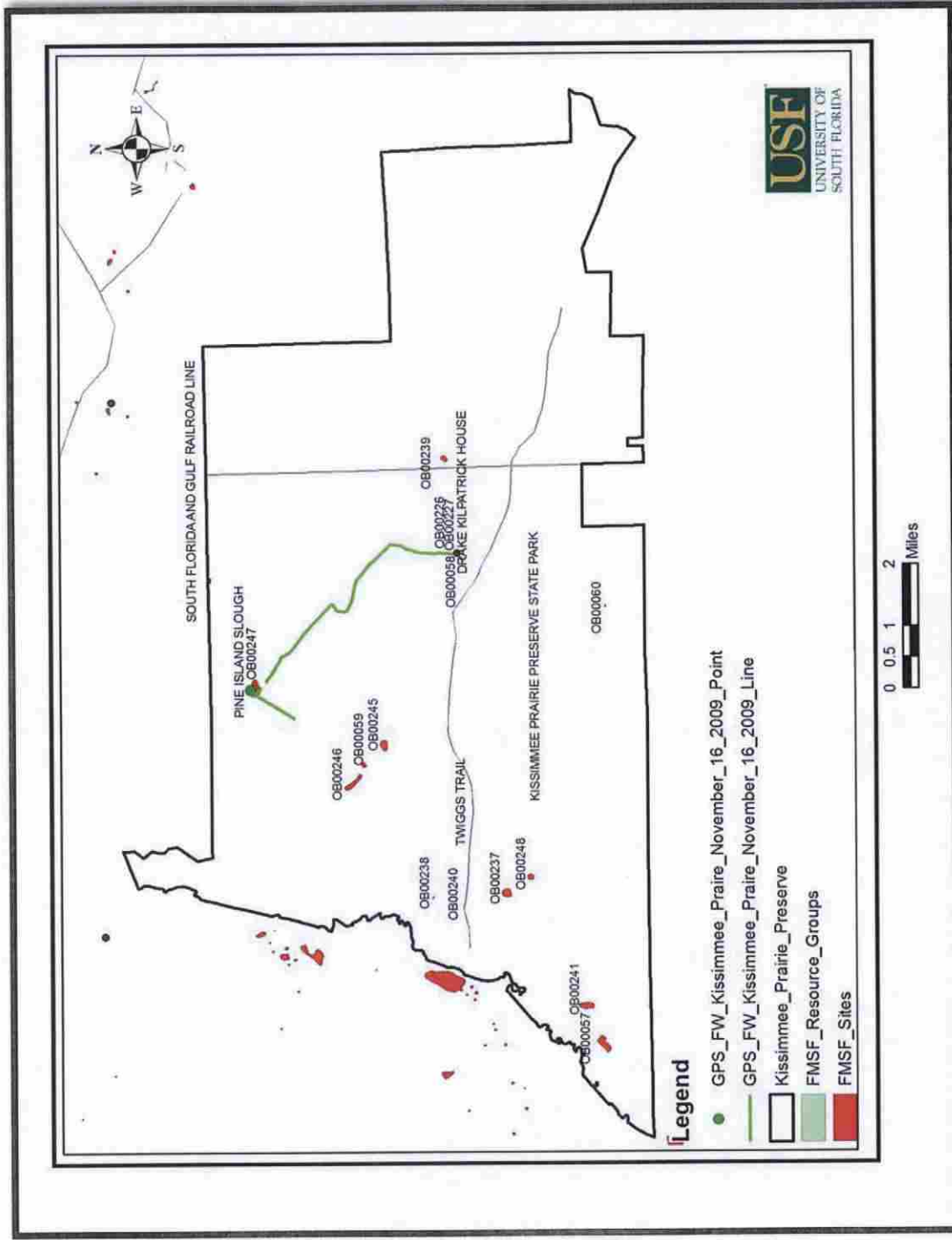


Figure 106. GPS survey data collected at Kissimmee Prairie Preserve State Park along with the FMSF site location data

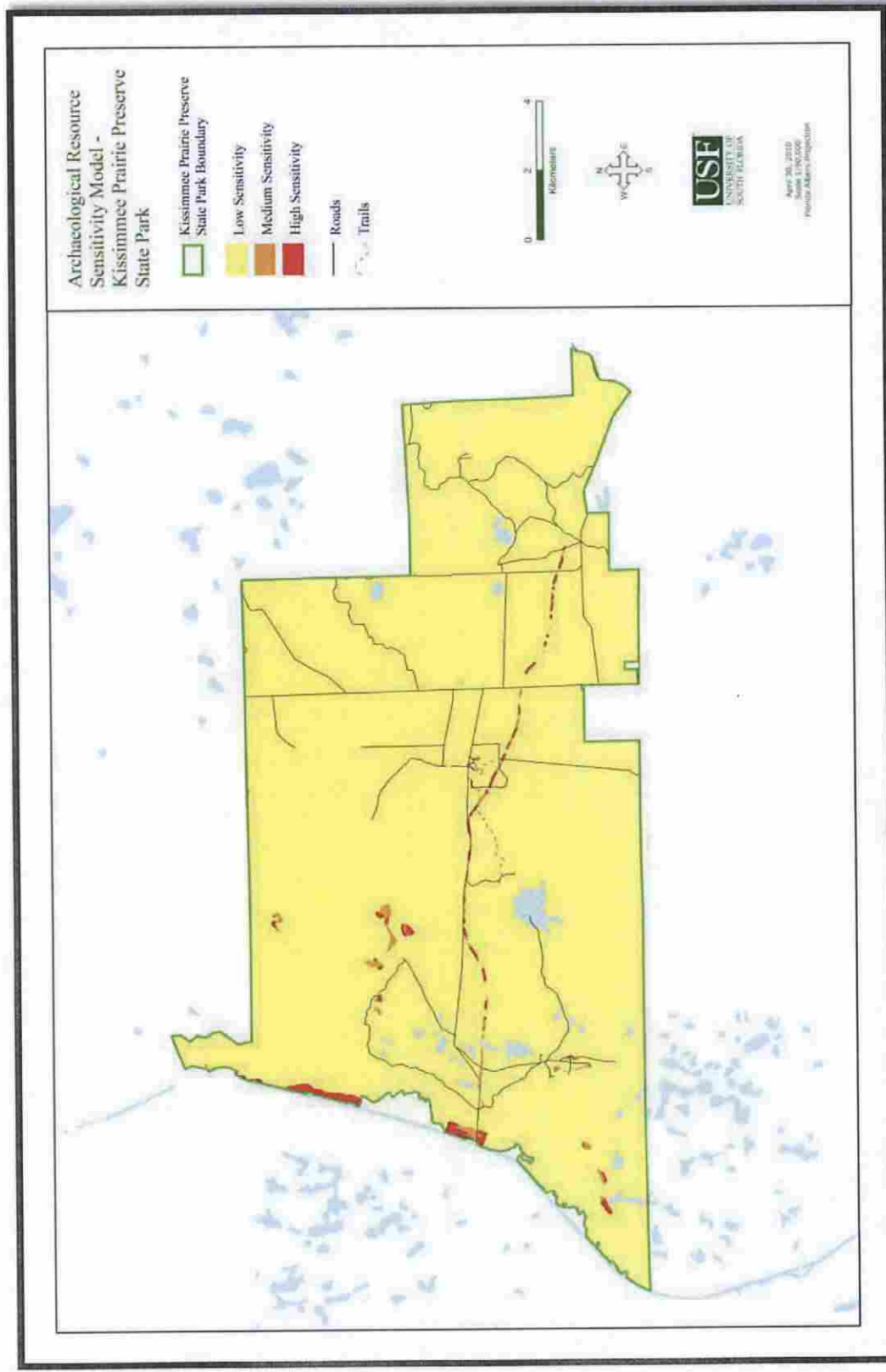


Figure 107. Archaeological Sensitivity Map for the Kissimmee Prairie Preserve State Park

Model Performance

When the Kissimmee River Preserve State Park model is verified using the FMSF polygonal site location data, the model captures the seven of the known 19 recorded sites at least partially, in the designated high and medium sensitivity area. Expressed as spatial percentages, the high archaeological resource sensitivity area at Kissimmee River Preserve State Park only accounts for approximately 0.6% of the land surface area (Table 17), with 13% of the recorded archaeological spatial extents found to correlate with these modeled areas. Using statistics ($p[MIS]-p[M]=.12$), our model represents a 12% improvement over chance of locating archaeological sites within our designated high sensitivity area (see Kvamme 2006:28). Combining the high and medium sensitivity areas shows that 16% of recorded archaeological spatial extents occur within our sensitivity areas, showing a 15% overall improvement over chance. A large percentage of recorded archaeological site boundaries fall within our modeled low sensitivity areas. Examination of the factors involved show that a number of middens and historic sites are missed by our model due to there being no NRHP evaluation or insufficient information for NRHP evaluation. This lack of data means that no matrix score can be assigned and it is difficult to overcome the negative environmental factors relating to soil drainage and inundation. Additionally, inaccurate (even slight errors in plotting) can cause problems with sites falling outside sensitivity areas that were defined in the model. Further, there are a number of historic sites and refuse sites on this preserve, such as cattle troughs, dip vats, and dumps, whose location is not correlated with environmental and cultural matrix variables. This sensitivity model can serve as a foundation for further archaeological survey and testing in the future and can assist with current management for cultural resource potential areas. The large amount of low sensitivity area associated with the model relates to the poor soil quality and inundation. High sensitivity areas are attributable largely to topography and better soil drainage characteristics in proximity to wetland and hydrologic features. Improvements to this model could emerge when LiDAR data becomes available for its extent, allowing for better distinctions in elevation and topography, especially in areas designated now as low sensitivity.

Table 17. GIS model performance calculations for Kissimmee River Preserve State Park

Kissimmee Prairie Preserve Sensitivity Model	Acres	Percent		FMSF Acres	Percent
High Sensitivity Area	325.01	0.06%		13.02	12.86%
Medium Sensitivity Area	306.91	0.06%		2.10	2.08%
Low Sensitivity Area	53,170.17	98.83%		85.92	85.04%
Total	53,802.10	98.95%		101.04	99.98%

Lake Griffin State Park

The Lake Griffin State Park is a 517.11 acre tract that is comprised primarily of lands associated with the lake and littoral zone. Lake Griffin proper lies to the south east of the park, and Dead River, which connects to Lake Griffin and its associated basin marsh lands comprise the bulk of the park. The Dead River within the park boundary is a designated Outstanding Florida Waterway (FDEP 2004d). Lake Griffin is the northernmost lake in the Ocklawaha chain of lakes in Lake County, and lies within the Central Lake District physiographic division (Brooks 1981). Lake Griffin is a karstic solution feature and has elevations along upland edges and small sections in the northwest and southwest sections of the park that range from 60 to 85 feet above mean sea level (FDEP 2004d) (Figure 108).

The park has one recorded archaeological features as listed on the FMSF (Figure 109). The Jenna T site (8LA2366) is shown on the FMSF GIS data layer to have part of its bounded extent within the Lake Griffin Park. This site consists of building remains and historic refuse associated with the American 20th century. There have been no archaeological surveys in this park, and very little upland areas actually exist at the park. There have been surveys in proximity to the park, and the area is well known archaeologically. The park falls within the East and Central cultural region (Milanich 1994). A full sequence of site types and cultural temporal ranges are found in this region from Paleoindian to Seminole to historic timber and turpentine industry sites of the 19th and 20th Centuries (Milanich and Payne 1993). Synthetic approaches and modeling for the East and Central cultural areas are useful in understanding the settlement and resource utilization within the region as are previous GIS models conducted in this region (East 1999; Estabrook 2004; FDOT 1998; Horvath 2001; Janus 2001; Richards 2001; Weisman 1999; Weisman 2002b).

Our GPS and reconnaissance survey of this park included collecting a spatial reference point on the Jenna T site (8LA2366). The FMSF location for 8LA2366 was found to be 200 meters in error as well as in error in regards to polygonal extent. Currently the site is shown as being on the property line, but our visit and GPS data show the site falls entirely within the boundary of the park (see Figure 109). We also recorded GPS data from locations on environmentally important features, such as areas of high elevation and an area with an old growth oak tree, and of paved surfaces and road areas for control points (Figure 110). LiDAR data and high-resolution aerial imagery is available for the full extent of this park boundary.



Figure 108. Map showing the archaeological resources as listed on the FMSF in relation to collected LIDAR elevation data for Lake Griffin State Park

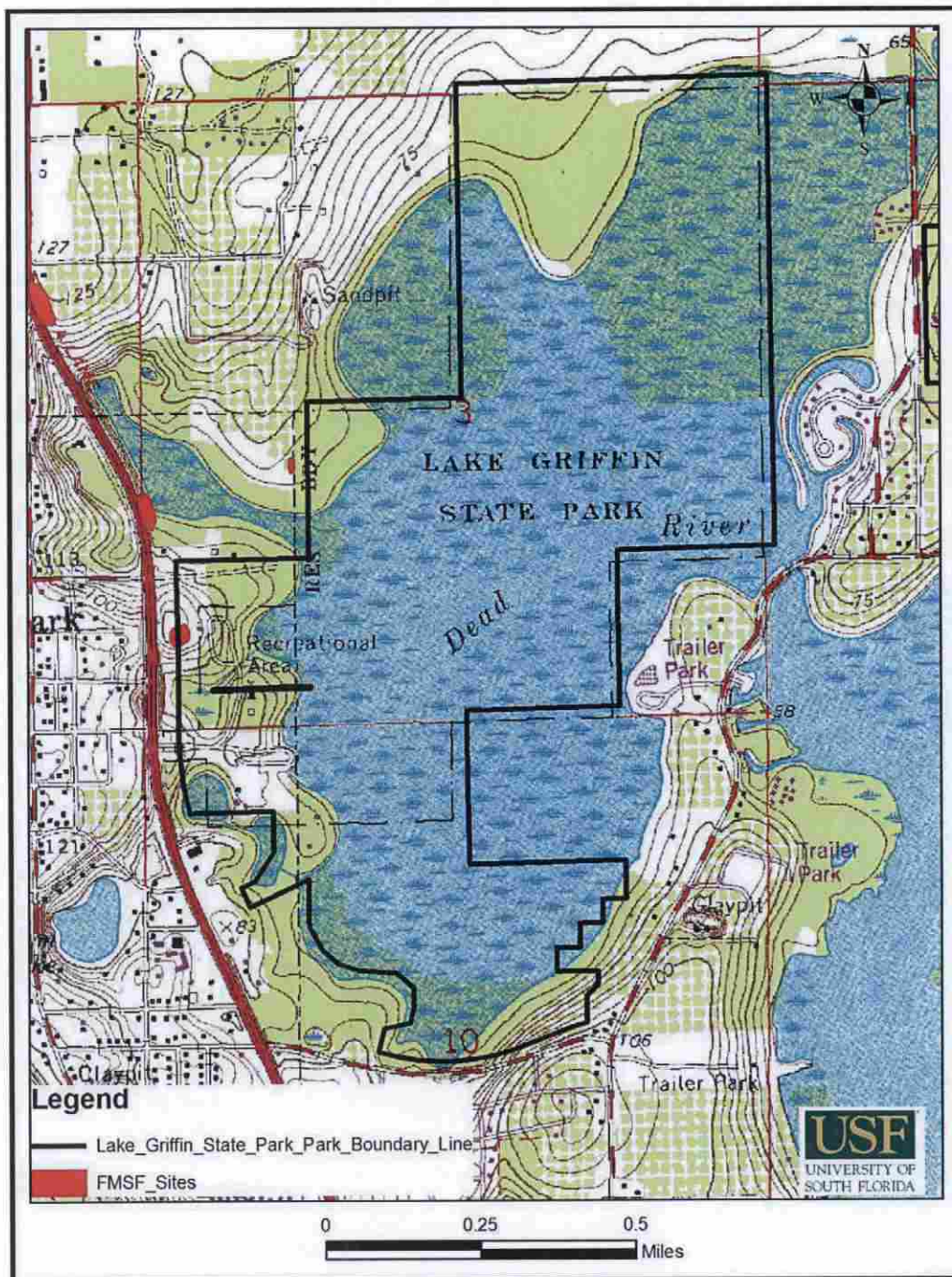


Figure 109. Florida Master Site File data for the Lake Griffin State Park area

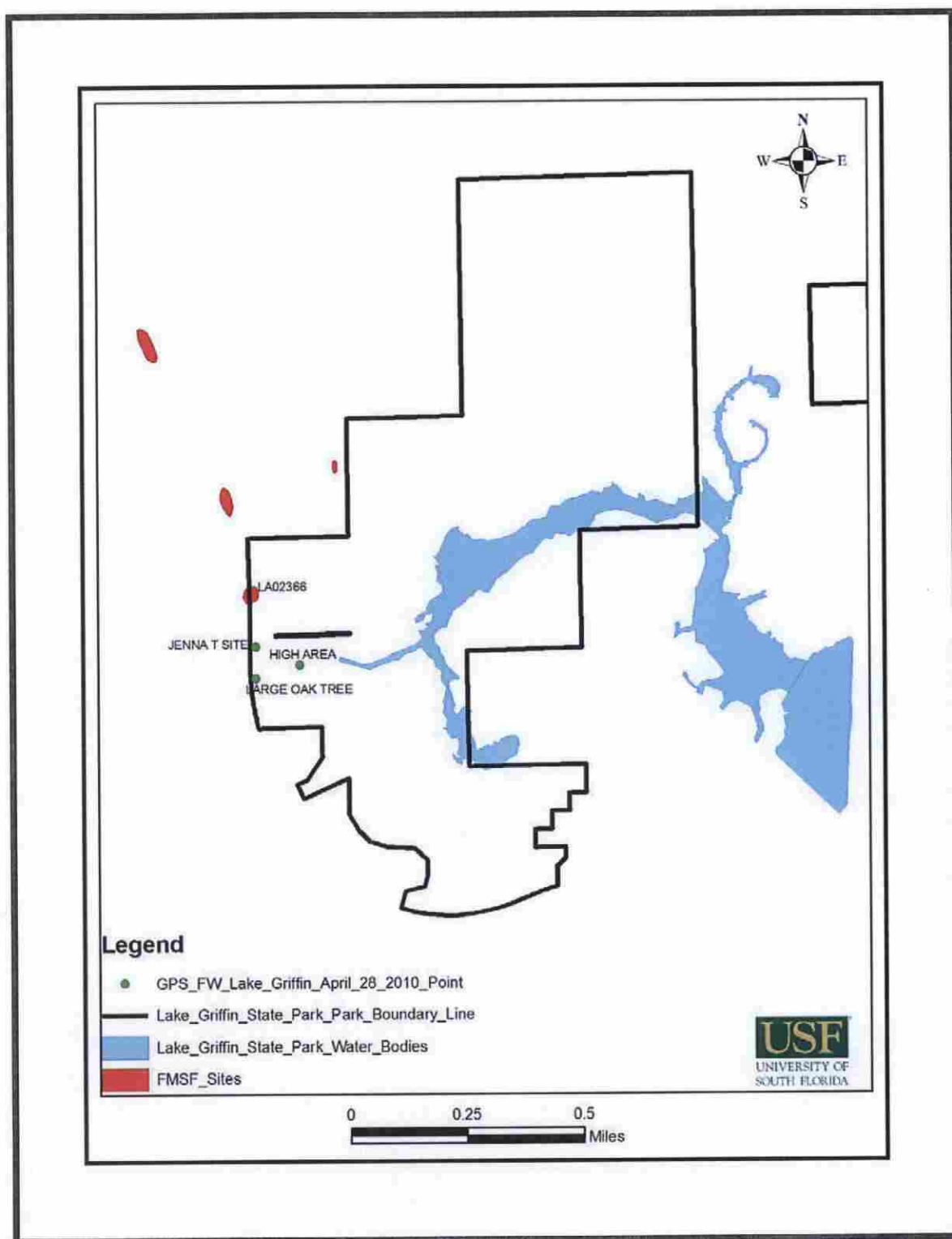


Figure 110. GPS survey data collected at Lake Griffin State Park along with the FMSF location data

Results and Discussion

The archaeological sensitivity model development for Lake Griffin State Park included factors that took in a variety of environmental and cultural variables that account for the presence of sites through time and space and account for the variability of site types within the region as demonstrated through previous surveys and research within the regional vicinity to the park. A primary factor for cultural site locations in this park included the presence of hydrographic features including the upland edge of the littoral zone surrounding Dead River in the northwest and southwest sections of the park. Wetland and water features occur in the preserve bounded area. Matrix factors utilized for model evaluation included distance to wetlands, distance to ponds or lakes, relative elevation, soil drainage characteristics, and presence of flood plain and zone areas. Our archaeological resource sensitivity model for the park is shown at a 1:12,000 scale and is provided in the park geodatabase at 1:24,000 scale for comparable consistency (Figure 111).

Model Performance

There is only one recorded archaeological site found within the park boundary as listed on the FMSF. The known site location polygonal extent from the FMSF for 8LA2366 largely falls within our high sensitivity area, with portions of the site falling in the medium sensitivity (Table 18). However, with the GPS coordinates, 100% of this site falls within the high sensitivity area. Of the 517+ acres in the park boundary, the majority of acreage is associated with flood plain areas and fall within low sensitivity area due to inundation. Our assessment of needs for this park would be to utilize the model for environmental and project planning purposes, avoiding high and medium sensitivity areas or including surveys and monitoring as part of recommended strategies for the protection of cultural resources. Additionally, should a cultural resource survey be undertaken, the model can be utilized to more efficiently target areas which are more likely to contain cultural resources. These sensitivity areas can be best refined by conducting a Phase 1 archaeological field survey that combines field verification with use of the model and direct remote sensing observations using high resolution aerials and LiDAR data. It should also be noted that our models are for terrestrial resources, but submerged and now inundated resources have been discovered along lake system edges (Sassaman 2003a) in the region and could exist in this park.

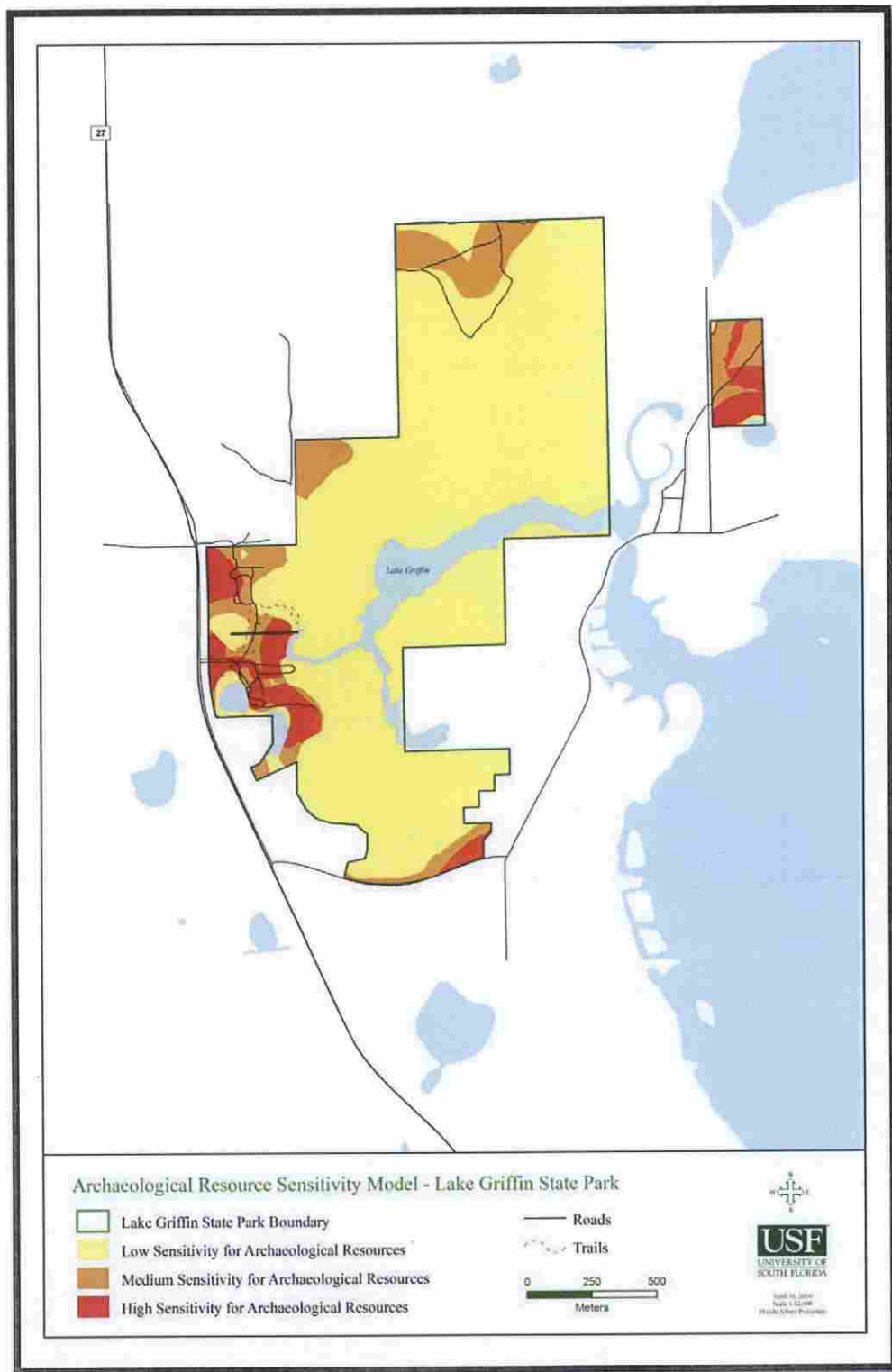


Figure 111. Map showing the archaeological resource sensitivity model developed for Lake Griffin State Park

Table 18. GIS model performance calculations for Lake Griffin State Park

Lake Griffin Sensitivity Model	Acres	Percent		FMSF Acres	Percent
High Sensitivity Area	34.81	6.73%		0.35	92%
Medium Sensitivity Area	62.22	12.03%		0.03	8%
Low Sensitivity Area	420.08	81.24%		0.00	0.00%
Total	517.11	100.00%		0.38	100.00%

Lake Kissimmee State Park

The Lake Kissimmee State Park is a large 5,877.36 acre tract that is predominantly flat across the park boundary and exhibits little difference in relative elevations, with a range of approximately 50 to 63 feet above mean sea level (Figure 112). Prominent environmental features include Lake Kissimmee, one of the five largest lakes in Florida, is located to the east, Lake Rosalie to the west, and Rosalie and Tiger Creeks in the south of the parcel, and elevated Buster Island central to the property (FDEP 2004e). Lake Kissimmee State Park is located in Polk County and is characterized geologically by ridges and upland remnants associated with the Lake Wales Ridge system and the Central Highlands physiographic province (Brooks 1981). Soils in the park are generally poorly drained with numerous lakes, seeps, streams and ephemeral wetland features (FDEP 2004e; Myers and Ewel 1990). Historic alterations to the hydrology in the area have occurred, with drainage providing more area for land uses such as cattle ranching and farming. Early aerials and historic survey maps are useful for examining the historic and pre-settlement landscapes.

The park has two recorded archaeological sites as listed on the FMSF (Figure 113). The Gobbler Ridge site (8PO5300) is a prehistoric site containing ceramics that are not temporally diagnostic. The site is located along the northeast edge of the property bordering Lake Kissimmee, and the Cow Camp site (8PO5301) is a multi-component site interpreted as a historic (1860s) cattle ranching living history site and also contains a prehistoric component. The site is located on the north upland edge of Buster Island in the central portion of the park. Additionally, there is an unrecorded historic cemetery in the northwest section of the park that is associated with historic homestead occupations. There have been no archaeological surveys in this park, and very little upland areas actually exist at the park. There have been surveys in proximity to the park, and the area is well known archaeologically. The park falls within the East and Central cultural region and is transitional with a mixture of St. Johns traits and is bordering the Okeechobee Basin area to the south (Milanich 1994). A full sequence of site types and cultural temporal ranges are found in this region from Paleoindian to Seminole to historic timber and

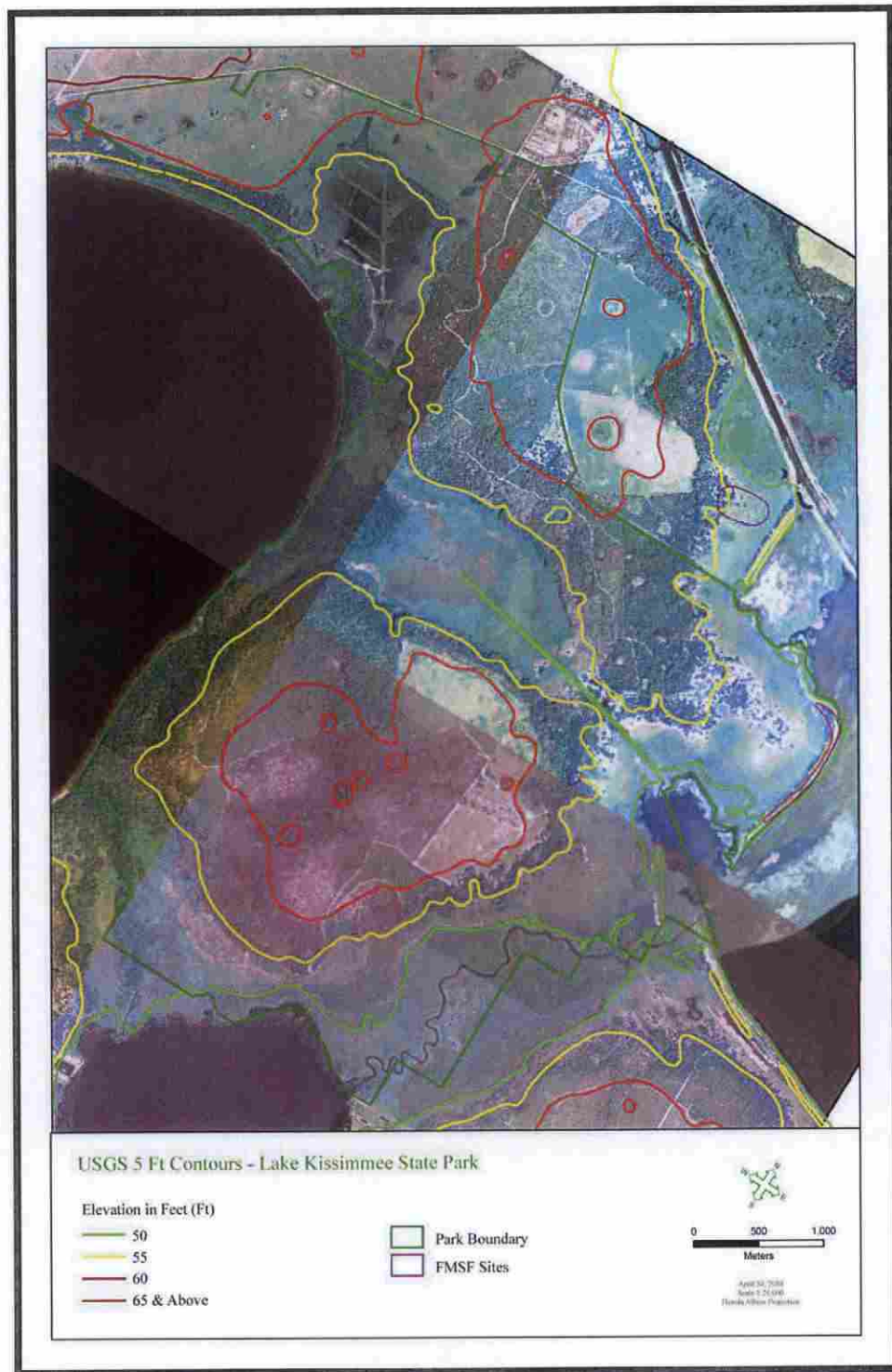


Figure 112. Five foot contour interval map showing elevations areas in Lake Kissimmee State Park

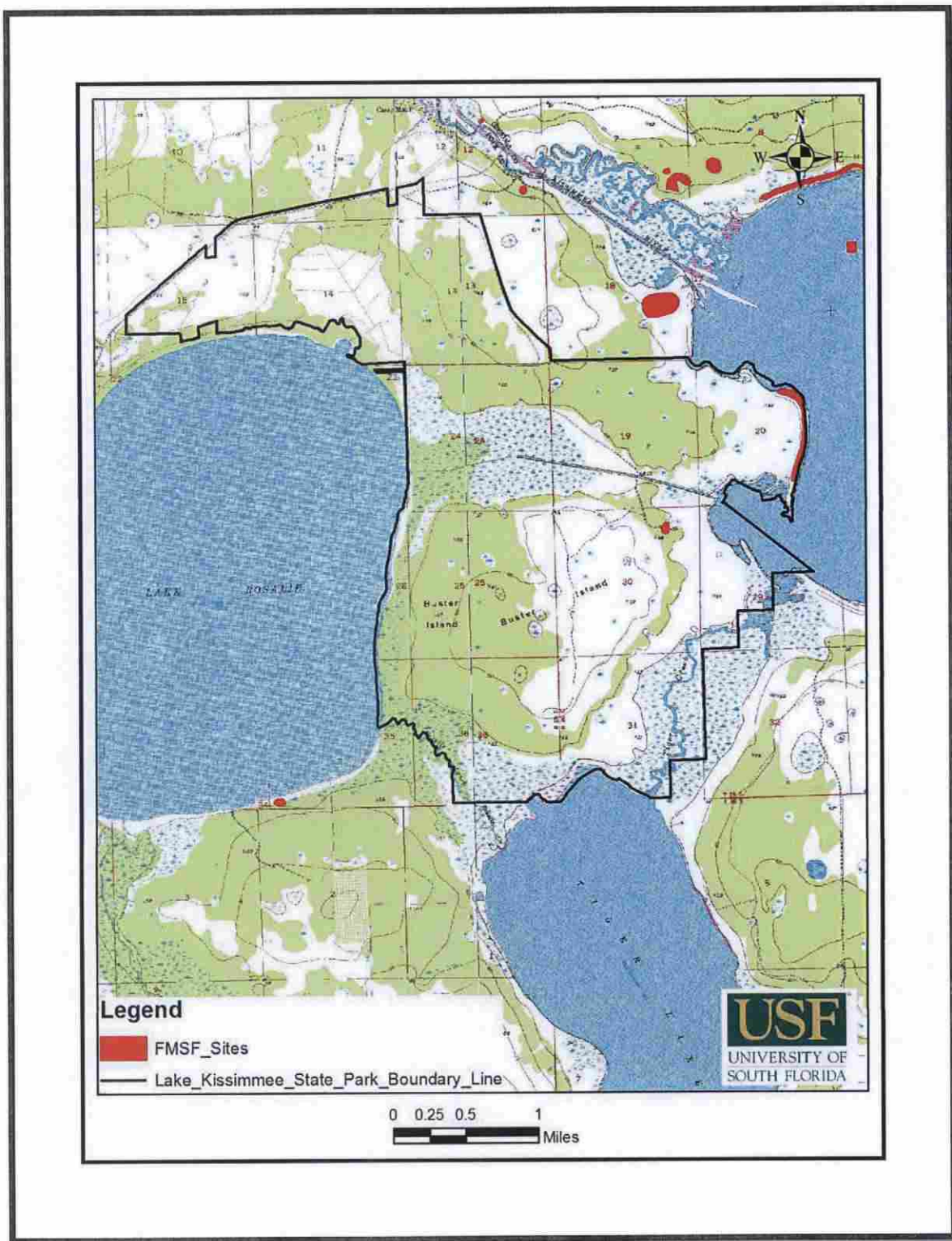


Figure 113. Florida Master Site File data show two archaeological sites within the Lake Kissimmee State Park

turpentine industry sites of the 19th and 20th Centuries (Milanich and Payne 1993). Synthetic approaches and modeling for the East and Central cultural areas are useful in understanding the settlement and resource utilization within the region as are previous GIS models conducted in this region and CRM surveys (Blakney and Erbe 2002; East 1999; Harvey 1996; Memory and Newman 1998; Weisman 1999; Weisman 2002b).

Our GPS and reconnaissance survey of this park included collecting a spatial reference points on the two recorded archaeological sites, the Gobbler Ridge Site (8PO5300) and the Cow Camp site

(8PO5301). Additional data was collected for the location of the unrecorded historic cemetery near the 8PO5301 site that reportedly contains 3-5 internments, and a positional point was taken at a location of what is believed to be the old town of Rosalie. The GPS point was taken per the ranger's knowledge of where intersecting roads are noted on historic aerials. A surface scatter of

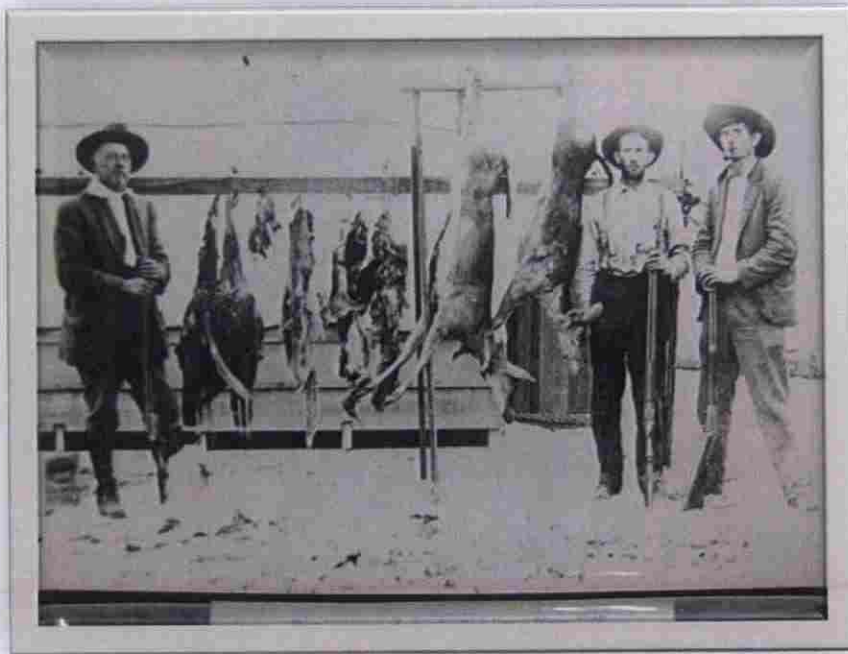


Figure 114. Hunt camp along the Kissimmee River in 1900

historic period glass was also noted at this point. The land around Lake Kissimmee is known to contain historic settlements and sites relating to cattle ranching, timber harvesting operations, turpentine, and farming. Numerous historic photos are found at the park offices that show what life was like during these historic periods in the region (Figure 114). The GPS survey also included linear feature locations, such as park trails to assist in the georeferencing of historic maps and location of unrecorded features in relation to previously recorded data (Figure 115).

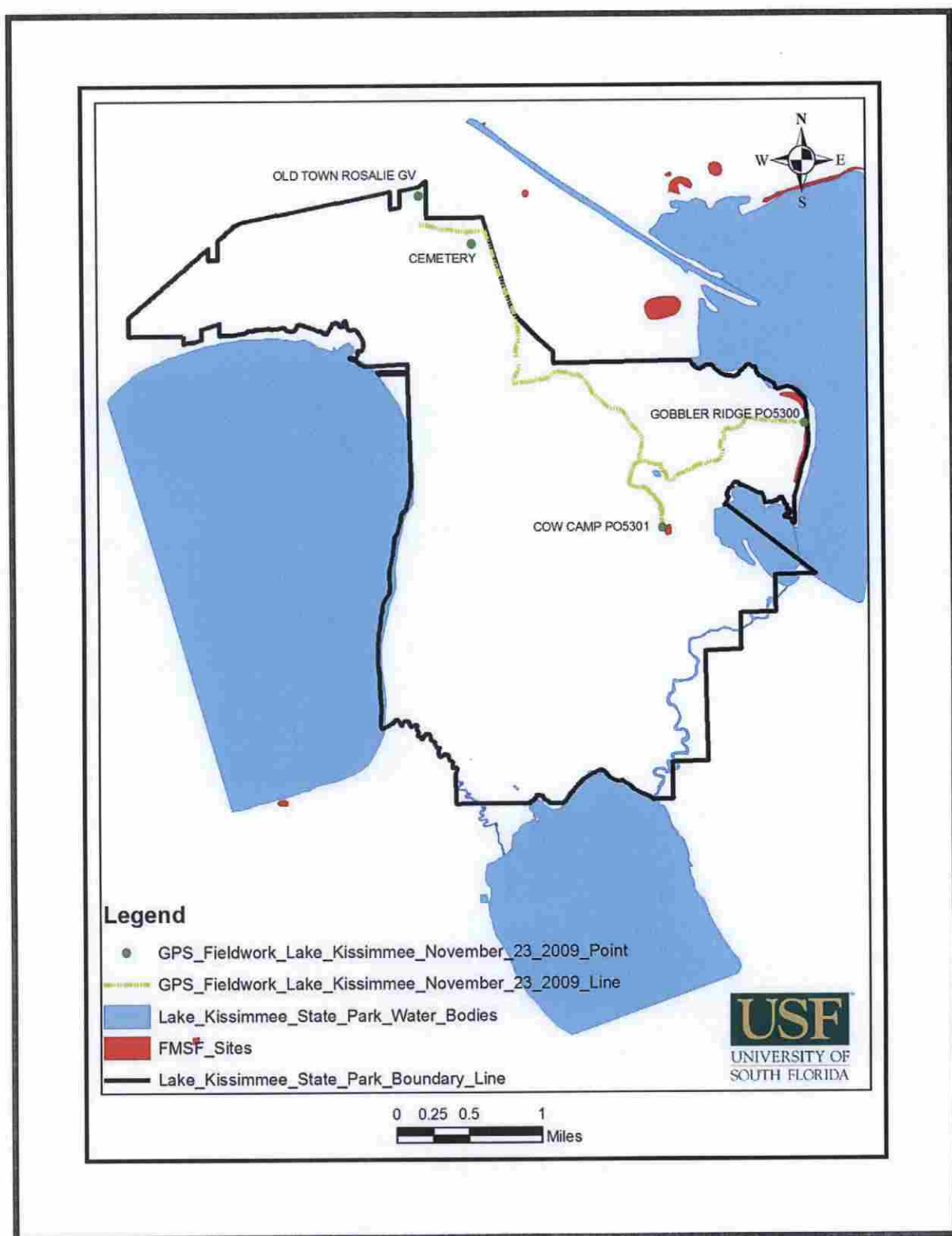


Figure 115. GPS survey data collected at Lake Kissimmee State Park along with FMSF location data

Results and Discussion

The archaeological sensitivity model development for Lake Kissimmee State Park included factors that took in a variety of environmental and cultural variables that account for the presence of sites through time and space and account for the variability of site types known to occur within the park as demonstrated through regional surveys in vicinity to the preserve. A primary factor for cultural site locations in this park included the presence of hydrographic features including Lake Kissimmee and Rosalie, creeks and wetlands. Early General Land Survey Office maps and other historical maps were of benefit in checking both landform configurations and in reviewing land use, cultural feature location, and modification through time. Matrix factors utilized for model evaluation included distance to wetlands, distance to ponds or lakes, relative elevation, soil drainage characteristics, and presence of flood plain and zone areas. Our archaeological resource sensitivity model for the park is shown at a 1:24,000 scale (Figure 116).

Model Performance

When this model is verified using the FMSF polygonal site location data, the model captures 2 out of 2 recorded sites, at least partially, in the designated high and medium sensitivity areas. The model also captures the area thought associated with the historic town of Rosalie and the unrecorded historic cemetery that were both recorded as part of the GPS survey. Portions of site boundaries using the FMSF polygonal extents fall within the low sensitivity areas, likely due to incorrect plotting of boundaries with the FMSF. There has not been any survey for archaeological resources conducted within this park, and site boundary verification and plotting may contain some error. Expressed as spatial percentages, the high archaeological resource sensitivity area at Lake Kissimmee accounts for less than 1% of the land surface area (Table 19), and has 9% of the recorded archaeological spatial extents correlating with these modeled areas. Using statistics ($p[MIS]-p[M]=.08$), our model represents a 8% improvement over chance of locating archaeological sites within our designated high probability area (see: Kvamme 2006:28). Combining the high and medium sensitivity areas shows that 44% of recorded archaeological spatial extents occur within our sensitivity areas, showing a 40% overall improvement over chance. These sensitivity areas can be best refined by conducting a Phase 1 archaeological field survey that combines field verification with use of the model and direct remote sensing observations using high resolution aeriels and LiDAR data as it becomes available for this area.

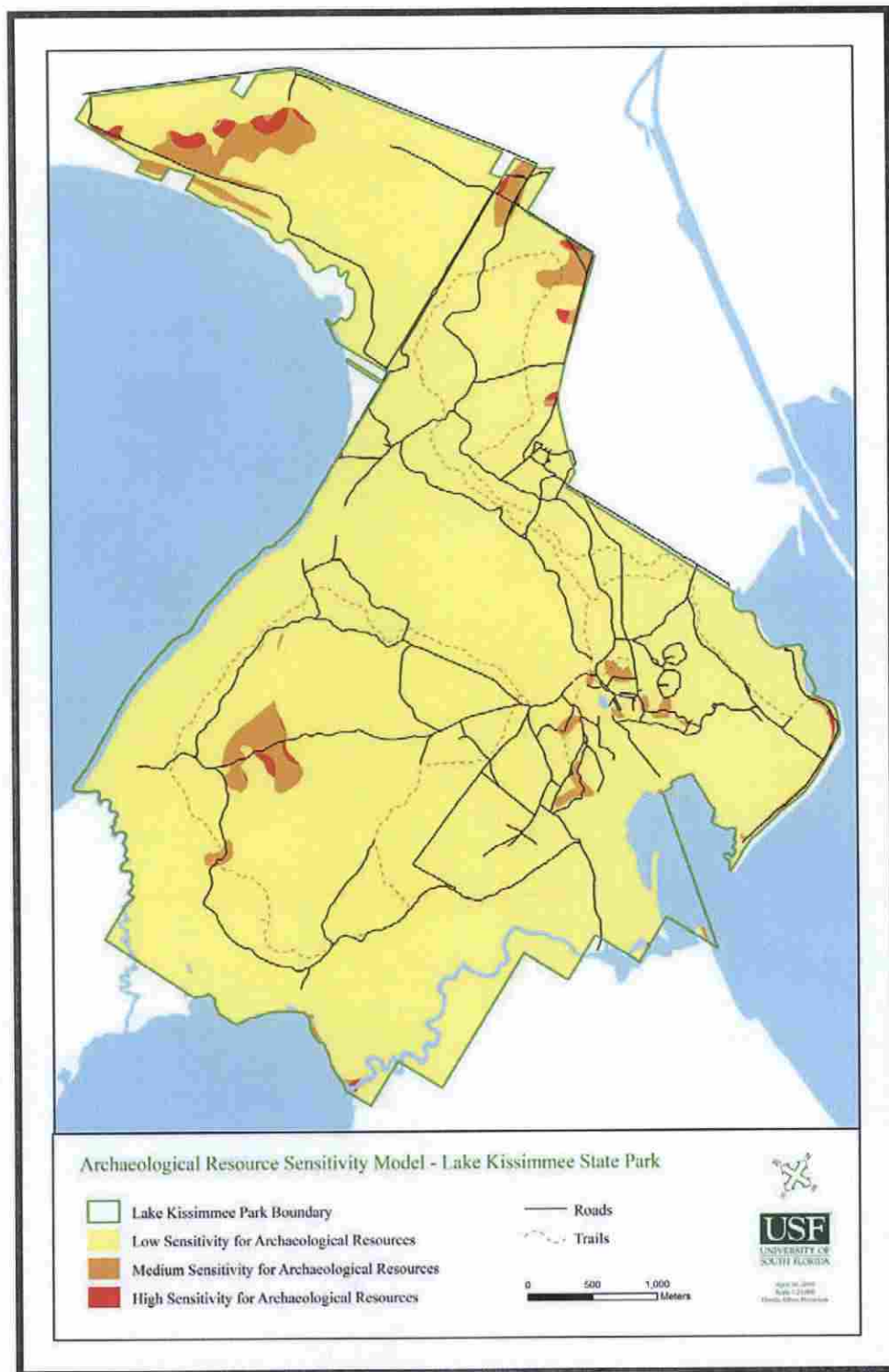


Figure 116. Map showing the archaeological resource sensitivity model developed for Lake Kissimmee State Park (note orientation is not north to maintain 1:24,000 scale presentation)

Table 19. GIS model performance calculations for Lake Kissimmee State Park

Lake Kissimmee Sensitivity Model	Acres	Percent		FMSF Acres	Percent
High Sensitivity Area	36.09	0.62%		1.27	9.06%
Medium Sensitivity Area	221.81	3.77%		4.90	34.98%
Low Sensitivity Area	5,619.46	95.61%		7.85	56.01%
Total	5,877.36	100.00%		14.01	100.00%

Lake Louisa State Park

The Lake Louisa State Park is a large, 3,758.41 acre parcel that is in Lake County, Florida. The park has six lakes that are found completely within the boundaries of the parcel and an additional four that are partially located within the park, along with a number of streams, creeks, and permanent water features. The topography goes from low-lying areas in the western portion of the park to much higher elevations in the eastern section, ranging from 185 to 100 feet above mean sea level (Figure 117). Much of the southwest section of the park contains seasonally-flooded marsh areas that receive overflow from the nearby Bear Lake (FDEP 2005c). The park is physiographically defined as being within the Groveland Karst subdistrict of the Central Lakes District (Brooks 1981). The property is characterized by low hills and solution lake systems (FDEP 2005c).

The park has 20 recorded archaeological sites and historic structures listed on the FMSF (Figure 118). There are 19 sites and one historic structure within the present-day boundary of Lake Louisa Park. The site types include a submerged boat, prehistoric artifact scatters, procurement sites, lithic scatters and quarries, and historic homestead locales. The temporal range of use for these recorded sites shows occupation in the St. Johns periods and historically in the 20th Century (1900-present). Most sites are multi-component, and the artifact assemblages collected are not diagnostic of a temporal affiliation. The Lake Louisa region is known to have occupation for the full cultural sequence from Paleoindian, Archaic, Mount Taylor, Orange, Transitional, St. Johns, First Spanish Period, British Period, Second Spanish Period, Territorial and Seminole (Milanich 1994). There are no sites within the park that contain human remains and most, 17 out of 20, have been evaluated by the recorder and the SHPO as being ineligible for listing on the NRHP. Two sites (8LA2272 and 8LA2569) have not been evaluated for NRHP eligibility and one site (8LA2630) has insufficient information for the SHPO to provide an NRHP evaluation. The 8LA2569 site is a historic turpentine barge dating to the 19th or early 20th century that is submerged and is not considered in our terrestrial sensitivity modeling.

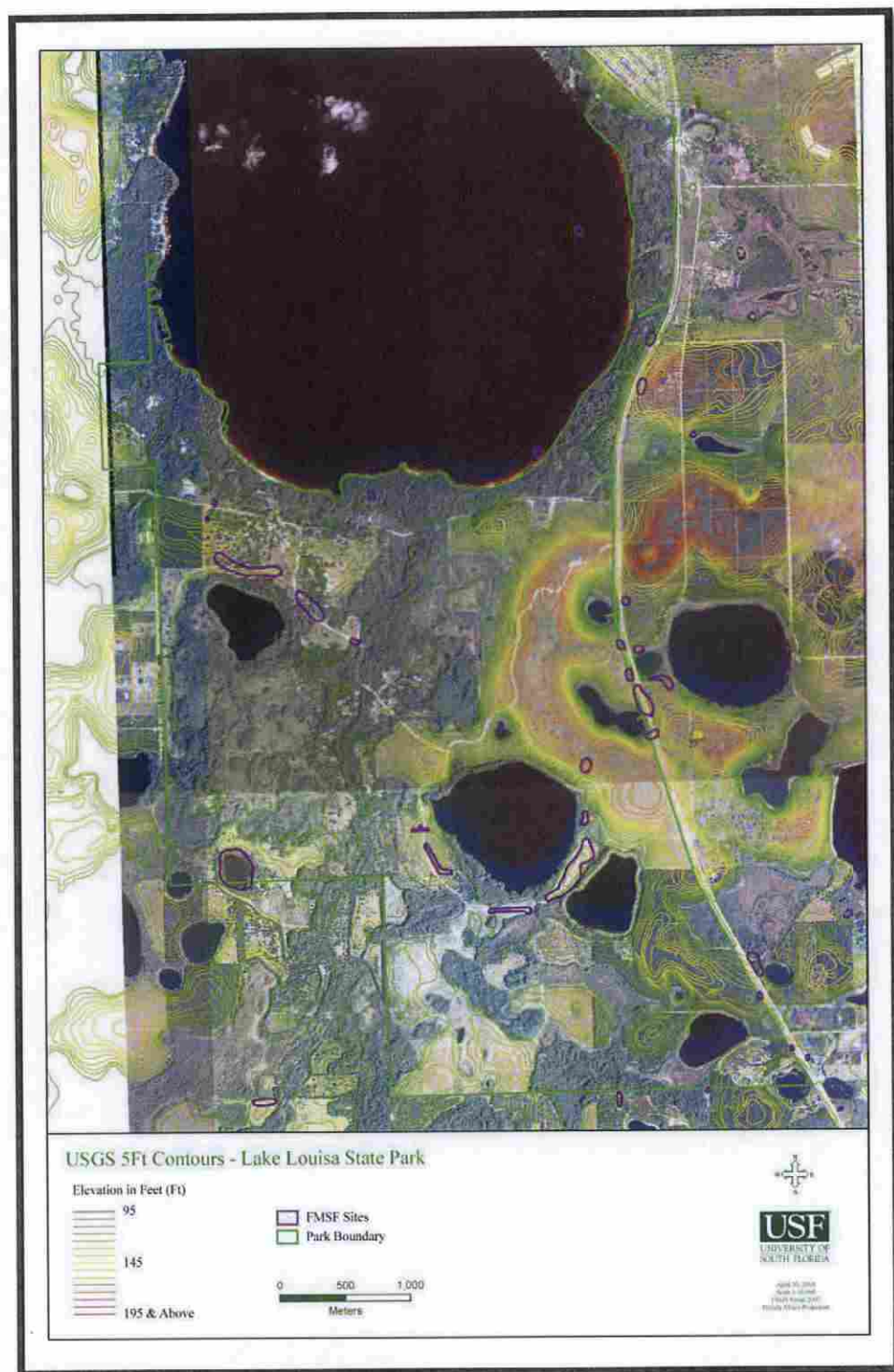


Figure 117. Map showing the archaeological resources as listed on the FMSF in relation to collected elevation data for Lake Louisa State Park

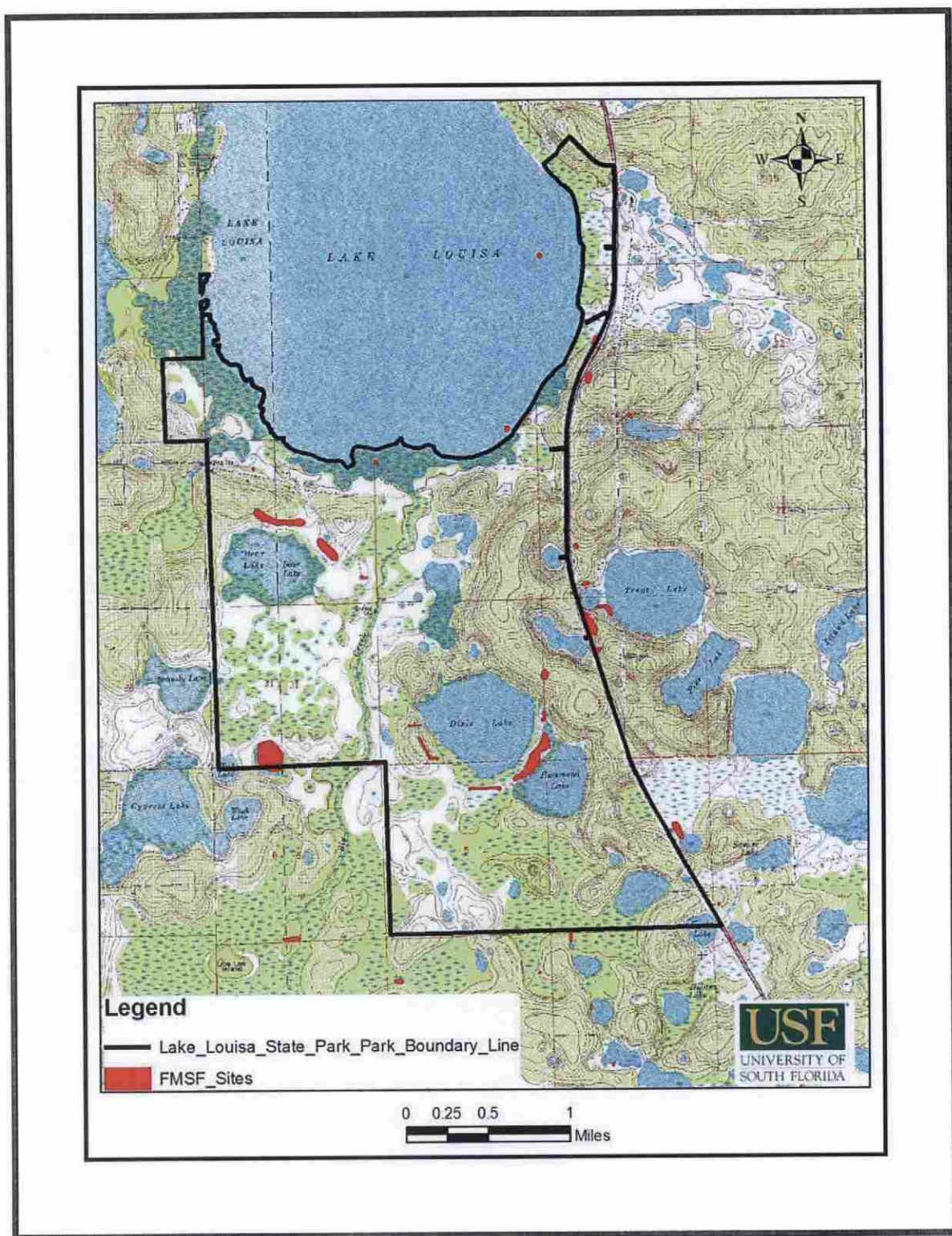


Figure 118. Florida Master Site File data of recorded archaeological sites within the Lake Louisa State Park

Surveys within the park boundary or within the vicinity of the park include several CRM projects for roads and gas pipelines, park infrastructural development projects, and nearby BAR and CARL archaeological assessment and documentation projects (Dunbar and Newman 2006; Estabrook 2000; Estabrook and Sims 2002; FDOT 1998; Fillman and Richards 1995; Handley and Nash 2005; Janus 1996; Parker 2000). In addition, two aboriginal canoes in Lake Louisa and the remains of a WWII airplane wreck site are submerged resources that have been documented by the FDHR. The park as a whole has never been archaeologically surveyed, only sections relating to infrastructure development and activities, and it is likely that a number of other historic and prehistoric sites exist. Synthetic approaches and regional understanding surveys include some



Figure 119. The fish trap site consists of a number of standing wood posts extending into the Lake Louisa in the northeast section of the park

with GIS query and applications for significance determination (Carr and Stelle 1993; East 1999; Weisman 2002b; Weisman, et al. 1999).

Our visit to the preserve included the collection of sub-meter level GPS data for the site locations listed on the FMSF, including 8LA2630, 8LA2272, 8LA2632, 8LA2634, 8LA2633, 8LA1067, 8LA1068, and 8LA1069.

Additionally, two new sites were recorded as part of our survey.

One site that was not listed on the FMSF appears to be the building remains from a 19th

century saw mill structure (8FL896). This location is in close proximity to two recorded sites (8LA3350 and 8LA1070) which also have components that relate to saw mill activities and likely represents an area that is related with this agro-industry. GPS line data was collected for paved and dirt roads and the location of a historic railroad bed in the northwest section along Lake Louisa were mapped. The second site we recorded and mapped was the location of a fish trap or docking area and various historic artifacts scattered in association with this site (8LA4238). The location consists of a number of standing wood posts that are extending into the Lake Louisa in the northeast section of the park (Figure 119). Artifacts encountered on the surface in this area included railroad spikes, brick fragments, a piece of milled lumber, iron objects, and a broken historic bottle likely from the early 20th century. All artifacts were left, and GPS point and line positions were taken. The GPS and reconnaissance

survey data were useful in updating and verifying site locations for our model, and for delineating sites that are not currently listed on the FMSF (Figure 120).

Results and Discussion

The archaeological sensitivity model development for Lake Louisa State Park included factors that took in a variety of environmental and cultural variables that account for the presence of sites through time and space and for the variability of site types known to occur within the park as demonstrated through previous surveys in and within the regional vicinity to the park. A primary factor for cultural site locations in this park included the presence of hydrographic features including the numerous lakes and permanent water features within the park. Additionally, the areas of high topographic relief and karst terrain were attractive for settlement and resource extraction during prehistoric times, and the fertile soils and available timber and agricultural resources were settlement factors historically. Early maps and surveys including early aerials were useful in the examination of landform changes and looking for areas of historic settlement and use. Matrix factors utilized for model evaluation included distance to wetlands, distance to ponds or lakes, relative elevation, soil drainage characteristics, and presence of flood plain and zone areas. Our GPS data collected is used to record two new sites relating to historic agriculture and timber activities on the park property. Additionally, positional data was useful to verify site locations and consider polygonal boundary extents as shown in the FMSF GIS data. Our archaeological resource sensitivity model for the park is shown at a 1:24,000 scale (Figure 121).

Model Performance

When this model is verified using the FMSF polygonal site location data, the model captures 18 out of 20 recorded sites and structures, at least partially, in the designated high and medium sensitivity areas. The model misses two sites because they fall within areas that are submerged resources and not modeled. One site, 8LA2569 is listed with the FMSF as a boat, and the other site is LA2272, Dude's Lake. Dude's Lake is not specified as to site type by the recorder, who circled the entire polygonal extent of the lake as the site locale. This large and ambiguous extent skews the low sensitivity area slightly for this park model. Also, our GPS data collected for the location of this ceramic scatter site shows the location to be on the north shoreline area of the lake, and our GPS point falls within a defined high sensitivity area for archaeological resources. The FMSF data takes in the water surface area, which is not part of our terrestrial modeling.

Expressed as spatial percentages, the high archaeological resource sensitivity area at Lake Louisa accounts for less than 16% of the land surface area (Table 20), but it has nearly 36% of

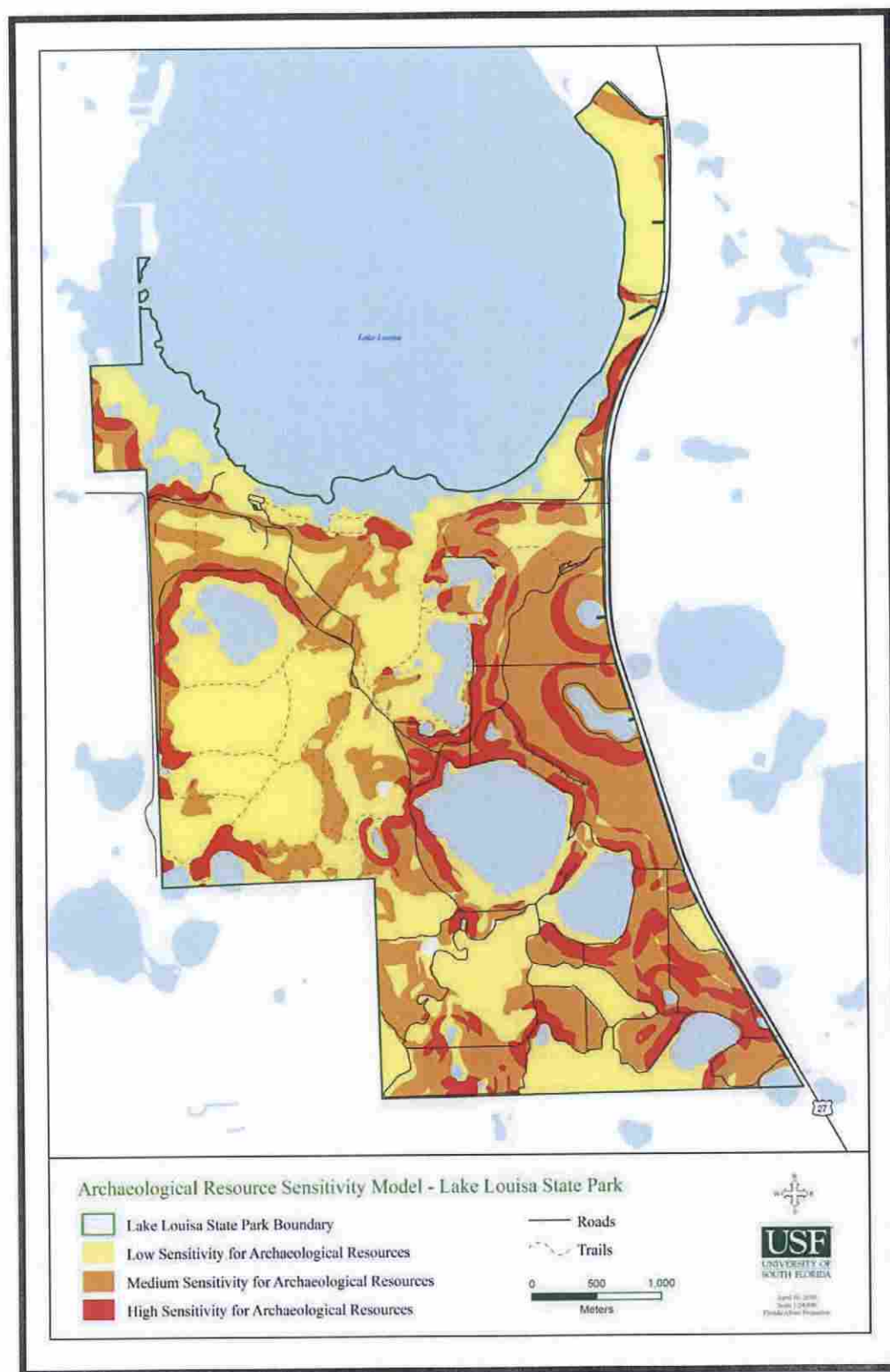


Figure 121. Map showing the archaeological resource sensitivity model developed for Lake Louisa State Park

the recorded archaeological spatial extents correlating with these modeled areas. Using statistics ($p[MIS]-p[M]=.20$), our model represents a 20% improvement over chance of locating archaeological sites within our designated high probability area (see Kvamme 2006:28). Combining the high and medium sensitivity areas shows that 69% of recorded archaeological spatial extents occur within our sensitivity areas, showing a 19% overall improvement over chance. These sensitivity areas can be best refined by conducting a Phase 1 archaeological field survey that combines field verification with use of the model and direct remote sensing observations using high resolution aeriels and LiDAR data. The LiDAR data is useful as well for examining the landscape for linear features such as historic rail beds and for elevated site locations such as mounds and habitation sites. Additionally, spatial locations of sites listed within the FMSF can be further verified to offer even more improvement.

Table 20. GIS model performance calculations for Lake Louisa State Park

Lake Louisa Sensitivity Model	Acres	Percent		FMSF Acres	Percent
High Sensitivity Area	595.29	15.84%		18.08	35.61%
Medium Sensitivity Area	1,285.79	34.21%		17.00	33.48%
Low Sensitivity Area	1,877.33	49.95%		15.68	30.88%
Total	3,758.41	100.00%		50.77	100.00%

Lower Wekiva River Preserve State Park

The Lower Wekiva River Preserve State Park is part of the larger Wekiva River Basin State Park that includes Wekiwa Springs, Rock Springs Run, and the Lower Wekiva Preserve. The preserve is an expansive tract with 17,176.70 acres in the present-day boundary. The preserve is located in the Central Lakes District physiographic area, and is in a sub-area that has hills of less than 95 feet elevation that are separated by areas of flatwood expanses and river swamps (Brooks 1981) (Figure 122). More than 75 percent of the preserve is mapped as wetland communities, with floodplain and hydric hammocks predominant (Myers and Ewel 1990). Other hydrologic features found in the preserve include marshes, blackwater streams, and flatwoods lakes. More than 500 acres of blackwater streams have been mapped within the preserve, and 630 acres of upland mixed forests are another primary ecosystem (FDEP 2005f).

The preserve has 11 recorded archaeological sites listed on the FMSF (Figure 123). The site types include prehistoric mounds and middens, artifact scatters, prehistoric campsites and habitation sites, and historic refuse locales. The temporal range of use for these recorded sites show that occupation here occurred in the Late Archaic and St. Johns periods prehistorically,

and historically in the 20th century (1900-present). Most sites are multi-component, and the artifact assemblages collected are not diagnostic of a temporal affiliation. The preserve is within the East and Central Florida cultural area, which is known to have occupation for the full cultural sequence from Paleoindian, Archaic, Mount Taylor, Orange, Transitional, St. Johns, First Spanish Period, British Period, Second Spanish Period, Territorial and Seminole (Milanich 1994). There are no sites within the park that contain human remains and most, (10 out of 11), have not been evaluated by the recorder or the SHPO or contain insufficient information for NRHP evaluation. One site, Katie's Landing (8SE1177) has been determined as eligible for listing on the NRHP according to the recorder, but was have not been evaluated for NRHP eligibility by the SHPO (Cockrell 2003a; Ellis 1994; Stanton 2002) .

There has been one park-wide survey for cultural resources for the Lower Wekiva River preserve (Lammers, et al. 1999), and several that have looked at specific tracts comprising portions of the park today and adjacent to the preserve boundaries (Dunbar and Newman 2004; Christine Newman and B. R. Weisman 1993), and two surveys and one field visit that looked specifically at the Katie's Landing site (8SE1177) (Cockrell 2003a; Ellis 1994; Stanton 2002). Additionally, there have been a number of surveys for proposed development, road work projects, cell towers and infrastructure development within the regional vicinity to the preserve.



Figure 122. Contour elevation data for the Lower Wekiva River Preserve State Park area

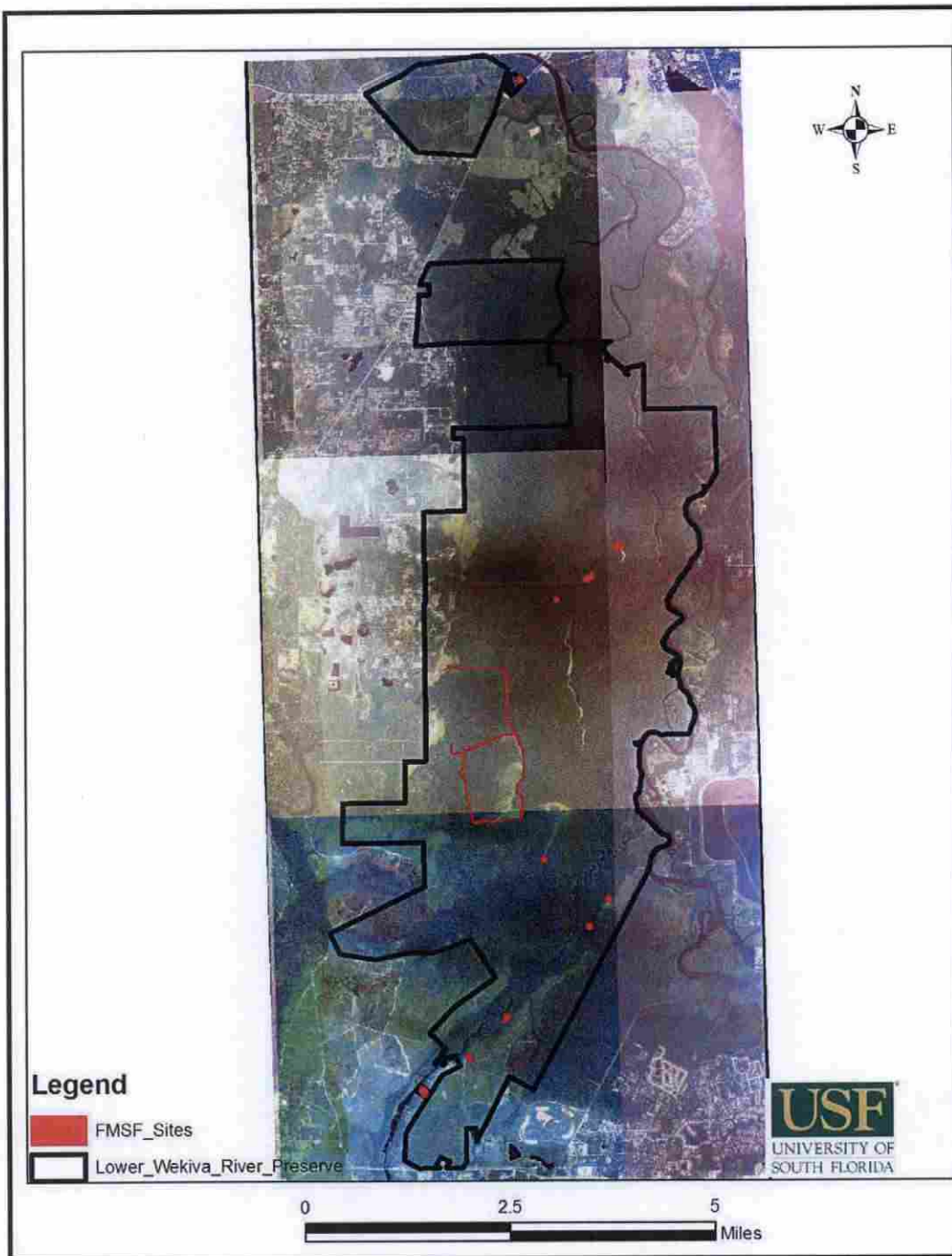


Figure 123. Florida Master Site File data showing archaeological sites within the Lower Wekiva River Preserve State Park

Our GPS work at this preserve consisted of collecting a point location for the recorded Katie's Landing site area. This site area was previously mapped by the Division of Recreation and Parks with a sub-meter mapping grade GPS, with full polygonal data provided to the FMSF bounding this site (Stanton 2002). This is a low mound and midden site, disturbed over large sections from historic land use as a trailer park prior to state ownership. The site is located on the Wekiva River in the southwest section of the preserve. No other GPS work was possible during our reconnaissance trip to this preserve due to the extreme wet condition with road flooding making other recorded sites inaccessible.

Results and Discussion

The archaeological sensitivity model development for the Lower Wekiva River Preserve State Park included factors that took in a variety of environmental and cultural variables that account for the presence of sites through time and space and account for the variability of site types known to occur within the park as demonstrated through previous surveys in and within the regional vicinity to the preserve. A primary factor for cultural site locations in this park included historic and prehistoric utilization of the St. Johns and Wekiva Rivers, streams, creeks and marsh systems associated with diverse wetland habitats, blackwater streams and flatwoods lakes. The poor soil drainage and seasonal and year-round flood plain areas are negative settlement factors and create large expanses of low sensitivity areas in our model. Many of the recorded midden sites along the Wekiva River are in fact inundated most of the time, and inaccessible. FMSF records indicate that many of these site locales were insufficiently mapped. Examination of polygonal extents from some of the riverine midden sites listed as inundated or partially inundated show problems with consistency in plotting, with differing ecotonal placements and natural community types reportedly associated with sites and the lack of correlation with natural systems and environmental GIS data. Professional surveys in the park and adjacent areas were useful for understanding cultural sequence, general site locations, and significance determination (Cockrell 2003a; Ellis 1994; Stanton 2002), however, many sites were inadequately plotted and no evaluations of insufficient information exist in regard to the NRHP, although a greater understanding for site types and their general locations were helpful for our modeling (Lammers, et al. 1999; Christine Newman and B. R. Weisman 1993).

Matrix factors utilized for model evaluation included distance to wetlands, distance to ponds or lakes, relative elevation, soil drainage characteristics, and presence of flood plain and zone areas. Additionally, areas defined through surveys and the FMSF data as having high likelihood of containing significant sites based on recorded or archival data or oral tradition (survey evaluations from FMSF = likely or eligible for the NRHP) was also used as a matrix evaluation factor in our model. Our archaeological resource sensitivity model for the park is shown at a 1: 68,000 zoomed-out viewable scale (Figure 124).

Model Performance

When this model is verified using the FMSF polygonal site location data, the model captures 6 out of 11 recorded sites, at least partially, in the designated high and medium sensitivity areas. Sites that are missed by our modeling include 8SE83, a midden site along the Wekiva River that has no NRHP evaluation and may be incorrectly plotted. FDEP staff has tried to relocate this site using the survey maps with the FMSF and have not successfully relocated the area (FDEP 2005f). Our model also misses 8SE578 and 8SE577, both midden sites along this same area of the Wekiva River with similar map plotting issues. These sites are also described by the surveyors as being inundated by high water a significant portion of the time (Christine Newman and B. R. Weisman 1993). Also missed by are model are two sites that are listed with the FMSF as general vicinity locations (8LA510 and 8LA46), one being based on an informants description and never visited (8LA510). In the case of 8LA46, there is modeled medium sensitivity area within 125 meters of the plotted general vicinity location, and therefore it is likely that the site is incorrectly plotted. Additionally, there are also two resource group sites at the preserve as listed on the FMSF. One resource is a linear logging road (8LA2024). Portions of this trial fall within our high and medium sensitivity, however we did not digitize the full linear feature as we could not accurately establish the full extent of the trial with aerials, elevation contours or GPS ground control. Should the site become accessible or if the site becomes more fully visible through LiDAR availability with this parcel, then this would add area to our high and medium sensitivity locations. There also are large tram roads that were constructed in the northern sections of the preserve in the early to mid 1900s. These roads relate to historic timber harvesting. Their impacts on the hydrology of the preserve have been significant and restoration and mitigation at the park involves their removal to promote rehydration of wetland systems. Because these areas are being removed and not considered sensitive, we did not digitize or model for this resource group.

Expressed as spatial percentages, the high archaeological resource sensitivity area at Lower Wekiva River preserve State Park accounts for only about 1.5% of the land surface area (Table 20), yet has more than 41% of the recorded archaeological spatial extents correlating with these modeled areas. Using statistics ($p[MIS]-p[M]=.40$), our model represents a 40% improvement over chance of locating archaeological sites within our designated high probability area (see Kvamme 2006:28). Combining the high and medium sensitivity areas

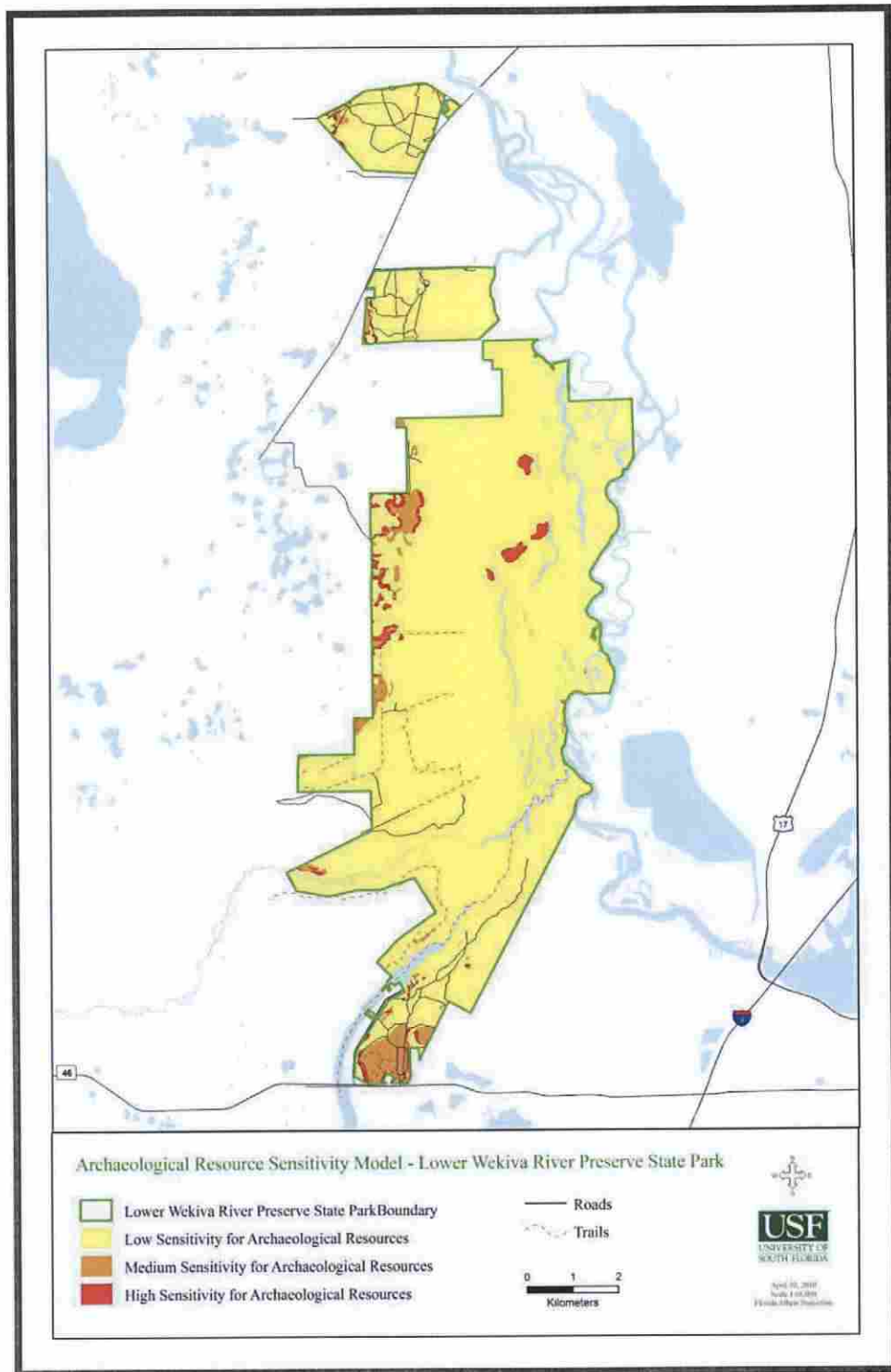


Figure 124. Map showing the archaeological resource sensitivity model developed for Lower Wekiva River Preserve State Park

shows that nearly 45% of recorded archaeological spatial extents occur within our sensitivity areas, showing a 40% overall improvement over chance. These sensitivity areas can be best refined by conducting a GPS and aerial remote sensing survey specific to this park, and visiting at seasonal times when accessibility to inundated resources is permissible. Additional data on site significance and other culturally mitigating factors would also assist for sites where settlement and site use choices were made for reasons other than strictly environmental conditions. A research design that combines field verification with use of our model and direct remote sensing observations using high resolution aeriels and LiDAR data as it becomes available for this area would be recommended. Additionally, we suggest use of the model in conjunction with archaeological survey to look for sites that reflect historic occupations and those associated with agro-industries such as timber-related sites. Informant and ranger knowledge of spatial details relating to artifact occurrence such as Herty cups used in turpentine activities and the mapping of resources such as cat-faced trees would be useful in further improvement and delineation of cultural resources in this preserve.

Table 21. GIS model performance calculations for Lower Wekiva River Preserve State Park

Lower Wekiva River Preserve Sensitivity Model	Acres	Percent		FMSF Acres	Percent
High Sensitivity Area	267.03	1.56%		6.42	41.18%
Medium Sensitivity Area	610.20	3.55%		0.59	3.78%
Low Sensitivity Area	16,299.47	94.89%		8.58	55.04%
Total	17,176.70	100.00%		15.59	100.00%

Ravine Gardens State Park

Ravine Gardens State Park is a distinctive park in the Florida system that has unique natural and cultural features. Located in Palatka in Putnam County, this 152.67 acre parcel that is a National Register of Historic Places designated site is an example of garden architecture projects created by the Works Progress Administration in 1933. The NRHP park consists of the Palatka Ravine Gardens Historic District (8PU91), classified with the FMSF as a historic landscape that is comprised of the ravines and eight structure outbuildings, three historic suspension bridges, and one prehistoric (Archaic period) campsite (8PU1215).

The Ravine Gardens State Park has two adjacent parcels located within the Eastern Flatwoods Physiographic District (Brooks 1981). The western parcel is characterized by having residual hills composed of sand, silt, and clay of Plio-Pleistocene Age. It is located on the southeastern end of

the Palatka Hill and the eastern side of the Penholoway Terrace. Elevations in this portion of the park range from 15 to 75 feet above sea level. The eastern parcel is characterized as lowland. It is located on the St. Johns River offset with elevations averaging 2 feet above sea level (FDEP 2008) (Figure 125). The eastern portion of the park is comprised of floodplain forest, marsh, and swamps that make up the large percentage of the land in this part of the park (84.21 acres), and represent areas not suitable for archaeological occurrence. This eastern portion of the park does contain an area of upland hardwood forest along the western edge.

Archaeological and historical surveys at Ravine Gardens State Park include one park-wide survey and one infrastructural development survey in an area adjacent to both east and west parcels (Dickinson and Wayne 1997, 1998). The park-wide survey in 1998 included the recording of all of the park's eight structures, three suspension bridges, as well as the prehistoric site location (Figure 126). The surveyors also assessed conditions and made significance evaluations (Dickinson and Wayne 1998).

Our GPS and reconnaissance work at the Ravine Gardens State Park consisted of taking sub-meter location positions on all existing structures and bridges, and delineating the prehistoric site location and garden landscape feature extents. The GPS survey included the mapping of the following areas:

- Water Fountain / Amphitheater (8PU724)
- Suspension Bridge (8PU725, 8PU732)
- Suspension Bridge (location for 8PU726 – ruinous bridge)
- Entrance Station (8PU728)
- FDR Obelisk (8PU729)
- Garden Club Building (8PU727)
- Court of States (8PU730)
- Azalea Fountain/ Rock Gardens (8PU731)
- Terraces below the Water Fountain / Garden
- General Vicinity of a possible Civil War Encampment



Figure 125. Contour elevation data for Ravine Gardens State Park area

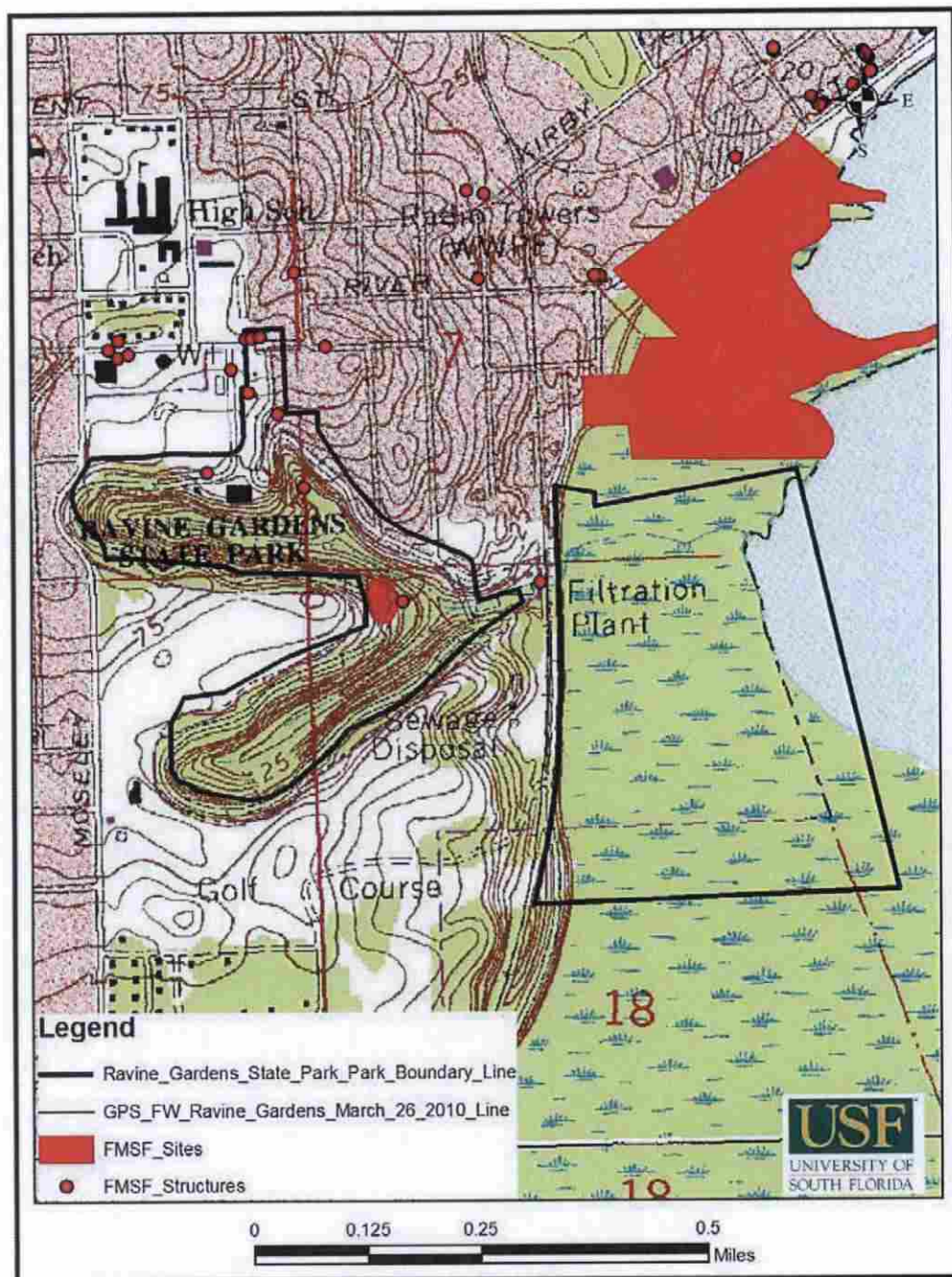


Figure 126. Florida Master Site File data for sites and structures within the Ravine Gardens State Park

A Civil War Encampment, Camp Call, was previously thought to be located in the ravine, however the archaeological survey of the park indicated no artifacts or indication of the camp



Figure 127. Stream that runs along the bottom of the ravine

location, and it is thought the probable locations are near high elevations at the adjacent City Golf course or at a residential area to the north of the present-day park boundary. There is also a historic road from Tampa to Palatka that is surveyed to the north of the park crossing section 12 in the 1833 General Land Office survey. The camp's location in closer proximity to this road feature would also be more probable. The numerous groundwater seeps and proximity to the St. Johns River would have likely provided potable water for

the troops, and so some activities within the present-day park associated with the encampment are likely (Dickinson and Wayne 1998) (Figure 127). Other prehistoric site locations (8PU103 and 8PU842) are also found adjacent to the present-day park location, but fall within the optimum boundary for the park (FDEP 2008). Our GPS survey was restricted to the resources that are within the present-day park boundary (Figure 128).

Results and Discussion

The archaeological sensitivity model development for Ravine Gardens State Park included factors that took in a variety of environmental and cultural variables that account for the presence of sites through time and space and account for the variability of site types known to occur within the park as demonstrated through previous surveys and recorded archaeological sites as listed on the FMSF. A primary factor for cultural site locations in this park included the Works Progress Administration created garden historic landscape, consisting of structural

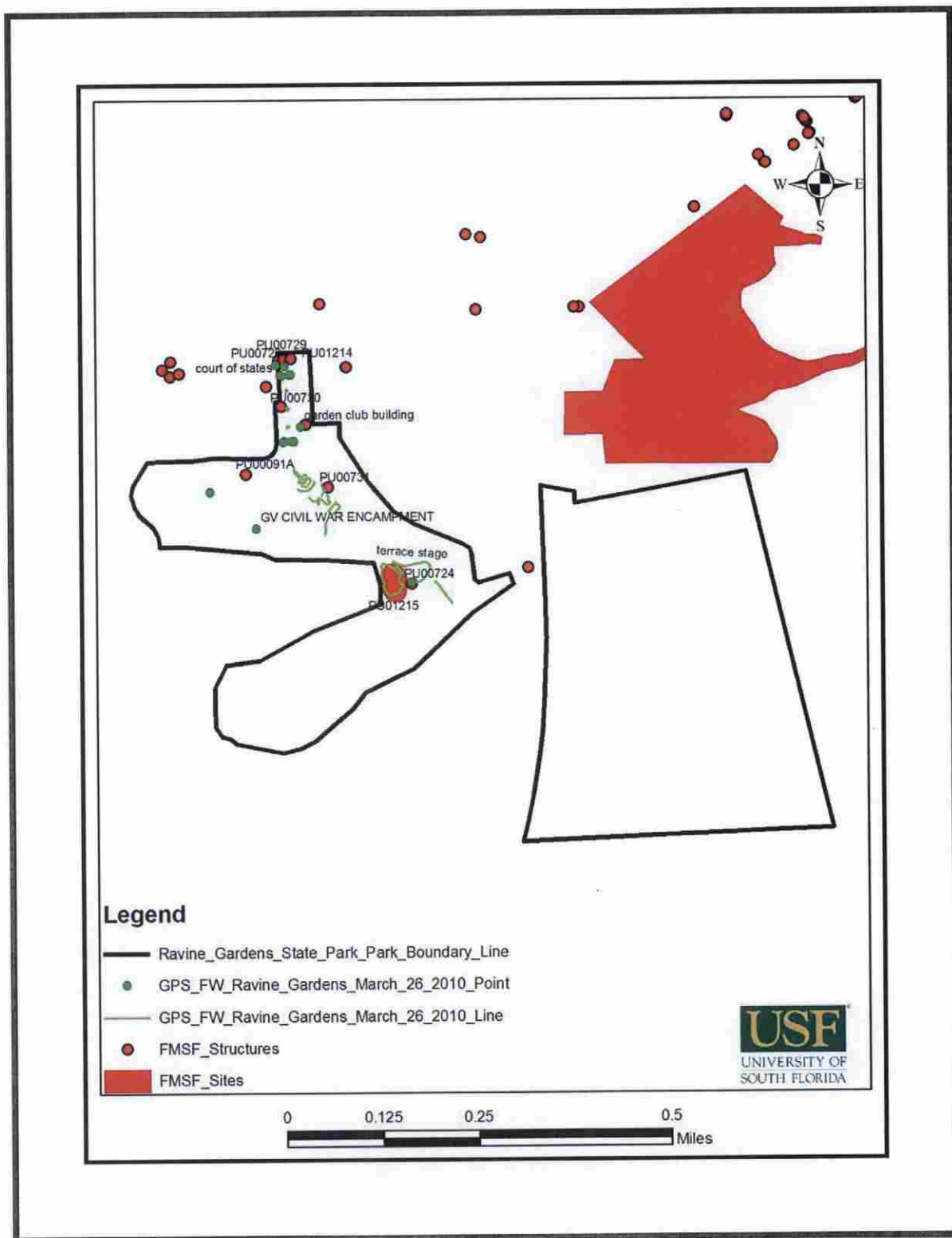


Figure 128. GPS survey data collected at Ravine Gardens State Park showing locations along with FMSF location data

extant and ruinous elements. The FMSF structural data inventory provided important details and locations, as did our own GPS survey of these features. The location of a prehistoric recorded site was known from previous survey of the park, and our GPS data along with the FMSF polygonal data were useful in our model development. Other data layers utilized include contour elevation data, aerial imagery, historical maps and references, and environmental layers such as the National Wetlands Inventory, hydrology, and SSURGO soil information. Other relevant data layers included the National Register and special resource group GIS data from the FMSF. Our model, presented at a zoomed-in view of 1: 8,000 scale for this report, captures the WPA era gardens and known prehistoric elements in the western parcel, but also shows areas in the eastern parcel which have medium and high sensitivity for cultural resources based on our matrix evaluation (Figure 129).

Model Performance

All eight structures and three suspension bridge locations that are found in Ravine Gardens State Park as recorded on the FMSF are captured in the high sensitivity area. Additionally, site 8PU1215, the only prehistoric recorded location is largely contained in the high sensitivity area of the model. A portion of the polygonal extent falls in the medium sensitivity area, but due to the potential for inaccuracies with the polygonal spatial locations of the FMSF data, this is likely due to inaccuracies with the plotting of the site extent. Collected GPS data and aerial imagery was utilized to more accurately reflect polygonal data, such as the garden terrace features, and was utilized in the model creation. Of the park's 152.67 acres, 103.82 acres (68%) fall within delineated low sensitivity areas. These areas are primarily in the eastern parcel, with floodplain swamps, forests, and marshes having negative matrix values for archaeological sensitivity (Table 22).

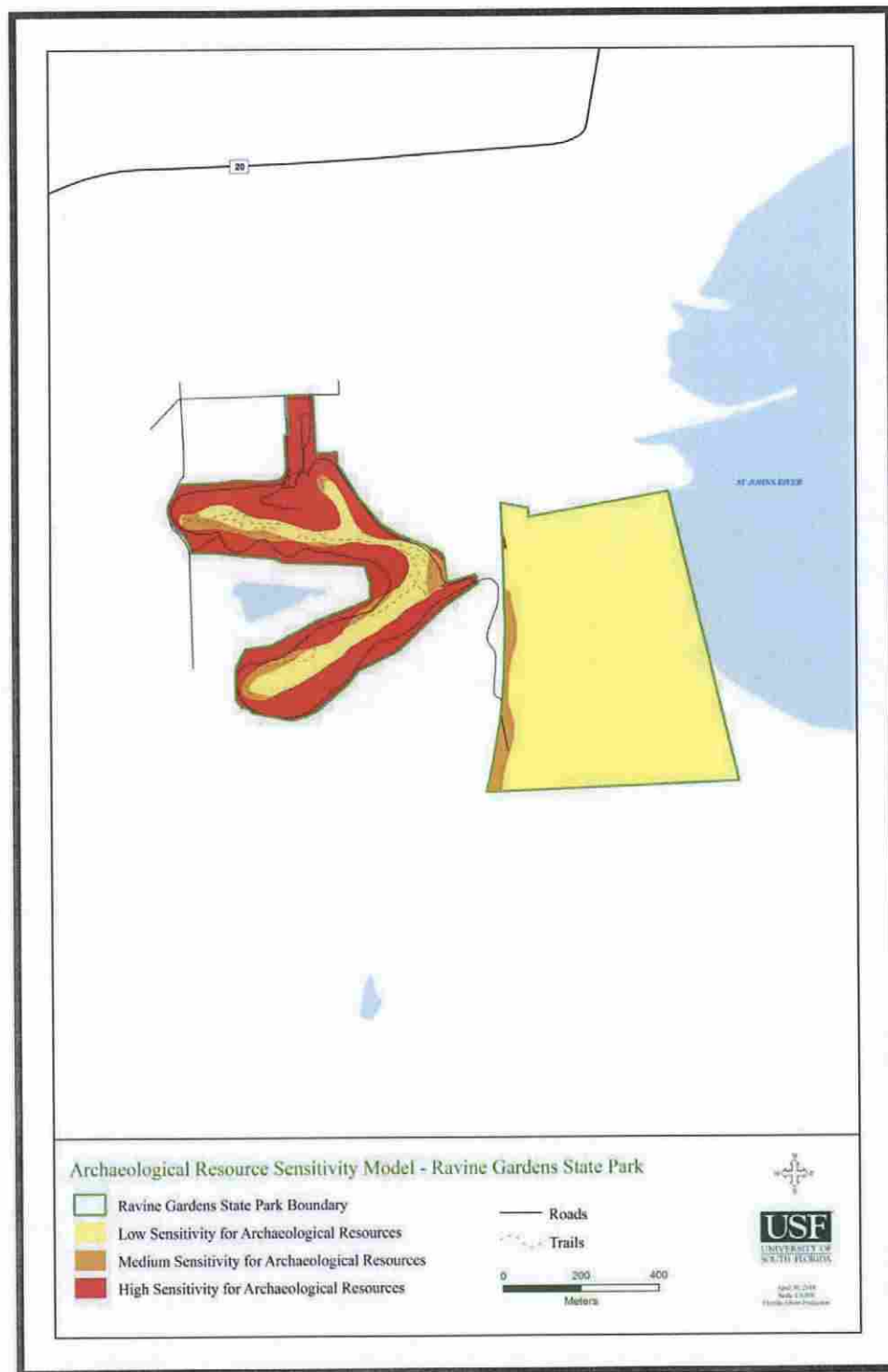


Figure 129. Map showing the archaeological resource sensitivity model developed for Ravine Gardens State Park

Table 22. GIS model performance calculations for Ravine Gardens State Park

Ravine Gardens Sensitivity Model	Acres	Percent		FMSF Acres	Percent
High Sensitivity Area	40.36	26.44%		0.88	95.65%
Medium Sensitivity Area	8.48	5.55%		0.04	4.35%
Low Sensitivity Area	103.82	68.01%		0.00	0.00%
Total	152.67	100.00%		0.92	100.00%

Rock Springs Run Reserve State Park

Rock Springs Run Reserve State Park is a 14,010.08 acre parcel that is part of the Wekiva River basin State Park. The Wekiva River Basin State Parks, including the Rock Springs Run State Preserve is located in the Central Lake District physiographic region (Brooks 1981). Portions of this reserve are included in the Apopka Hills sub-district. Within the reserve, residual sandhills modified by karst processes and seaward deposits of the Mt.Dora Ridge are noted (FDEP 2005f). The Mount Dora Ridge is nearly level to rolling, with slopes between 0 and 8 percent, except in areas near sinkholes where the soils have slopes of almost 25 percent (Brooks 1981). The general topography of the reserve includes low flooded areas along Rock Springs Run, with some higher sandhill areas especially in the north and northeast sections of the park. The elevations range from approximately 15 feet above mean sea level to 80 feet in the reserve's sandhill community areas (Figure 130).

The headwaters for Rock Springs Run are Rock Springs, located on Orange County property adjacent to the reserve. The run is a winding 8-mile long course and joins with Wekiva Springs Run to form in part the Wekiva River. The reserve is known to be the most hydrologically diverse unit within the Wekiva River Basin parks, with numerous wetlands, ponds, springs, more than 200 acres of depressional marsh, and 6,000 acres of hydric hammock and floodplain swamp (FDEP 2005f).

Archaeologically, the reserve falls within the East and Central Archaeological Region (Milanich 1994). The region around the reserve was occupied for the full sequence of Precolumbian cultural periods, beginning with the Paleoindian, and continuing through the Archaic, Mount Taylor, Orange, Transitional, and St. Johns Periods (Milanich and Payne 1993). Seminole occupation in the area is also recorded (Carr and Stelle 1993), as are numerous historic period sites and structures. Within the present-day boundary of the reserve, there are 17 recorded archaeological site locations, one recorded historic cemetery (8LA1135), one National Register District (8OR3230) and two resource groups, a rail way and tram roads (Figure 131). Of the 17 archaeological sites recorded, site types include prehistoric campsites, middens, artifact

scatters, and mounds. Two sites, 8OR452 and 8OR457 are listed on the FMSF as containing human remains, and along with 8OR459, are shown as potentially eligible for listing on the National Register. These midden feature sites are all located on the west bank of the Wekiva River just south of the St. Johns River confluence on the eastern side of the reserve. Sites 8OR457 and 8OR459 (Wekiva 7 and Wekiva 8) are part of the designated Twin Mounds Archeological District, listed in 1992, with temporal affiliations from 2000 BC to AD 1565 (Figure 132). These sites are described as large refuse middens that were first assessed by a researcher from Rollins College in the 1980s, and later the site was topographically mapped and limited excavations were performed by BAR archaeologists Christine Newman and Brent Weisman (FDHR 1991; Weisman and Newman 1990).

There has been no park-wide survey for cultural resources for the Rock Springs Run Reserve State Park, but several surveys have looked at specific tracts and archaeological features comprising portions of the park today and adjacent to the preserve boundaries (Dunbar and Newman 2004; Estabrook 1988; Handley, et al. 2007; Janus 2008; Christine Newman and B. R. Weisman 1993; C. Newman and B. R. Weisman 1993; Weisman and Newman 1990), as well as a number of proposed development CRM surveys and cellular tower location surveys to the east of the present-day park boundary.

Our GPS and reconnaissance survey of the Rock Springs Run Reserve State Park included visiting the Twin Mounds Archeological District (8OR3230), marking in a historic cemetery location (8LA1135), taking a coordinate position on the linear rail way resource group location in the northern section of the reserve (8LA414), and taking a position on 8OR449, a mound site that shows to be partially in the Rock Springs Reserve on the FMSF GIS data layer, but actually is part of the Wekiwa Springs State Park parcel and is plotted incorrectly on the FMSF. Additionally, we visited a site currently not listed on the FMSF, consisting of the remains of river barge boat from the 1900s (8OR9987). Photographs and a coordinate were taken on this location (Figure 133).

Our GPS work at the Twin Mounds Archeological District (8OR3230) finds this National Register designated area to be incorrectly plotted with the FMSF. We took several positions on both mound features to delineate their bounded extents as visible from surface elevations, and we found the FMSF data to be between 100 – 200 meters in error. The Wekiva 8 site (8OR459) can also clearly be delineated using the available LiDAR elevation data (Figure 134). The new GPS position and plot will be provided to the FMSF to correct the boundary for this NR District location.

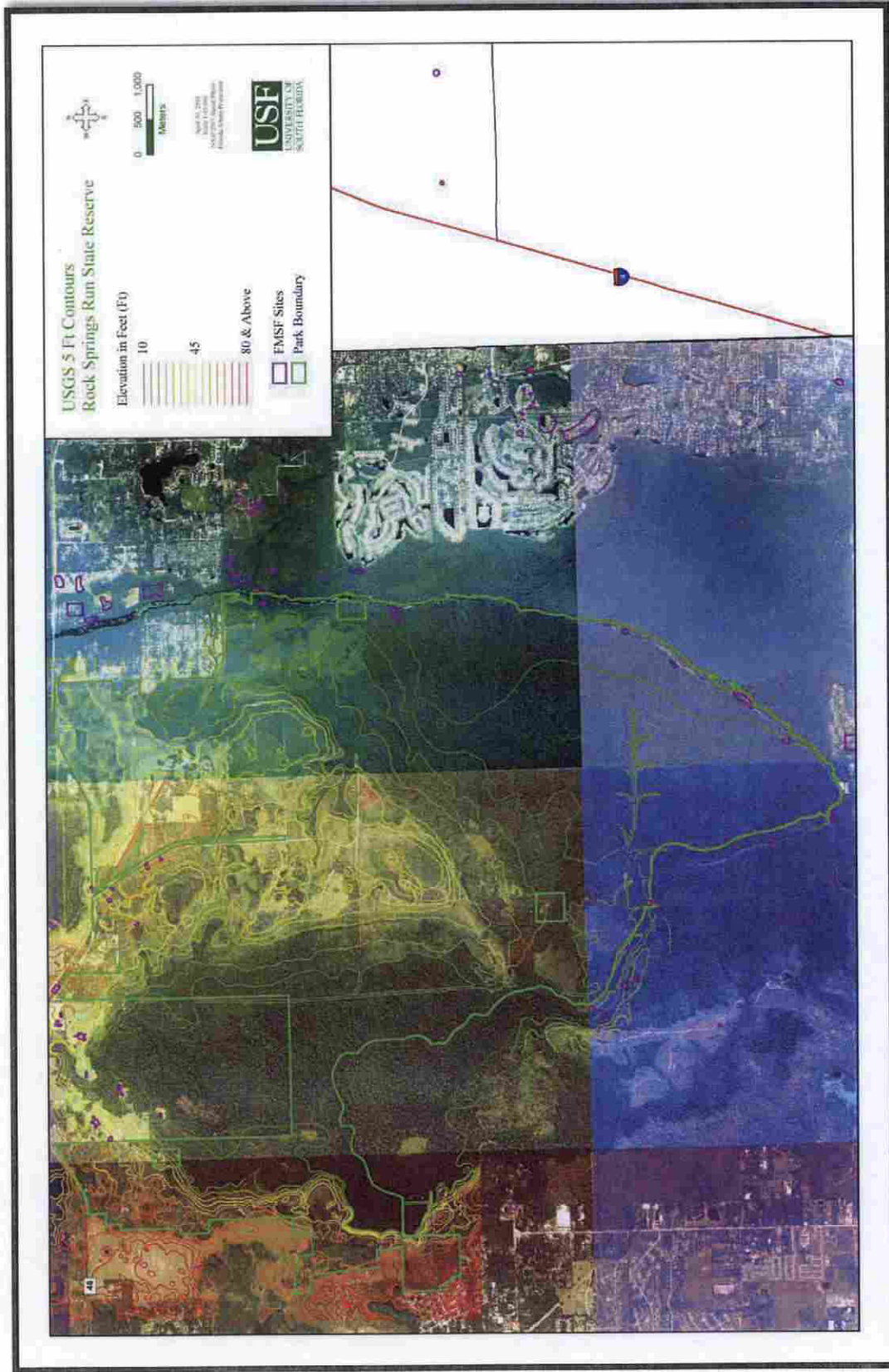


Figure 130. Map showing the archaeological resources as listed on the FMSF in relation to collected elevation data for Rock Springs Run State Reserve

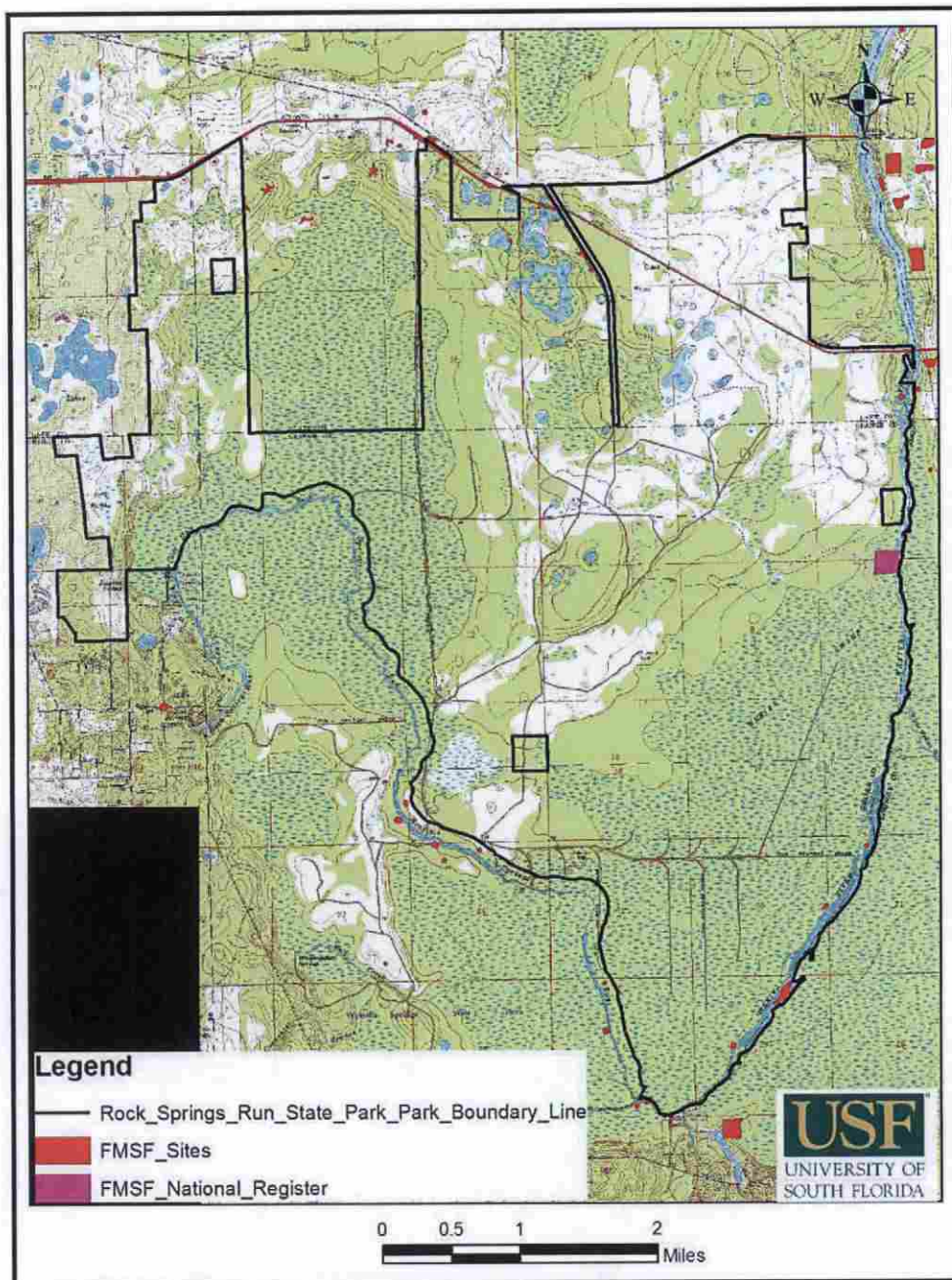


Figure 131. Florida Master Site File data showing the recorded archaeological sites within the Rock Springs Run State Reserve



Figure 132. Florida Park Service interpretive for the Twin Mounds Archaeological District (8OR3230)

Results and Discussion

The archaeological sensitivity model development for the Rock Springs Run Reserve State Park included factors that took in a variety of environmental and cultural variables that account for the presence of sites through time and space and account for the variability of site types known to occur within the park as demonstrated through previous surveys in and within the regional vicinity to the reserve. A primary factor for cultural site locations in this park included historic and prehistoric utilization of the St. Johns and Wekiva Rivers, streams, creeks and marsh systems associated with diverse wetland habitats, blackwater streams and flatwoods lakes.

Several areas with stable riverine islands and swamp or knoll island features occur in this reserve and were digitized and utilized as a matrix factor. The presence of areas with sinkholes, caves, or outcrops and relict springs were karstic evaluation factors also considered in the model. The poor soil drainage and seasonal and year-round flood plain areas are negative settlement factors and create large expanses of low archaeological sensitivity areas in our model. Many of the recorded midden sites along the Wekiva River are in fact inundated most of the time, and inaccessible. Professional surveys in the park and adjacent areas were useful for understanding cultural sequence, general site locations, and significance determination; however, many sites were inadequately plotted and no evaluations or insufficient information exist in regard to the NRHP, although a greater understanding for site types and their general locations were helpful for our modeling. Of particular note is the inaccurate location for the National Register of Historic Places Twin Mounds Archaeological District. Our model reflects the high sensitivity area to now correlate with the GPS and LiDAR verified positions, rather than the previously inaccurate FMSF plot in this case. Additionally, the spatial plot for site 8OR449 was updated, and one new site was recorded. Our archaeological resource sensitivity model for the park is shown at a 1: 45,000 zoomed-out viewable scale (Figure 135).

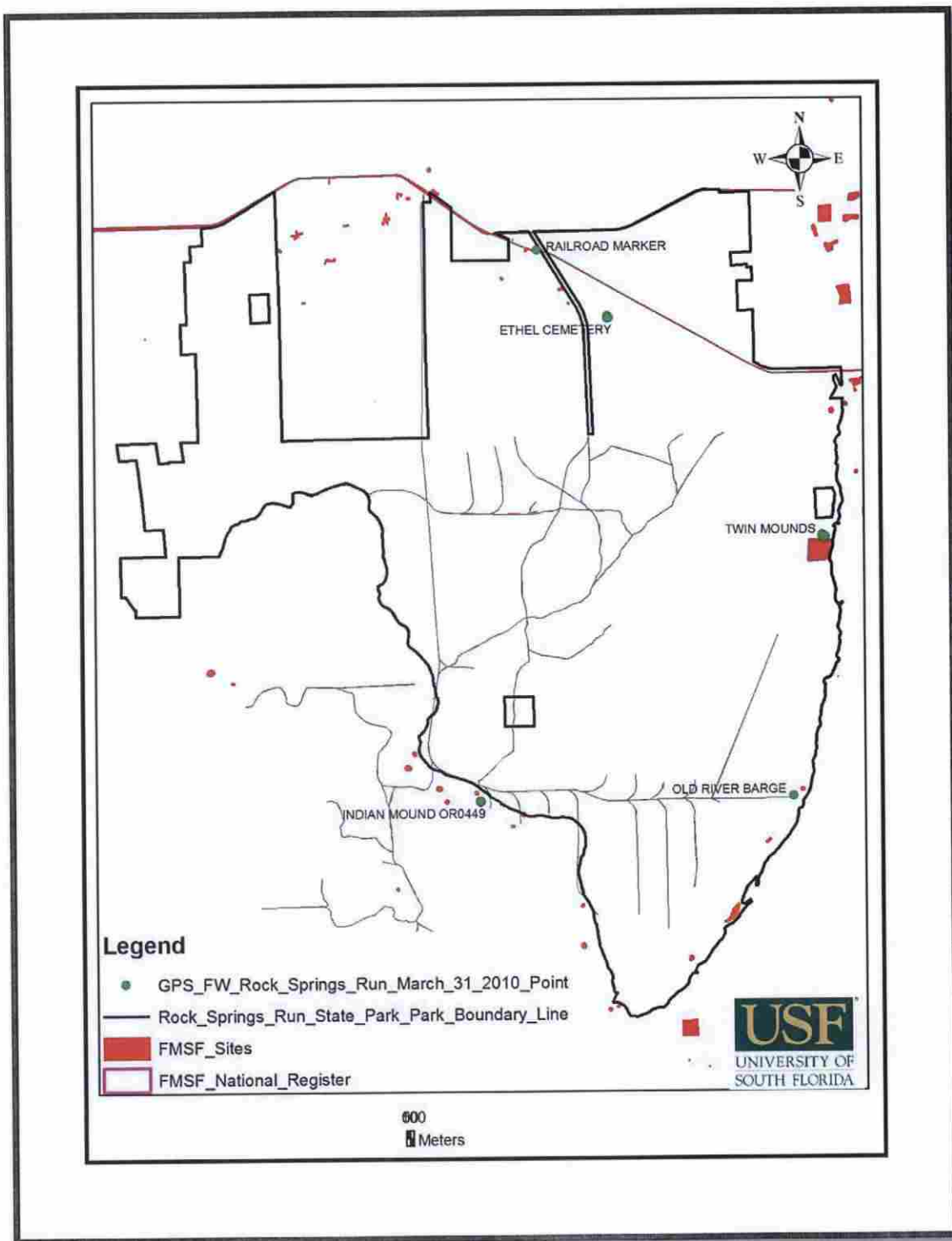


Figure 133. GPS survey data collected at Rock Springs Run State Reserve along with the FMSF existing archaeological data

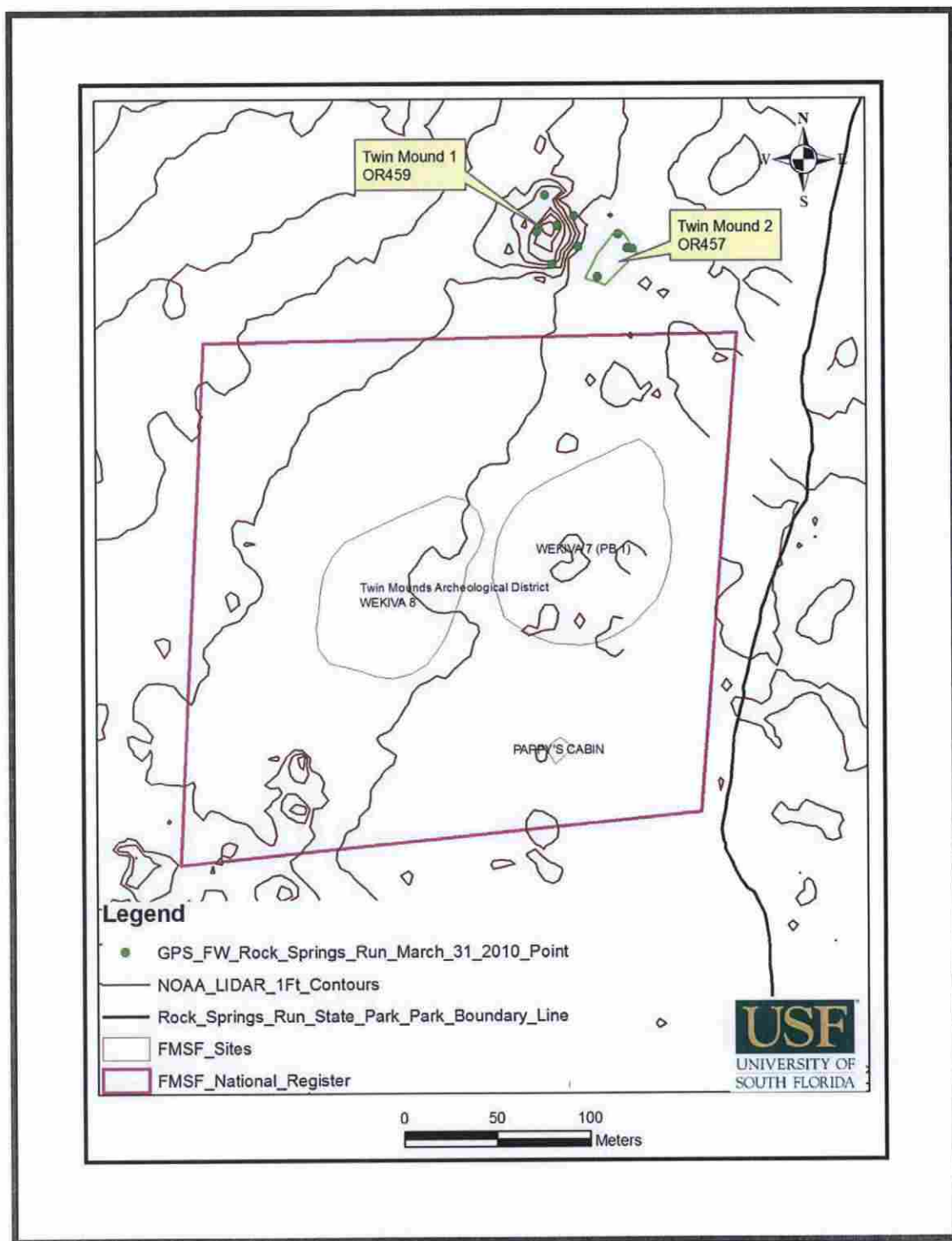


Figure 134. LiDAR data and GPS field data for Rock Springs Run State Reserve showing incorrect plotting from the FMSF data (purple)

Model Performance

When this model is verified using the FMSF polygonal site location data, the model captures 14 out of 19 recorded sites (including resource groups, archaeological districts, historic cemeteries, and archaeological sites), at least partially, in the designated high and medium sensitivity areas. The model misses some site locations due to their polygonal extent recording on the FMSF. For example, sites 8OR451 and 8OR453 are midden sites in the southern section of the reserve along with western bank of the Wekiva River. These site plot locations are within 50 meters of high sensitivity defined areas and could represent errors in the field plotting of the site location. Sites 8LA532 is an isolated find single artifact site that was not reflected in our sensitivity modeling, and site 8LA2127 is a submerged resource that was not included in our terrestrial model. Additionally the tram roads that are listed with the FMSF as a resource group, like those at Lower Wekiva River Preserve, are being removed and are ineligible for listing on the NRHP and were not digitized and modeled as a resource.

Expressed as spatial percentages, the high archaeological resource sensitivity area at Rock Springs Run Reserve accounts for approximately 4% of the land surface area (Table 23), but has over 52% of the recorded archaeological spatial extents correlating with these modeled areas. Using statistics ($p[MIS]-p[M]=.48$), our model represents a 48% improvement over chance of locating archaeological sites within our designated high probability area (see Kvamme 2006:28). Combining the high and medium sensitivity areas shows that 54% of recorded archaeological spatial extents occur within our sensitivity areas, showing a 41% overall improvement over chance. These sensitivity areas can be best refined by conducting a Phase 1 park-wide archaeological field survey that combines field verification with use of the model and direct remote sensing observations using high resolution aeriels and available LiDAR data. Additionally, spatial locations of sites listed within the FMSF can be further verified to offer even more improvement. The Archaeological District (8OR3230) in this reserve will need to have its spatial boundaries updated with the FMSF and NR.

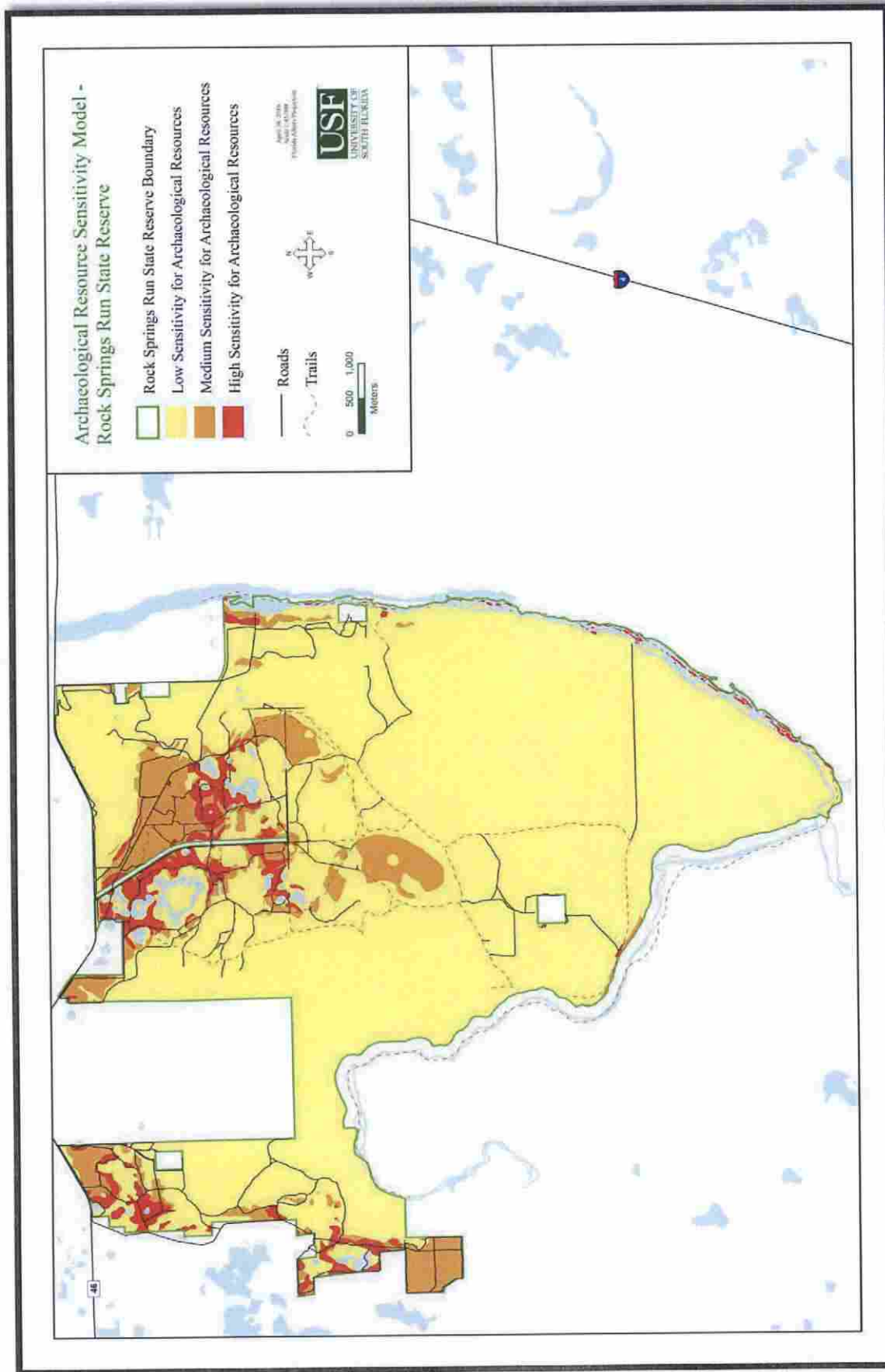


Figure 135. Map showing the archaeological resource sensitivity model developed for Rock Springs Run State Reserve

Table 23. GIS model performance calculations for Rock Springs Run State Park

Rock Springs Run Sensitivity Model	Acres	Percent		FMSF Acres	Percent
High Sensitivity Area	582.90	4.16%		7.60	51.60%
Medium Sensitivity Area	1,291.09	9.22%		0.37	2.50%
Low Sensitivity Area	12,136.10	86.60%		6.76	45.90%
Total	14,010.08	100.00%		14.73	100.00%

St. Sebastian River Preserve State Park

The St. Sebastian River Preserve State Park is a 21,624.36 acre parcel that lies in Brevard and Indian River Counties. The land in this region is relatively flat with an average elevation in the preserve of approximately 24 feet above mean sea level. The highest elevations on the preserve are associated with the north side, where areas of scrubby flatwoods have elevations reaching close to 35 feet above mean sea level. The slope of the property is toward the St. Sebastian River, where steep bluffs along the western bank are documented (FDEP 2005d)(Figure 136). The preserve is included within the Eastern Valley of the Atlantic Coastal Lowlands physiographic province (Brooks 1981). A large percentage (10,663.49 acres) of this preserve is comprised of mesic flatwoods, with poor drainage and seasonally inundated soils that are negative factors in our archaeological sensitivity modeling.

There are a total of 22 sites, structures, and resource groups listed with the FMSF within the St. Sebastian River Preserve State Park (Figure 137). The FMSF lists 13 of these to be archaeological sites, three to be historic structures, and six resource groups within the preserve. The site types range from historic homesteads, building remains, farmsteads, turpentine and naval stores, prehistoric middens and mounds and prehistoric campsites. The temporal range includes prehistoric occupation in the Malabar I and Malabar II periods and historic occupations in the 19th and 20th centuries with sites relating to boom time, depression, and WWII era. The preserve is located within the East and Central culture area (Milanich 1994), and a full sequence of Precolumbian cultural periods, beginning with the Paleoindian and continuing through the Archaic, Mount Taylor, Orange, Transitional, and post-regional cultures, are known (Milanich and Payne 1993). Additionally, historic aboriginal and European Contact sites are known in the Indian and Banana River and St. Johns River Valley areas of the region (Milanich 1995; Rouse 1951). Mission sites relating to Spanish and European settlement, Seminole period and Territorial period sites, and historic and agro-industry sites, homesteads and related features are known in the region (FDHR 1993).

A park-wide survey was conducted in 2000 by CARL archaeologists that recorded 18 new sites and 2 previously recorded sites (Newman, et al. 2001). The report overviews the prehistoric and historical occupations of the preserve, including the cattle ranching history that spanned from the 1930s until the property was purchased by the state in the 1990s. There were no recorded sites found to have human remains on the preserve. One site, 8IR852, recorded as a prehistoric campsite, was found to be ineligible for listing on the NRHP as determined from the field evaluation. All other sites were found to have insufficient information to determine NRHP eligibility. Of the six resource groups recorded, only 8BR1766, the Hernandez Trail, was found to be eligible for the NRHP. This linear resource was a military trail that was associated with the

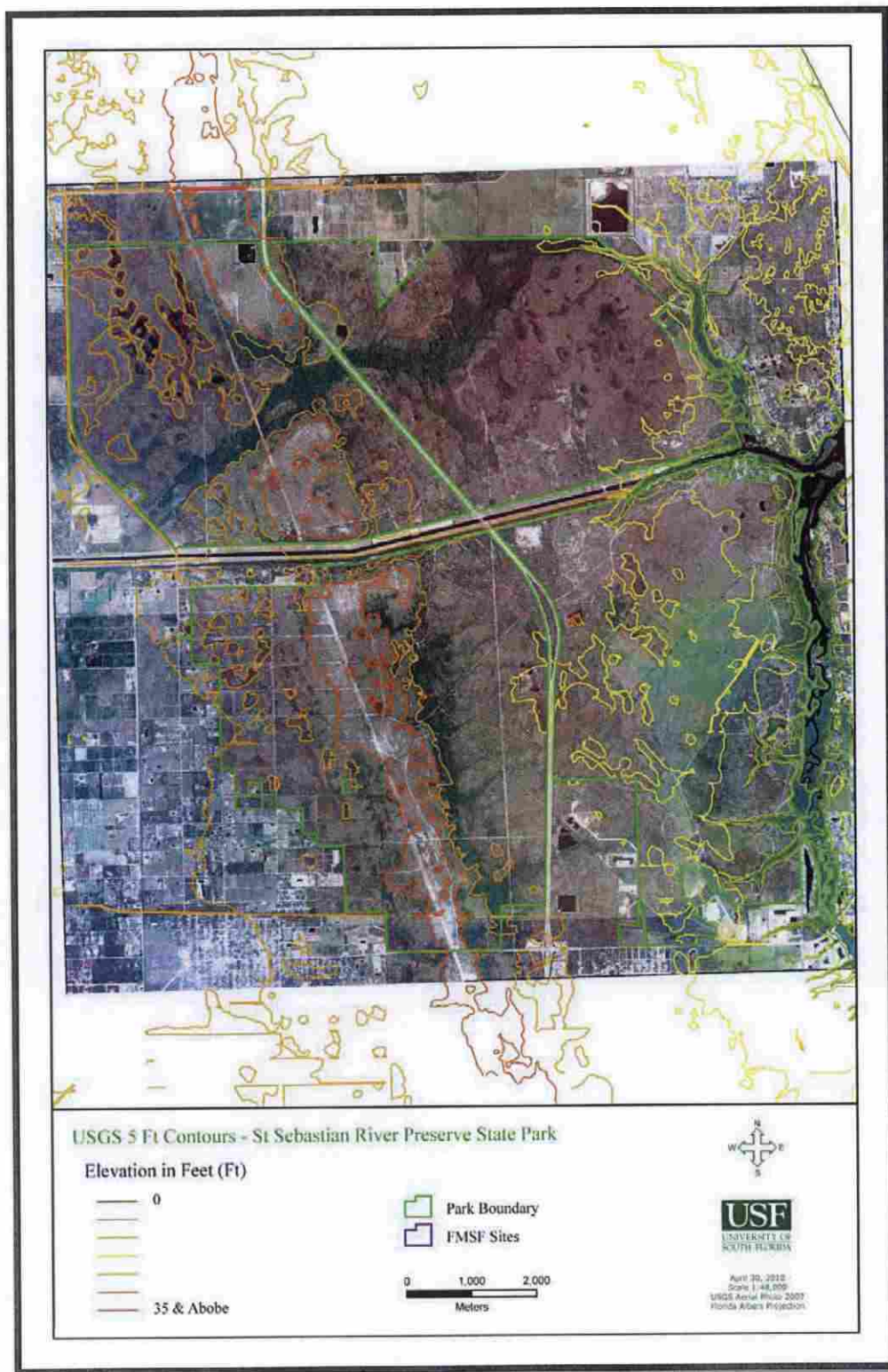


Figure 136. Contour elevation data for the St. Sebastian River Preserve State Park area

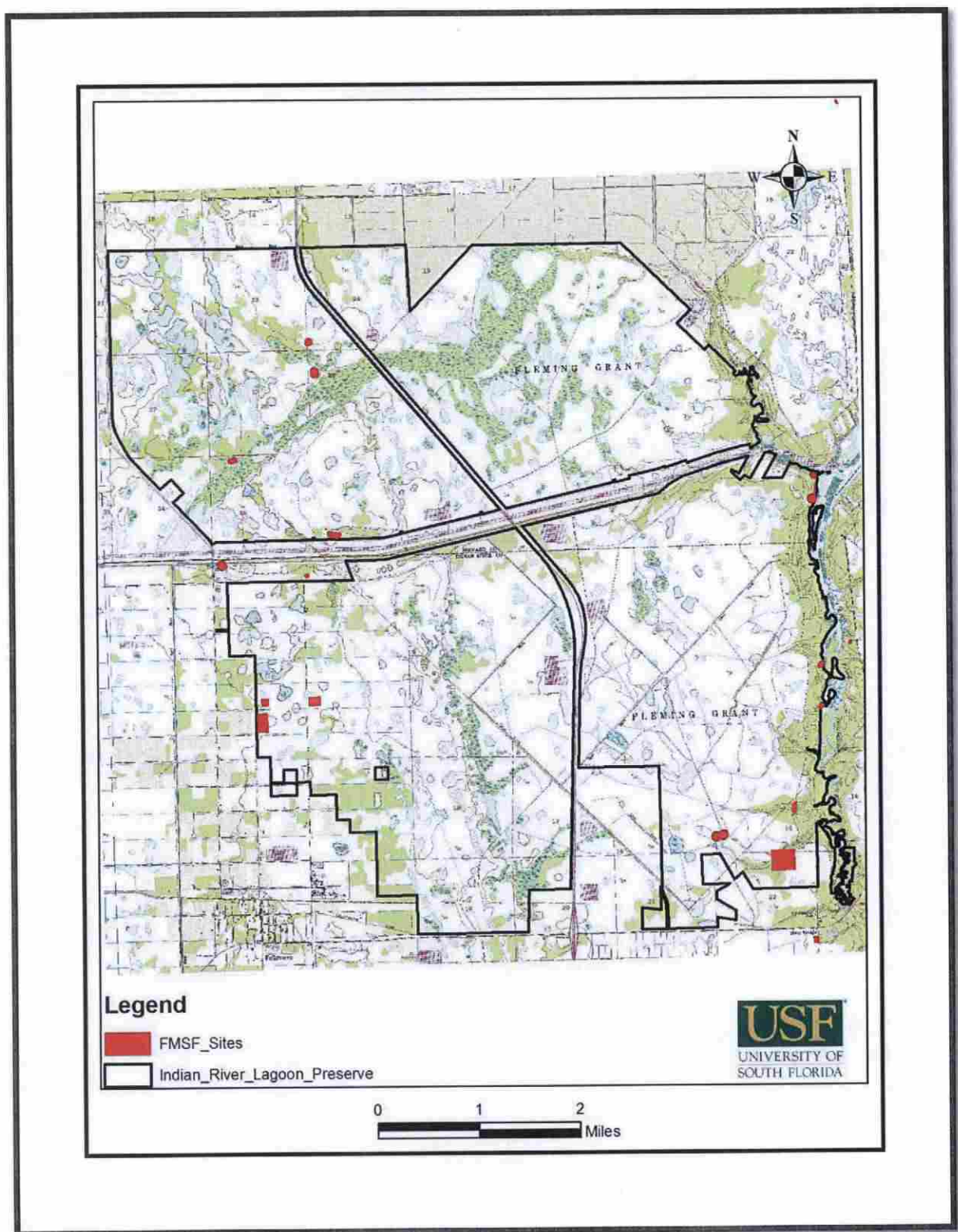


Figure 137. Florida Master Site File data showing archaeological sites within the St. Sebastian Preserve State Park

Seminole Indian War period. Parts of the trail later became a major transportation area of Interstate 95, but an intact portion of the trail cuts through the preserve (Figure 138).

No GPS work was done as part of this survey due to site access issues. Additionally, the park-wide survey included the use of hand-held GPS locations for the FMSF recordation of sites. Site locations on the FMSF GIS data layers were checked against high resolution aerial imagery, LiDAR and contour elevation data, and the georeferencing of historical maps.

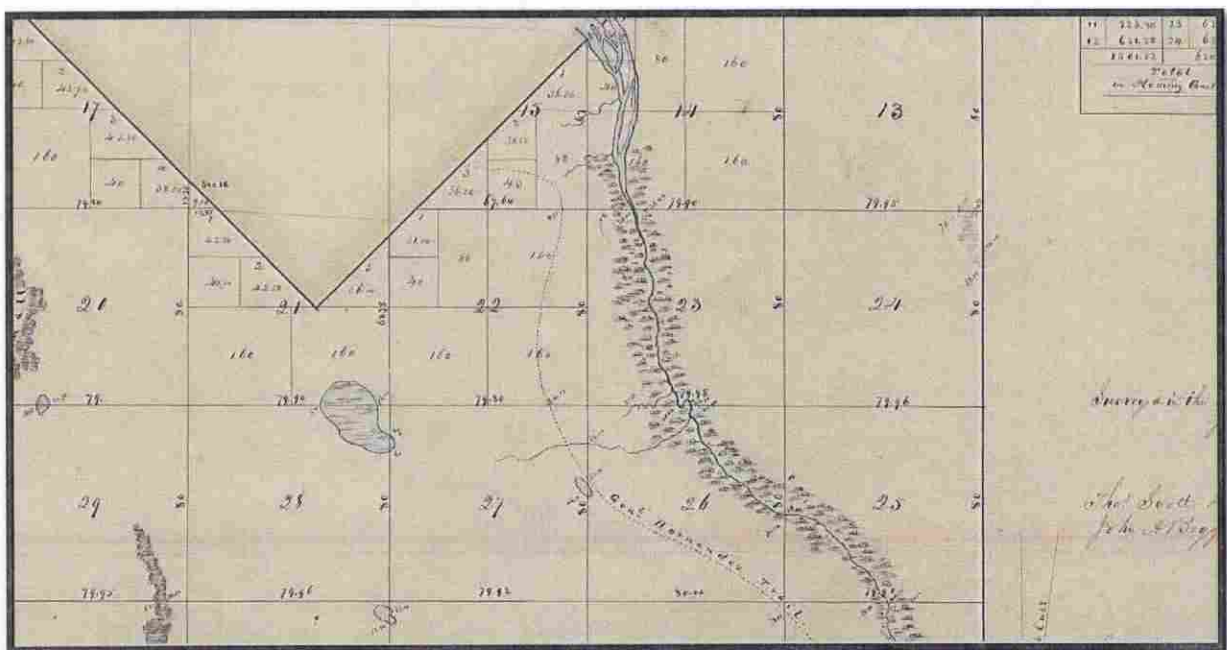


Figure 138. Map from 1845 showing the General Hernandez Trail and land grants in present day vicinity of St. Sebastian River Preserve

Results and Discussion

The archaeological sensitivity model for St. Sebastian River Preserve State Park includes a variety of environmental and cultural variables that account for the presence of sites through time and space and account for the variability of site types known to occur within the park as demonstrated through previous surveys in and within the regional vicinity to the preserve such as soils, elevation, adjacency to hydrologic features, and known historic land grant and settlement areas. Primary factors for cultural site locations in the park from our matrix evaluation relate to soil drainage characteristics, distance to riverine and permanent stream and water bodies including ponds, lakes and wetlands, relative elevation, presence of travel

corridors, FMSF archaeological resource groups, and high likelihood for historic landuse activities relating to early agriculture and agro-industries. The FMSF data including field notes, survey of the park, and surveys of the adjacent regional areas, were helpful in refining and creating our matrix model. These data, along with historical maps and information, further clarified pertinent features for sensitivity modeling purposes.

Model Performance

Our archaeological resource sensitivity model for the park is shown at a 1:48,000 scale (Figure 139). When this model is verified using the FMSF polygonal site location data, the model captures 15 of the 22 recorded sites, at least partially, in the designated high and medium archaeological sensitivity areas. The model misses portions of some sites primarily due to their polygonal extent recording on the FMSF which may not accurately reflect the true, on-the-ground spatial extents. The recorded sites that completely fall in our low sensitivity areas for archaeological resources are all historic era sites (8BR1780, 8BR1781, 8BR1782, 8BR1824, 8IR992, 8IR993 and 8IR994). These homesteads, farm and agro-industry related sites are primarily missed because they occur in areas with poor soil drainage characteristics and do not have NRHP evaluation criteria or other mitigating factors to score higher in our matrix evaluation.

Expressed as spatial percentages, the high archaeological resource sensitivity area at St. Sebastian River Preserve accounts for approximately 2% of the land surface area (Table 24), but it has 15% of the recorded archaeological spatial extents correlating with this modeled area. Using statistics ($p[MIS]-p[M]=.13$), our model represents a 13% improvement over chance of locating archaeological sites within our designated high sensitivity area (see Kvamme 2006:28). Combining the high and medium sensitivity areas shows that 19% of recorded archaeological spatial extents occur within our sensitivity areas, showing a 17% overall improvement over chance occurrence.

These sensitivity areas can be best refined by conducting a GPS survey specific to this park and in relation to the park-wide archaeological and historical survey previously done (Newman, et al. 2001). Many of the homestead locations are depicted as blocks of known acreage whereas our model looked at discrete site locations. Additionally, all of the sites missed lacked evaluations or had insufficient information to be able to determine NRHP eligibility. Assessment of eligibility might rank these site locations with higher matrix scores and potentially change the sensitivity level assigned in our modeling. Additional data on site significance and other

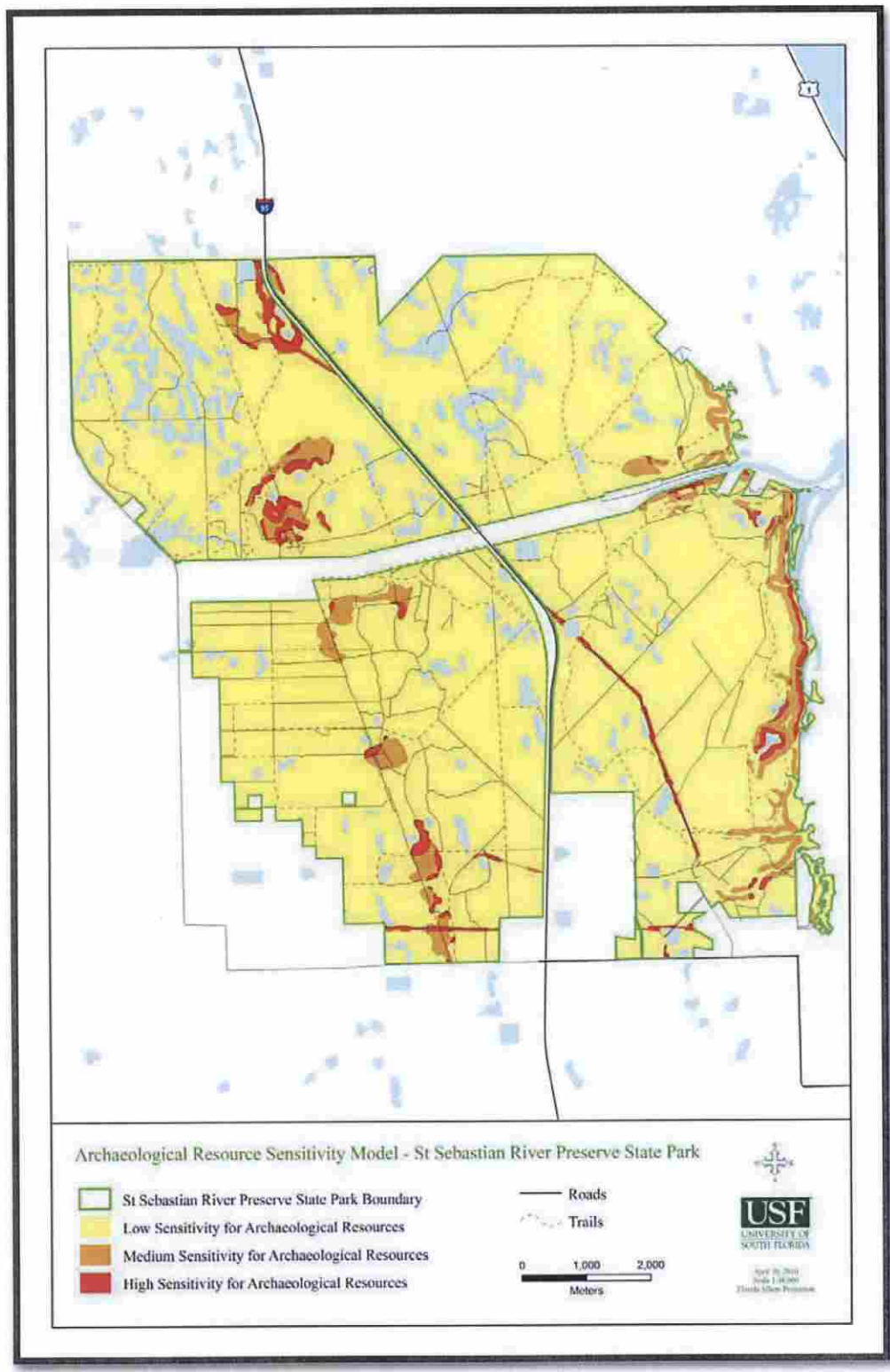


Figure 139. Archaeological Resource Sensitivity Model for St. Sebastian River Preserve State Park

cultural mitigating factors would assist for sites where settlement and use choices were made for reasons other than strictly environmental conditions. Our model also shows areas where currently no recorded archaeological or historical sites are known. These areas can be investigated with a targeted survey to determine if more, as yet unrecorded sites exist.

Table 24. GIS model performance calculations for St. Sebastian River Preserve State Park

St Sebastian River Preserve Sensitivity Model	Acres	Percent		FMSF Acres	Percent
High Sensitivity Area	465.99	2.15%		12.35	14.91%
Medium Sensitivity Area	977.83	4.52%		2.87	3.47%
Low Sensitivity Area	20,180.54	93.33%		67.57	81.62%
Total	21,624.36	100.00%		82.78	100.00%

Silver River State Park

The Silver River State Park is a 4,189.57 acre parcel in Marion County. The park is within the Ocala Uplift and is subdivided into the Anthony Hills in the western part of the park and the Ocklawaha Valley in the eastern portion (Brooks 1981). The park is topographically characterized by relatively flattened uplands sloping to floodplains, and elevations from 75 to 35 feet above mean sea level. The highest elevations are associated with the portion of the northern park border along SR40 and the lowest elevations are found along the north section of the Ocklawaha River in the park (Figure 140). Part of the Ocklawaha River drainage, this river and its grouping of artesian springs, including a first magnitude headspring, are prominent natural features of this area. The spring group flows from several vents, and forms the headwaters of the Silver River, a major tributary of the Ocklawaha (FGS 2002, 2003). The clear, spring fed river runs for approximately five miles through the park and forms the eastern boundary (FDEP 2002). The dominant natural communities in the park are upland hardwood forests that comprised 1926.01 acres and floodplain swamp that makes up another 853.28 of the total acreage. Wet flatwoods are also present, with 334.61 acres (FDEP 2002).

Archaeologically, the Silver River State Park falls within the East and Central Archaeological Region (Milanich 1994). The region around the reserve was occupied for the full sequence of Precolumbian cultural periods, beginning with the Paleoindian, and continuing through the regional culture periods (Milanich and Payne 1993). Seminole occupation in the area is also recorded (Carr and Stelle 1993), as are numerous historic period sites and structures.

Within the present-day boundary of the park, there are 22 recorded archaeological sites (Figure 141). These sites include mounds, middens, burial mounds, military sites, prehistoric campsites,

building remains and historic refuse sites, prehistoric artifact scatters, lithic scatters and historic roads. The temporal range of these sites spans from the Orange and Late Archaic to the 20th century. One recorded site (8MR1081) is listed with the FMSF as having human remains, and is shown with only a large general vicinity spatial location. The site location for 8MR1081 was provided by an informant and was not visited as part of the survey in which it was recorded (ACI 1987). Six sites were found to be eligible or potentially eligible for the NRHP or were recommended for more work as per the survey and/or SHPO evaluation. Site 8MR1920, a multi-component dense artifact scatter was found to be eligible for the NRHP. Site 8MR1878, also a multi-component artifact scatter, was found to be potentially eligible for the NRHP as per the SHPO evaluation. Site 8MR1922 contains building remains from the 19th and 20th century as well as a prehistoric component and was found to likely be eligible for the NRHP by the survey evaluation. The site is thought to be associated with the Lewis Ballard land grant of 1843 (Baker 1988:16). Site 8MR1920, the Oak Hammock site, was found to contain a dense scatter of lithic and ceramic artifacts from multiple temporal periods early and late including Orange wares and with Alachua cob marked wares (Baker 1988:8). The three sites recommended for more work were all relational to an informant who provided site locations and information concerning archaeological sites in the region. The Franklin sites (F65, F67 and F93) are 8MR1081, 8MR1083 and 8MR1084 respectively. All of these locations and information should be further verified as to spatial location and site type and affiliation. The sites were recorded as part of an early predictive modeling project in Marion County (ACI 1987). Sites 8MR 1081 and 8MR1083 are listed as prehistoric burial mound and midden site. These site locations are both listed as general vicinity and their plots on the FMSF GIS data layer are large and ambiguously defined. The 8MR1084 site is listed as a historic fort location based on the local informant information and the collection of limited historic period artifacts from the surface (ACI 1987).

Other surveys within or adjacent to the park have provided for an understanding for the site types, locations and temporal affiliations and diversity that exist in the Silver River State Park. Surveys have been conducted at the Silver River State Park for park infrastructure development, monitoring, and research efforts (Baker 1988; Carton 2002; Cockrell 2003b; Newman and Vojinovski 2002a, b; Triel 2004; Wisenbaker 1997, 1999, 2000), and for development, research, and documentation involving larger regional or adjacent land parcels including the Silver Springs River and headsprings areas (Boyer 2006; Dickinson et al. 2005; Faught and Thulman 2009; Hemmings 1975; Janus 2001; Neill 1958). Additionally, two pre or non-GIS predictive models were conducted for archaeological resources in Marion County (ACI 1987, 2005; Jones 1981), and a survey of the Ocklawaha riverine corridor inclusive of the park property was conducted through a Division of Historical Resources grant (Denson 1992). Early archaeological work at the Springs also included excavations by C.B. Moore in 1895 and work by John Goggin in 1952, among others.

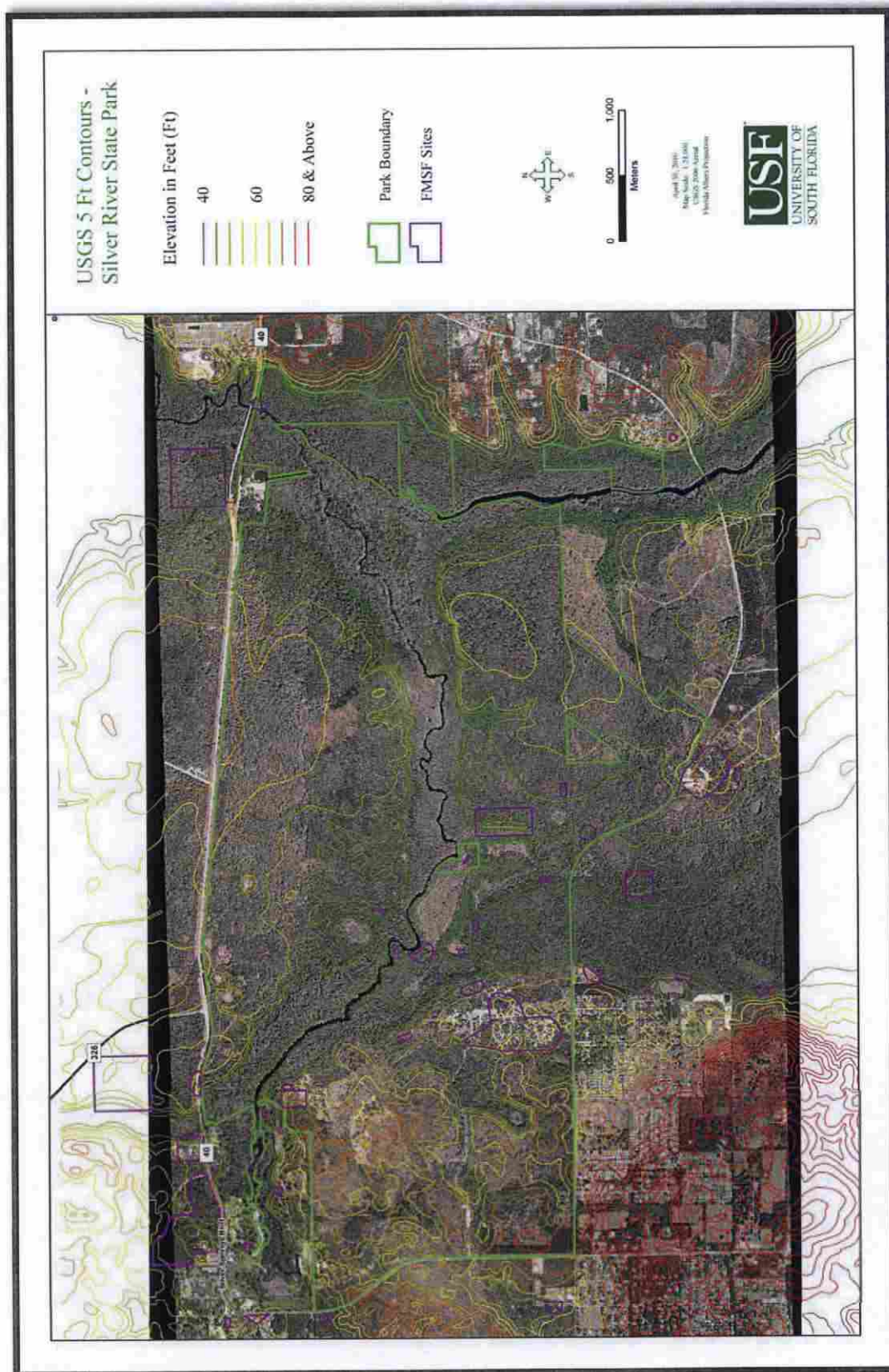


Figure 140. Five foot elevation contour map for Silver River State Park area

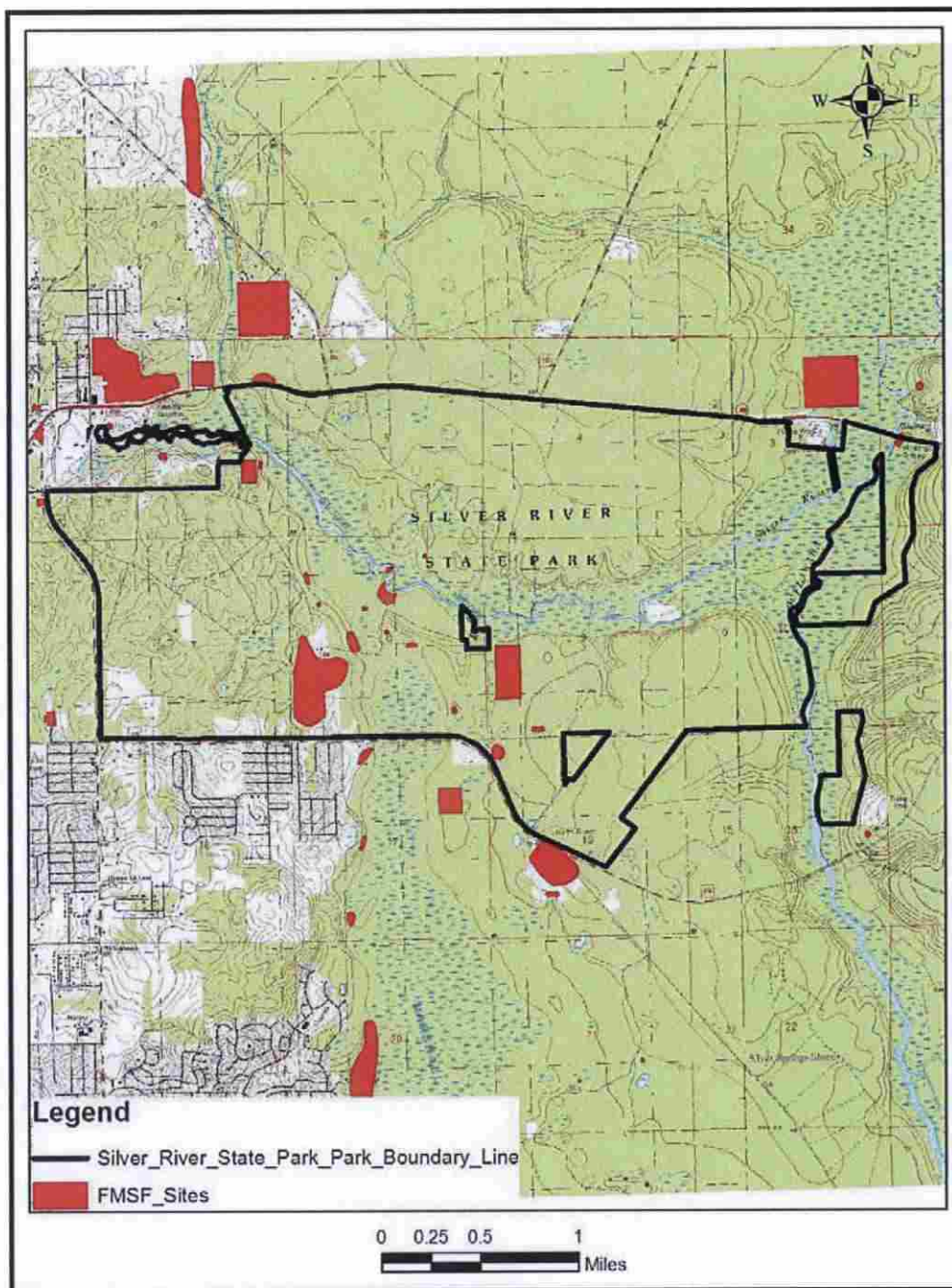


Figure 141. Florida Master Site File data show 22 recorded archaeological sites within the Silver River State Park under Management Control (five others within attraction area)

Our GPS and reconnaissance work at the Silver River State Park included the bounding and location of several recorded sites and features, and taking of spatial control points and line data along trails for use in georeferencing (Figure 142). The FMSF location for the 8MR1920 Oak Hammock site was confirmed with GPS. We also relocated and corrected the plot location for the 8MR1878 Cactus Flower site, which is a site along the northern park fence line that extends into the park as well as across the State Road 40 adjacent to the park. We were unable to relocate the F65 site (8MR1081) that is listed as a general vicinity burial mound. This site location comes through informant description (ACI 1987), and has not been archaeologically verified. We were however, able to locate in the same vicinity as this reported area, an animal bone yard where 'mounds' contain remains not of humans, but of exotic wildlife from the Silver Springs Attraction. This area of disposal is within 200 meters of where the burial mound was reported, and it is possible that there is confusion with this locale. Survey, including GPS and field testing is recommended to further clarify. Our GPS work also clarified a position for 8MR532, the Silver River 2 site. The GPS position for this midden site is actually 100 meters to the north of the FMSF plot. Additionally, the location of the Marshall Plantation building remains (8MR3214) was confirmed with the sub-meter GPS. The general vicinity site 8MR1083, a midden site, recorded through a local informant, was confirmed. The large general vicinity extent as listed on the FMSF for 8MR1083 is not the likely boundary for this location, but we were unable to fully map the site due to high water and inaccessibility.

Use of historic maps for documentation of travel corridors, trails, and historic homesteads showed areas of possible cultural sensitivity in this park. Using the General Land Office Surveys from 1844 for Township 23E, Range 15 South, Section 8 was found to correlate with the present-day park boundary. The eastern half of the section is described as hammock, and the southern half contains the continuation of the road from Section 7. The Northeast quadrant is related to permit 276, owned by Lewis Ballard. In accordance with the Armed Occupation Act of 1842, Lewis Ballard was granted a permit to settle in this area (FDEP 2002), and along with a homestead of Param Moody in Section 17, show as early homestead locations are with fields and structures that appear to be a residences (Figures 143 and 144).

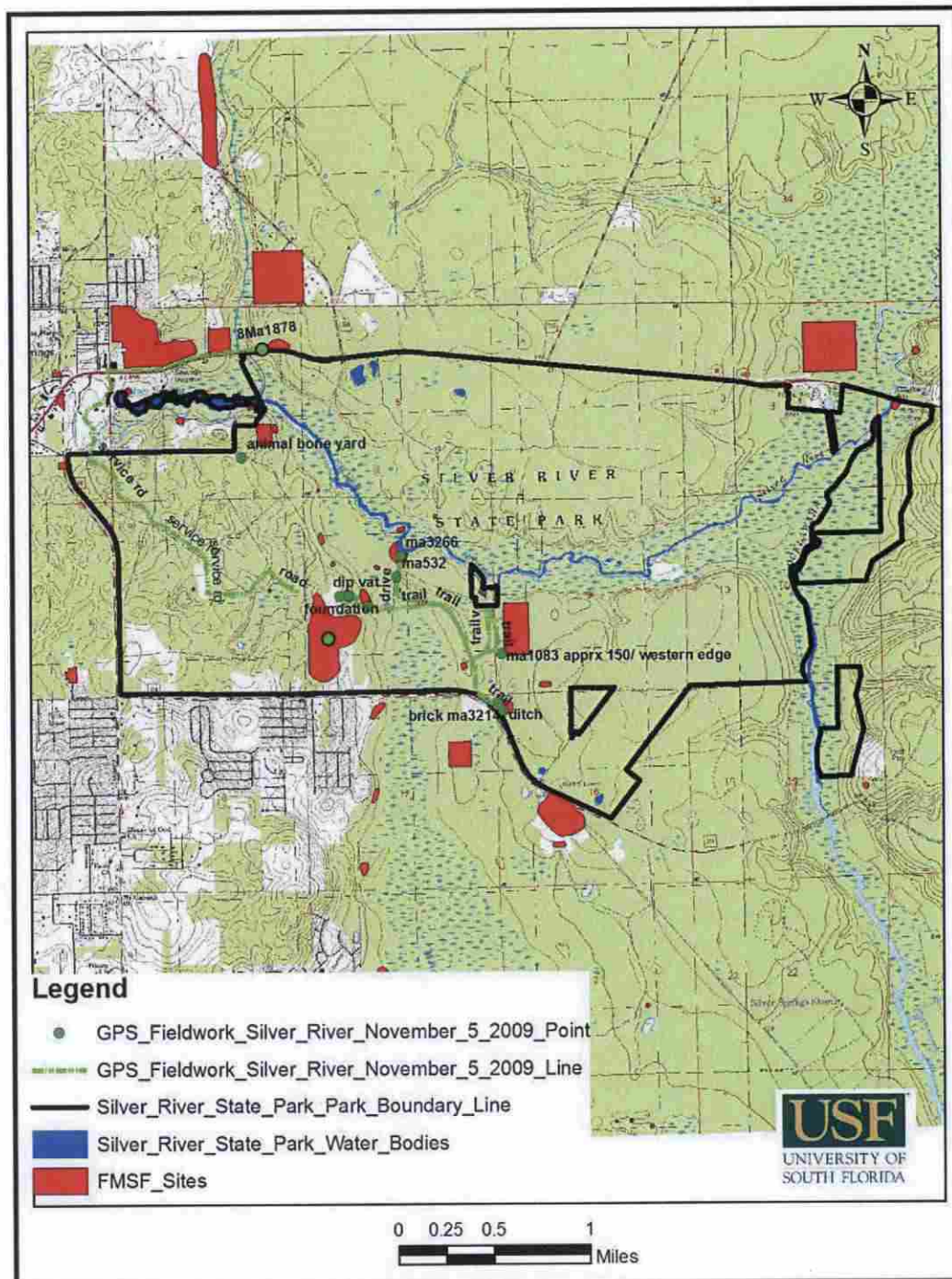


Figure 142. GPS survey data collected at Silver River State Park along with the FMSF existing archaeological data

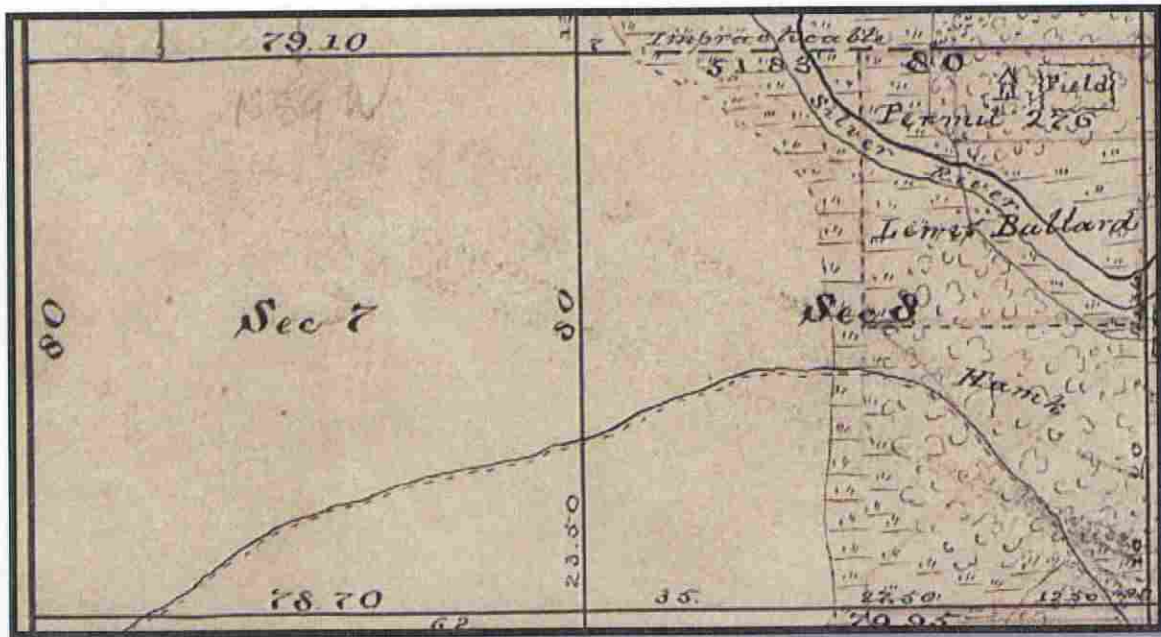


Figure 143. 1844 GLO map showing a portion of the Lewis Ballard land grant and a nearby road

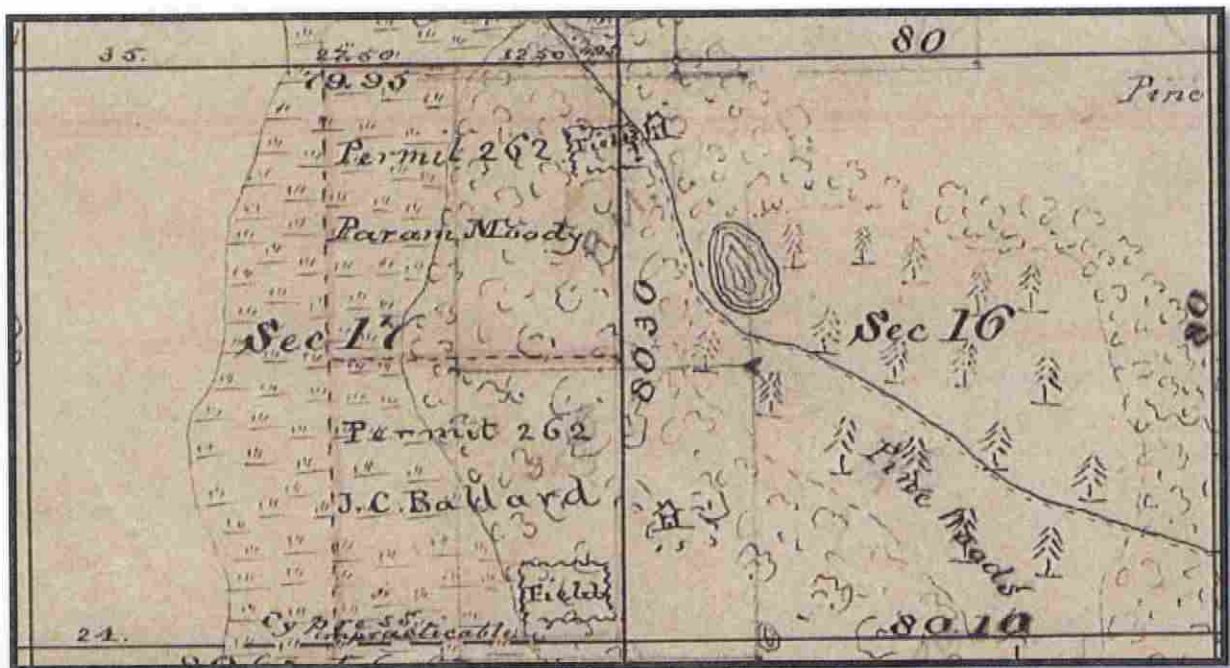


Figure 144. 1844 GLO map showing a portion of the J.C. Ballard land grant and the Param Moody homestead

Results and Discussion

The archaeological sensitivity model for Silver River State Park includes a variety of environmental and cultural variables that account for the presence of sites through time and space and account for the variability of site types known to occur within the park as demonstrated through previous surveys in and within the regional vicinity to the preserve. Primary factors for cultural site locations in the park relate to soil drainage characteristics, distance to water, and relative elevation. The presence of unique environmental setting characteristics, such as the spring and spring run, the adjacency to associated water features and elevated areas, are all contributory to cultural settlement. At Silver River State park, the environmental and cultural matrix items used in the model analysis included: distance to river or intermittent stream, distance to lake or pond, distance to wetlands, existing or relic spring, relative elevation, soil drainage characteristics, recorded sites with human remains, high likelihood of containing significant sites based on recorded or archival data or oral tradition (survey evals from FMSF = likely, potentially or eligible for the NRHP High likelihood of historic sites or (noted on FMSF or other informant data, and high likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries), travel corridors, special environmental or natural area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types), and high likelihood for historic site locations. GPS data collected with sub-meter instrumentation was useful in verifying control points on the ground, and comparing the data collected against known site spatial locations as listed in the FMSF. These data, along with historical maps and information further clarified pertinent features for sensitivity modeling purposes. LiDAR data is not available for this park, and so 5-ft. contour elevation data was used.

Model Performance

Our archaeological resource sensitivity model for the park is shown at a 1:24,000 scale (Figure 145). When this model is verified using the FMSF polygonal site location data, the model captures 16 out of 22 recorded sites at least partially, in the designated high and medium sensitivity areas. The model misses sites primarily due to their polygonal extent recording on the FMSF showing large and vaguely defined spatial extents, especially relating to the sites plotted as general vicinity. Expressed as spatial percentages, the high archaeological resource sensitivity area at Silver River accounts for less than 8% of the land surface area (Table 25), but has over 27% of the recorded archaeological spatial extents correlating with these modeled areas. Using statistics ($p[MIS]-p[M]=.20$), our model represents a 20% improvement over chance of locating archaeological sites within our designated high probability area (see Kvamme 2006:28). Combining the high and medium sensitivity areas shows that 65% of recorded archaeological spatial extents occur within our sensitivity areas, showing a 40% overall

improvement over chance. These sensitivity areas can be best refined by conducting a Phase 1 archaeological field survey that combines field verification with use of the model and direct remote sensing observations using high resolution aeriels. Additionally, the model should be updated when LiDAR data becomes available for this area. LiDAR will greatly assist in verifying locations and plotting linear and elevated features. Spatial locations of sites listed within the FMSF can be further verified to offer even more improvement. Sites that are listed as general vicinity or listed as needing more work to determine NRHP evaluations should be examined for accuracy of temporal affiliations, site types and locations.

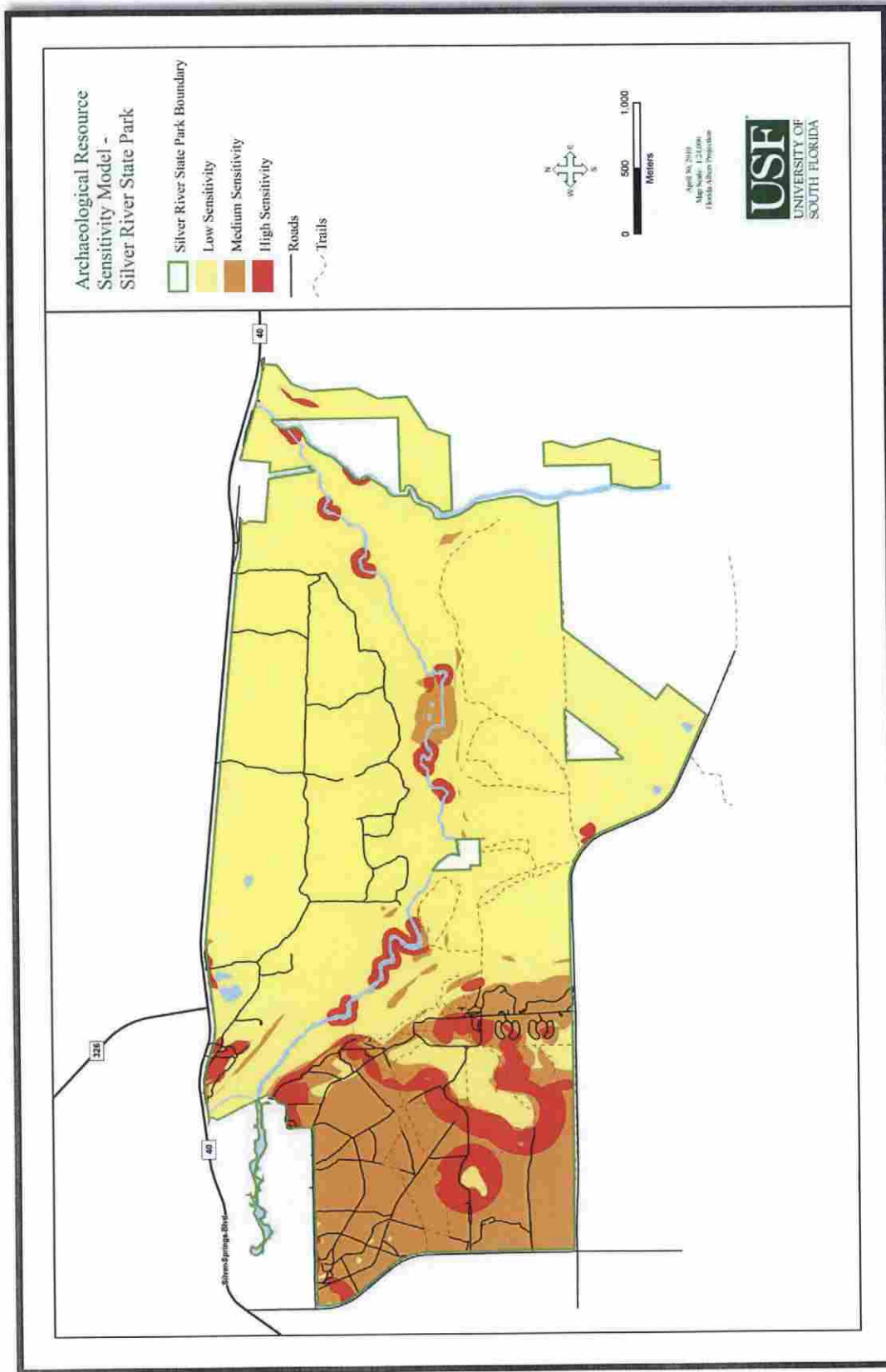


Figure 145. Map showing the archaeological resource sensitivity model developed for Silver River State Park

Table 25. GIS model performance calculations for Silver River State Park

Silver River Sensitivity Model	Acres	Percent		FMSF Acres	Percent
High Sensitivity Area	315.76	7.54%		25.36	27.15%
Medium Sensitivity Area	744.55	17.77%		35.71	38.23%
Low Sensitivity Area	3,129.26	74.69%		32.33	34.62%
Total	4,189.57	100.00%		93.40	100.00%

Tomoka State Park

The Tomoka River State park is a 1,497.52 acre parcel located in the City of Ormond Beach in Volusia County, and is one of the oldest parks in the Florida state park system with an acquisition date of 1946. The park is comprised of a long peninsula sand ridge that separates the Halifax River coastal lagoon from the Tomoka River floodplain (FDEP 2003a). High elevations in and adjacent to the park, range from 10 to 18 feet above mean sea level, with low areas in the flatwood and tidal floodplains ranging less than 3 ft. amsl (Figure 146). Historic land alteration in the area is considerable, with dredge and fill activities occurring on the Halifax River in the 1950s and 1960s. Manipulation of land and water resources in the area extends back to early agro-industries and plantation-era activities, with canals, ditches, dykes, and changes to the natural communities evident through time. The primary natural community at Tomoka State Park is the estuarine tidal marsh classification, comprising 464.87 acres. Present-day flatwood communities have arisen in part from land use and fire history at the park (FDEP 2003a). Historic aerials are useful for showing these changes in community and habitat types, and for examining land use activities from a historical perspective. Unique vegetative signatures have evolved on the shell mound structures in the park, supporting a tropical and temperate mix of unique plant species, some of which are identifiable through use of high resolution aerial imagery and Land Cover GIS data layers that delineate tropical vegetation. The park is located within the Atlantic Coastal Lowlands primary physiographic zone, with two major landforms of the Atlantic Coastal Ridge and the Silver Bluff Terrace (Brooks 1981; Myers and Ewel 1990; White 1970).

Tomoka State Park has a diversity of cultural features. The Florida Master Site File shows 11 recorded archaeological sites and two resource groups, and a National Register of Historic Places designated area within the present-day boundary of the park (Figures 147 and 148). These sites include several site types, shell mounds and middens, burial mounds, prehistoric

campsites, habitation sites procurement sites and artifact scatters, and historic refuse dumps, historic burial locations, historic earthworks and structures, and a historic town. There are also significant land grants and plantation-era features within the park. The temporal ranges for recorded sites as listed in the FMSF includes the prehistoric Orange period, Late Archaic, St. Johns I and II, British (1763-1783), and American (1821-present). The region including Tomoka State Park is culturally defined as the East Central region of Florida (Milanich 1994), with site types and temporal affiliations similarly represented in the park area. Three sites (8VO81, 8VO82 and 8VO640) are eligible or listed as preservation recommended according to the surveyor and SHPO recommendations for NRHP evaluations, and two of those sites (8VO81 and 8VO82) contain human remains. Additionally, the Nocoroco site (8VO82) is shown as a National Register District area, with multi-components representing the full range of occupational history of the park, and overlapping the Mount Oswald Plantation special resource group (8VO4310) area, with British and American temporal affiliations. The Mount Oswald district consists of a residential settlement with various support structures and agricultural fields and associated features (Piatek 1992). The Mount Oswald Plantation is depicted on a number of historic maps that are useful for delineating features within the defined district, including agricultural field areas (Figures 149-151).

Archaeological work and interest in the Tomoka State Park area was first discussed in publications in the 1880s when Andrew E. Douglas excavated in mounds located in the southwest section of the park (Douglas 1882). John W. Griffin and Hale G. Smith conducted work at the park in 1946, when Griffin was the staff archaeologist for the Florida State Park Service (Griffin and Smith 1946; Piatek 1992, 1995). Griffin would continue investigating archaeological resources in the park, including the Nocoroco site (Griffin 1949). Modern archaeological work within and in proximity to the park has included a look at seasonality and settlement pattern issues (Russo and StClair 1990), and two surveys conducted for overviews of park resources (Piatek 1992, 1995). In 1997, Ted Payne excavated part of the Nocoroco, Mount Oswald, and investigated the 1803 land grant area of the Perpal Plantation (in the same general vicinity of the Mount Oswald plantation), (FDEP 2003a). A CRM survey was also conducted for the SR5-US1 bridge replacement project on the southwest border section of the park (Janus 1998).

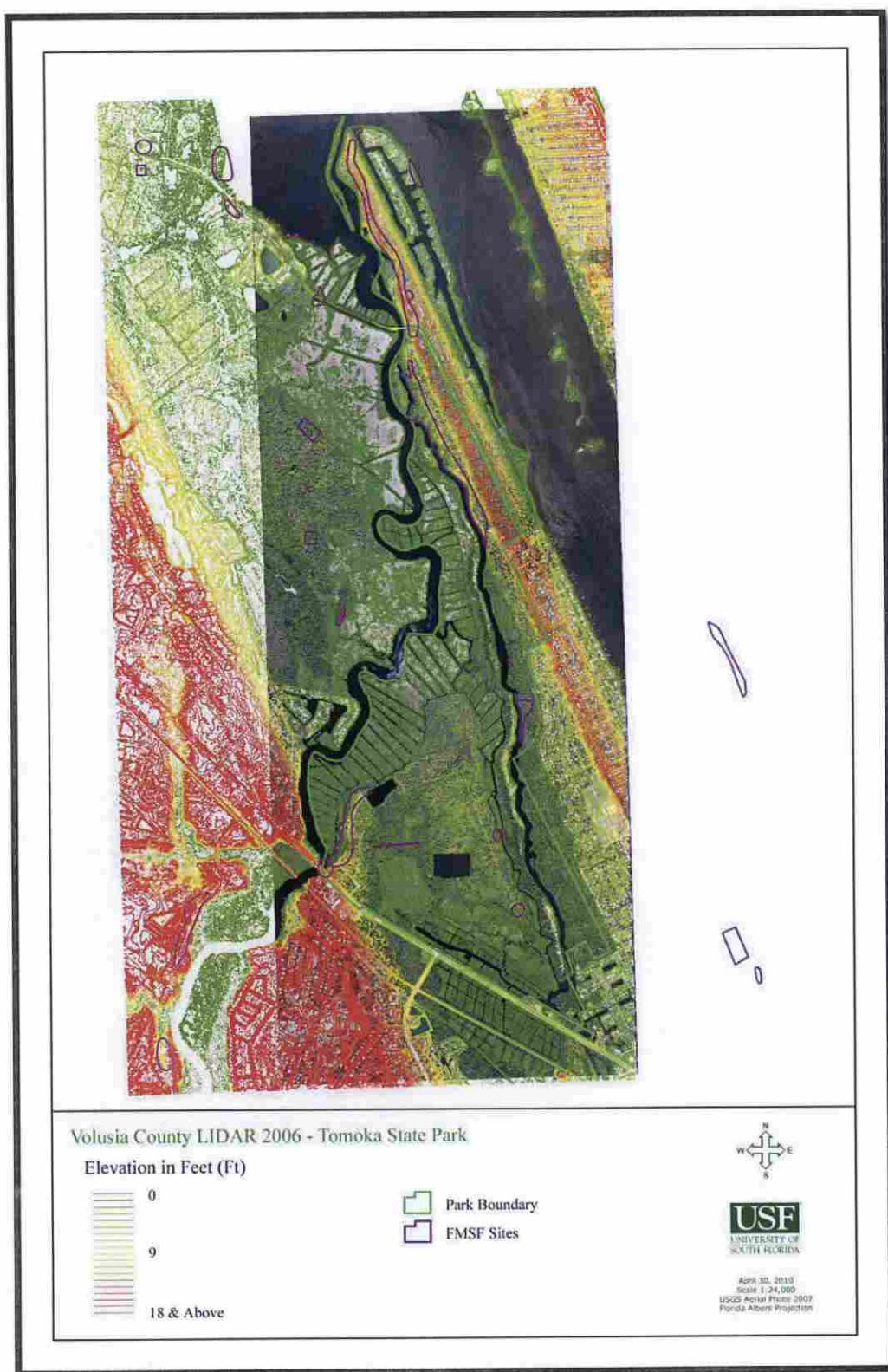


Figure 146. LiDAR data for the Tomoka State Park area

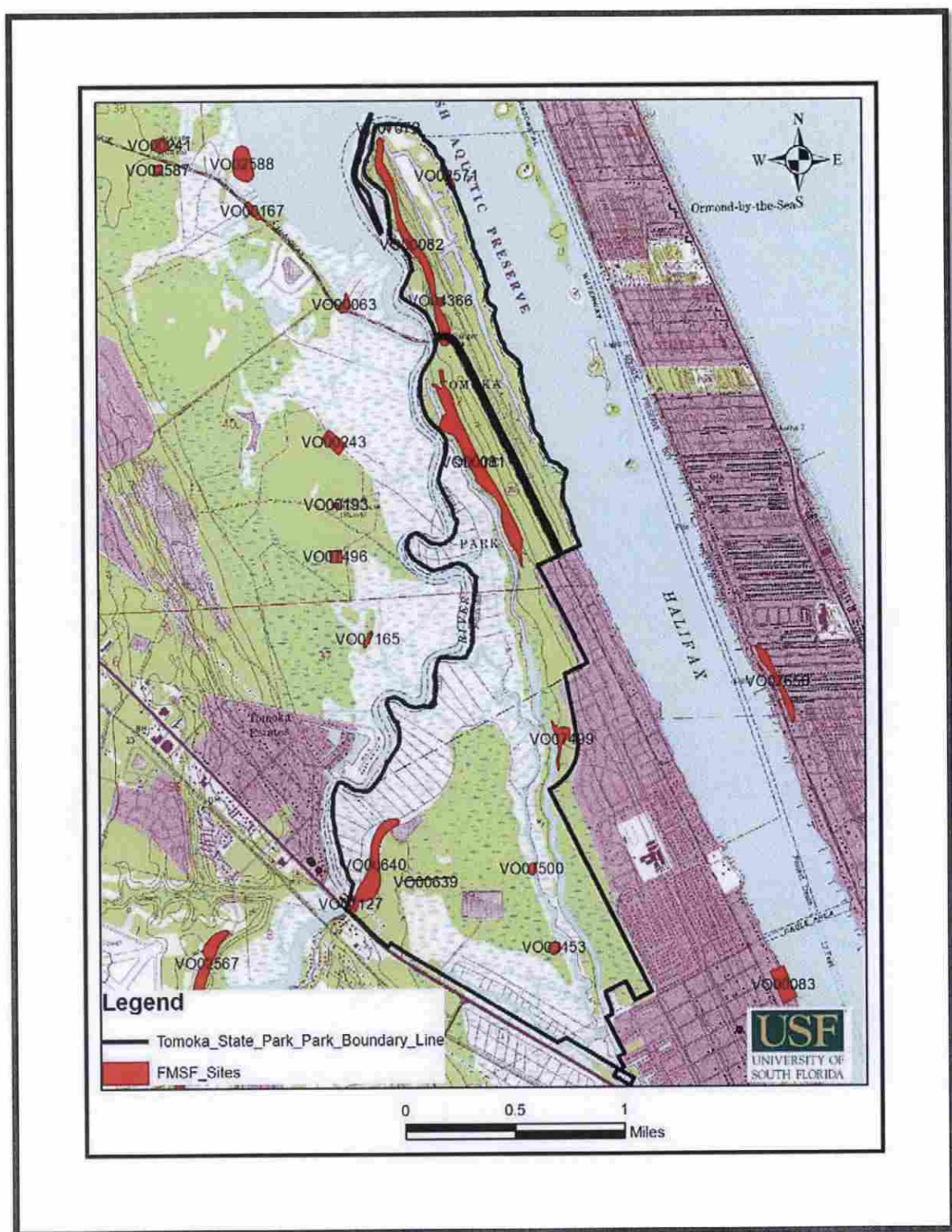


Figure 147. Florida Master Site File data showing archaeological sites within the Tomoka State Park area

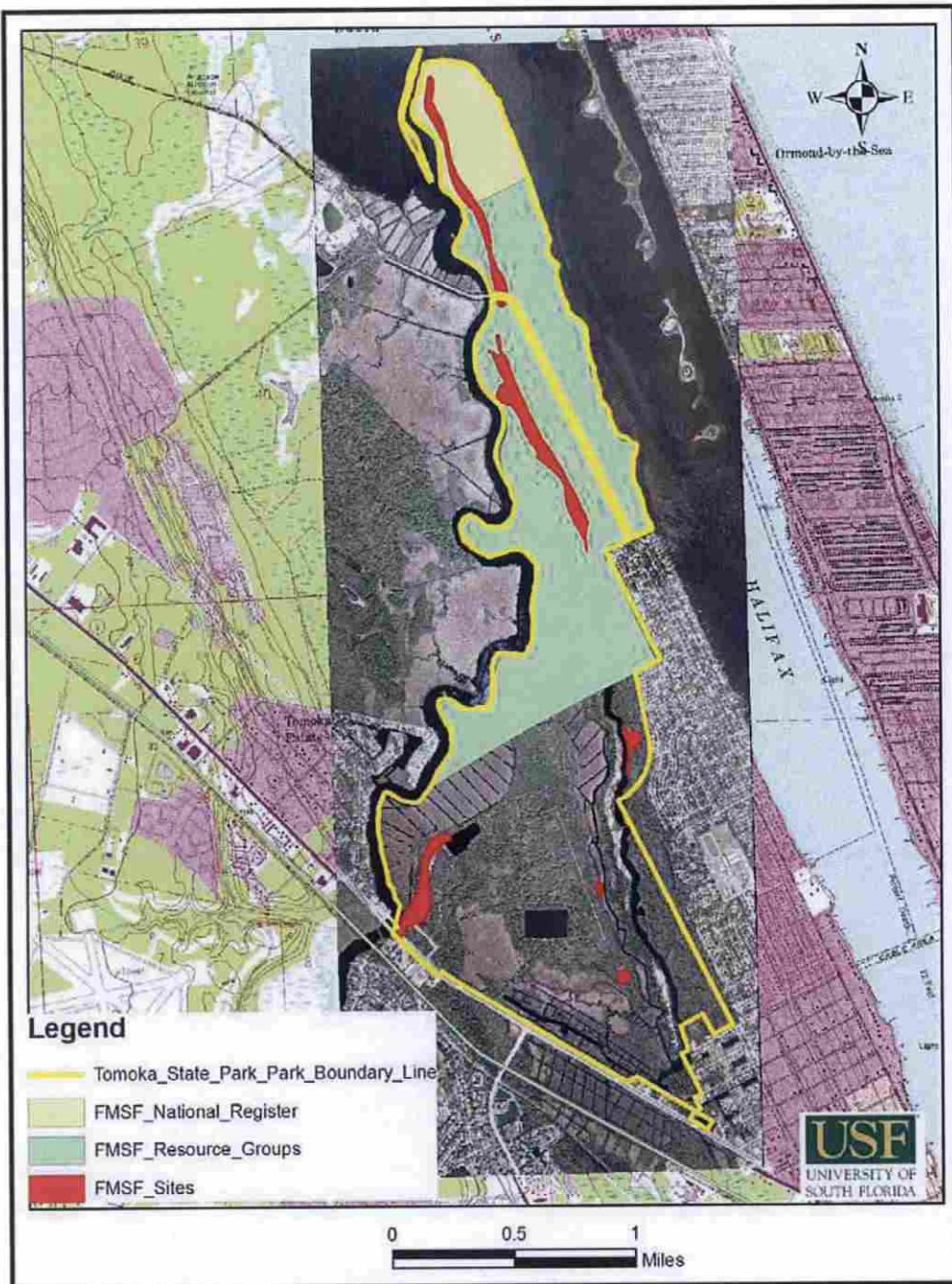


Figure 148. Florida Master Site File data showing archaeological sites, National Register locations and special Resource Groups within the Tomoka State Park

Because Tomoka State Park is jointly managed as a multi-unit park along with Bulow Creek State Park, Addison Blockhouse, and Bulow Historic Ruins State Park, archaeological, historical and architectural surveys that have taken place in these areas also contain useful information for all the parks. Surveys and inquiry at the Bulow Creek State Park include Phase I archaeological survey that was conducted by the FDHR in 1980 for a proposed development (Daniel 1980), and included the recording of a number of new prehistoric site locations. In 1995 and 1996 surveys focused on the various periods of plantation-era extant structures, features and building remains (Payne 1996; Payne 1998a, b; Payne 1999; Payne 2001). There are also a number of articles and reports with valuable information on the history and archaeological background for parks within this multi-unit area (Baker 1999; Gluckman 1967; Newman 2005b; Stanton 1949; Strickland 1980; Wilson 1945), and prehistoric landscape predictability factors that have been examined for the region (Austin 1989).

In 2008, the University of South Florida's AIST became involved in the documentation of the iconic Tomokie Statue at Tomoka State Park (Collins and Doering 2008) (Figure 152).

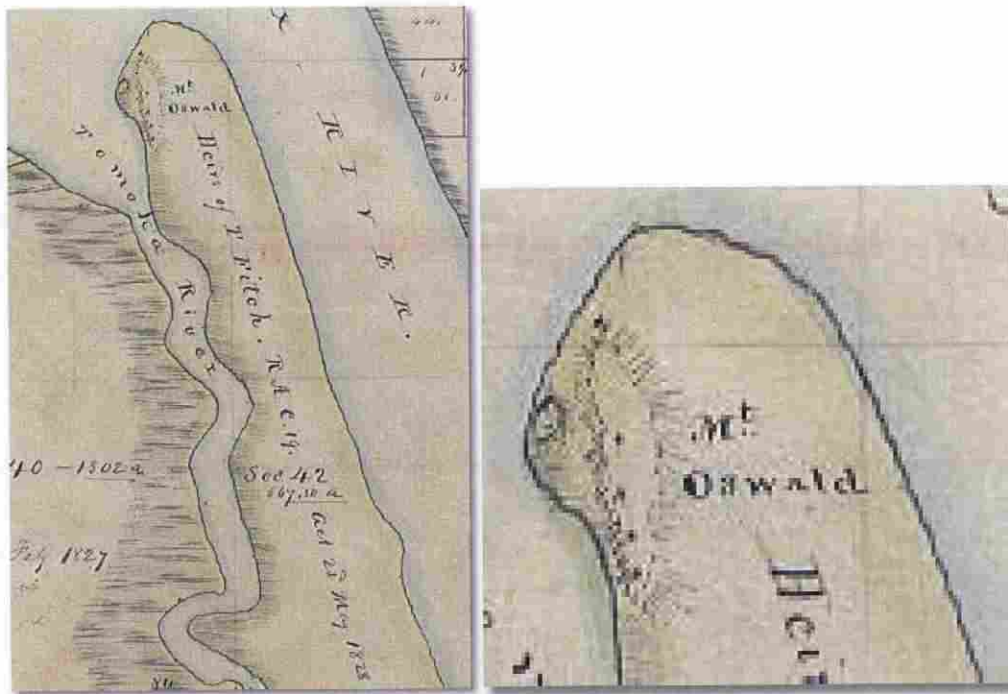


Figure 149. Historic maps of T13R32S42 showing Mount Oswald – This map depicts Section 42, which is largely park property. Section 42 is a Spanish Land Grant given to the Heirs of T. (Thomas) Fitch in May 1828. This parcel contains 567.5 acres. It is a peninsula, bounded on the west by the Tomoka River and on the east by the Halifax River. At the northernmost tip of the peninsula is a feature named “Mount Oswald.”

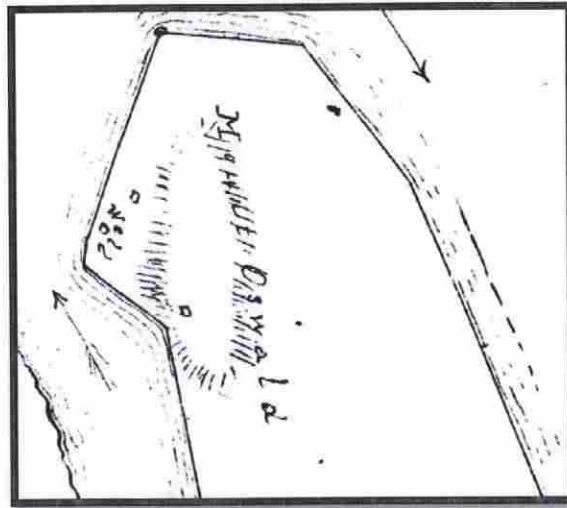


Figure 150. Historic map of T13R32S42 showing Mt. Oswald well and possible structures. This map is of the same section showing Mount Oswald at the northernmost tip. It also shows a circular feature labeled "Well." This image contains two square features, which could be structures.

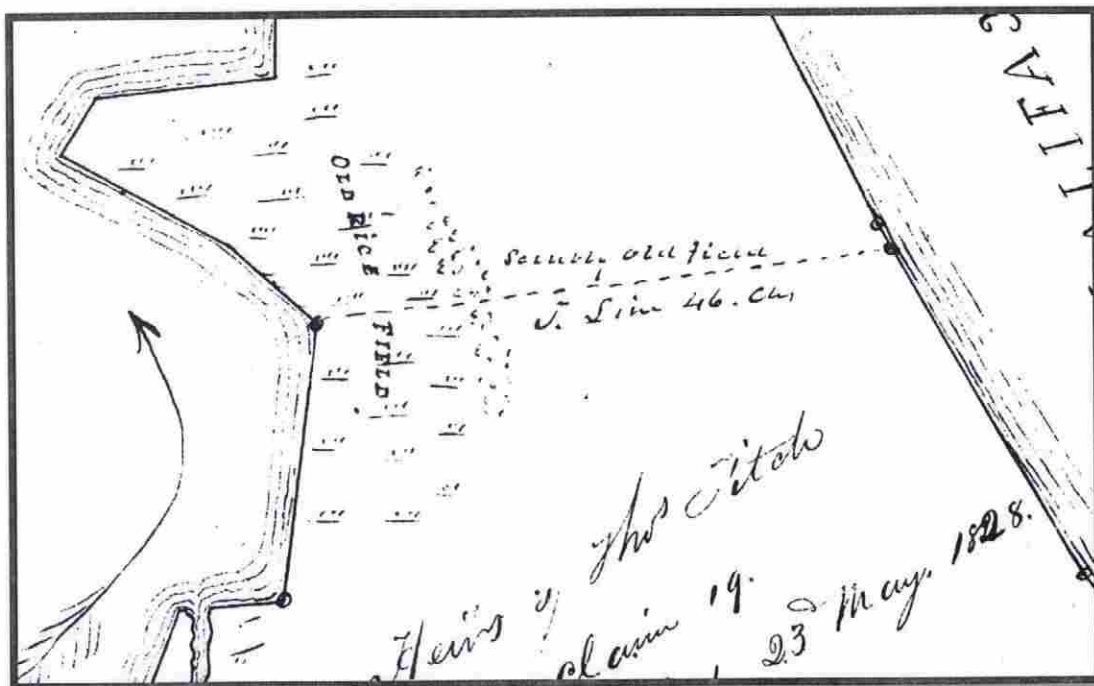


Figure 151. Historic map of T13R32S42 with notation of "Old Rice Fields", in the southern portion of this section

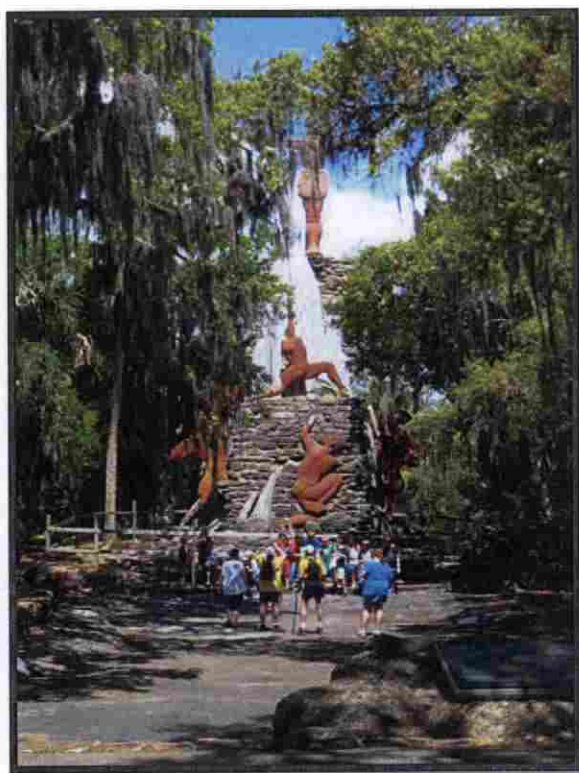


Figure 152. The 60-foot tall Tomoki Statue at Tomoka State Park

The outdoor statue was a project for the State of Florida in 1955 by the artist Fred Dana Marsh. Marsh was an artist who was experimenting with new forms of outdoor large-format artwork for Florida Parks, and used lightweight rock-like synthetic materials rather than more expensive natural rock, to create carved surfaces and depict large scale scenes. The statue, referred to as the Legend of Tomoki Statue or “Chief Tomokie” and its water reflection pond feature that was added the following year, were dedicated to the State in a 1957 ceremony. The statue measured over 60 feet in height and included a natural rock backdrop and water feature. A total of eight individuals are depicted in the scene, which is meant to showcase the legend of Timucua Indian Chief Tomokie, and the ‘beautiful enemy maiden Oleeta.’ The legend states that Tomokie drank from a sacred spring using a revered golden cup and caused an uprising against his action in which he, his group, and Oleeta were all killed (Boyd n.d.). The statue is on an area associated with the National Register of Historic Places register site of Nocoroco, a Timucuan village site along the Tomoka River and within the Tomoka State Park (Collins and Doering 2008). The statue was documented using 3D Terrestrial Laser Scanning and the archival modeling conducted are useful for management planning activities and feasibility studies (Figure 153).



Figure 153. Point cloud derived from the 3D Terrestrial Laser Scan Survey of Tomoki Statue showing as-built detail and measurements

Our site visit to Tomoka State Park and GPS work in the area is combined for our modeling of the parks in this multi-unit managed area. Because of the joint management planning for this GeoPark, consideration for the landscape is important. We have additionally added a number of new GPS positions for features and remains primarily associated with the plantation-era and agro-industrial use of the area, including building remains, historic refuse locales, trails and travel corridors, and historic dumps, and on the Tomoka State Park parcel we visited and collected spatial data for the Nocoroco, Oswald, and Perpal sites, the 8VO81 mound and midden complex, and an unrecorded canal feature (Figure 154).

Results and Discussion

The archaeological sensitivity model development for Tomoka State Park included factors that took in a variety of environmental and cultural variables that account for the presence of sites through time and space and account for the variability of site types known to occur within the park as demonstrated through previous surveys and recorded archaeological sites as listed on the FMSF. A primary factor for cultural site locations in this park included the plantation-era historic landscape locations, and the long, linear mound and midden complexes including the National Register site of Nocoroco (8VO82). Data layers utilized include aerial LiDAR, aerial imagery, historical maps and references, and environmental layers such as the National

Wetlands Inventory, Volusia County hydrology, and SSURGO soil information. The GPS field truthing and ground control points were useful. The FMSF data was used in the model, and assisted with the matrix evaluation in terms of sites that were eligible or likely eligible for the NRHP, contained human remains, or were representative of an area of site density or significance. Other factors used in the sensitivity model development included distance to rivers and permanent streams, distance to intermittent streams, ponds or lakes, distance to wetlands, relative elevation, presence of lake cove, peninsula, or head of bay, and soil drainage characteristics.

Model Performance

Our archaeological sensitivity model for Tomoka State Park is shown at 1:24,000 scale (Figure 155). When this model is verified using the FMSF polygonal site location data and corrections to the FMSF based on our GPS field reconnaissance and documentation, the model captures 8 out of 11 recorded sites at least partially in the designated high and medium sensitivity areas, as well as the one of two resource groups and the National Register designated area. Recorded sites that were not in the high and medium sensitivity area were located in areas with poor drainage, were listed with the site file as general vicinity (8VO639), or were potentially plotted incorrectly. One site, the Burns Midden (8VO7499) is plotted as being partially submerged and in a poor soil condition area and has no evaluation as to the NRHP eligibility. The John's Island Still site, 8VO3453, is plotted as a large circular location in the FMSF GIS data layer, but is described as a historic refuse, historic still locale that is likely much smaller in polygonal extent. These problems with the accuracy of site boundaries also show up with several sites occurring in more than one sensitivity zone. Expressed as spatial percentages, the high archaeological resource sensitivity area at Tomoka State Park only accounts for approximately 20% of the land surface area (Table 26), however, more than 63% of the recorded archaeological spatial extents are found to correlate with these modeled areas, representing a 43% improvement over chance of locating archaeological sites within our designated high sensitivity area (see Kvamme 2006:28). Other sites also partially fall in medium and low sensitivity areas, due to their polygonal extents (some of which are not thoroughly verified spatially). When the high and medium sensitivity areas are taken together, this represents 33% of the park acreage with 76.5% of the recorded archaeological site polygonal extents. Our model performance for high and medium sensitivity areas offers a 43.5% improvement over chance of containing archaeological resources.

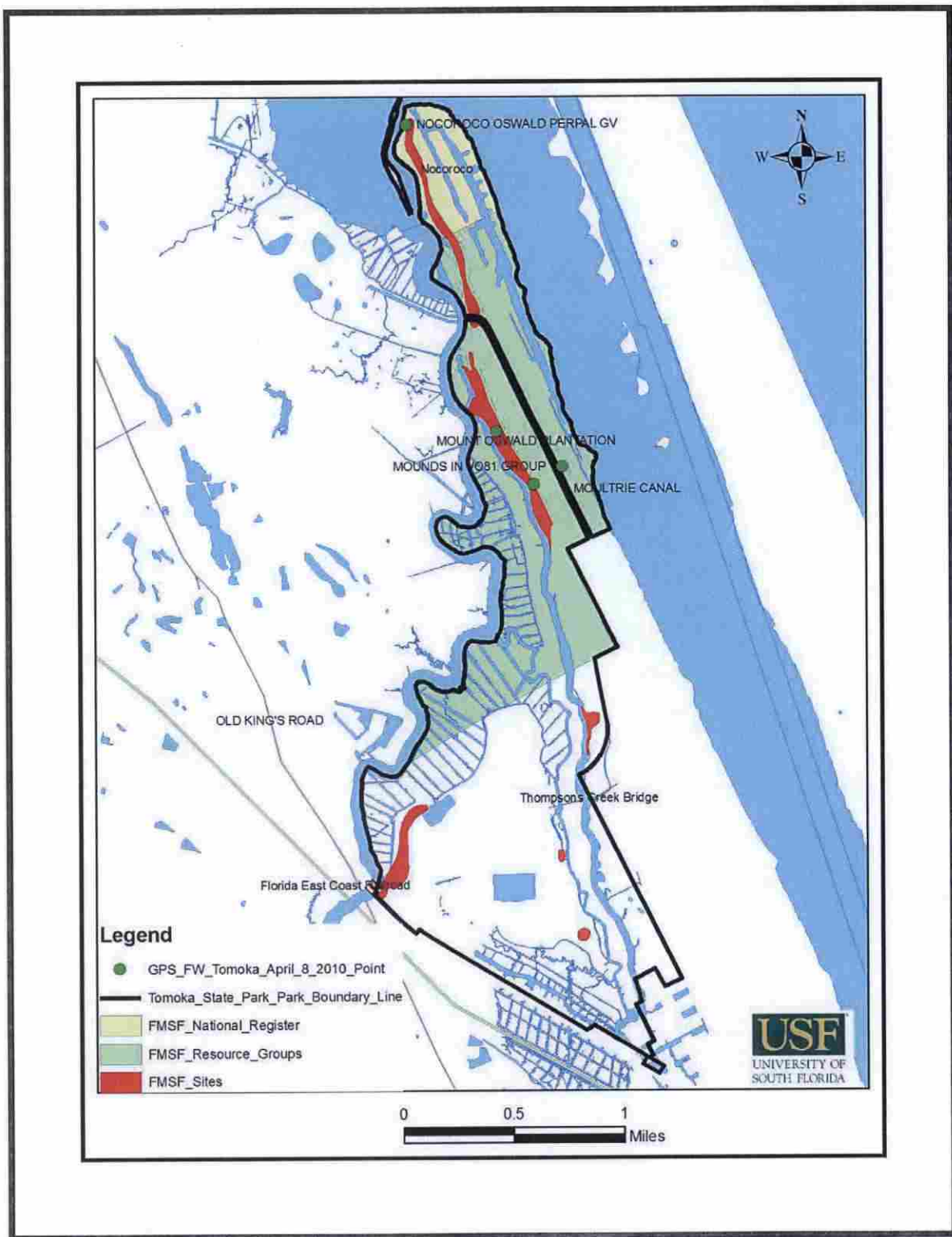


Figure 154. GPS survey data collected at Tomoka State Park showing site locations along with FMSF data, National Register designated areas and special Resource Groups.

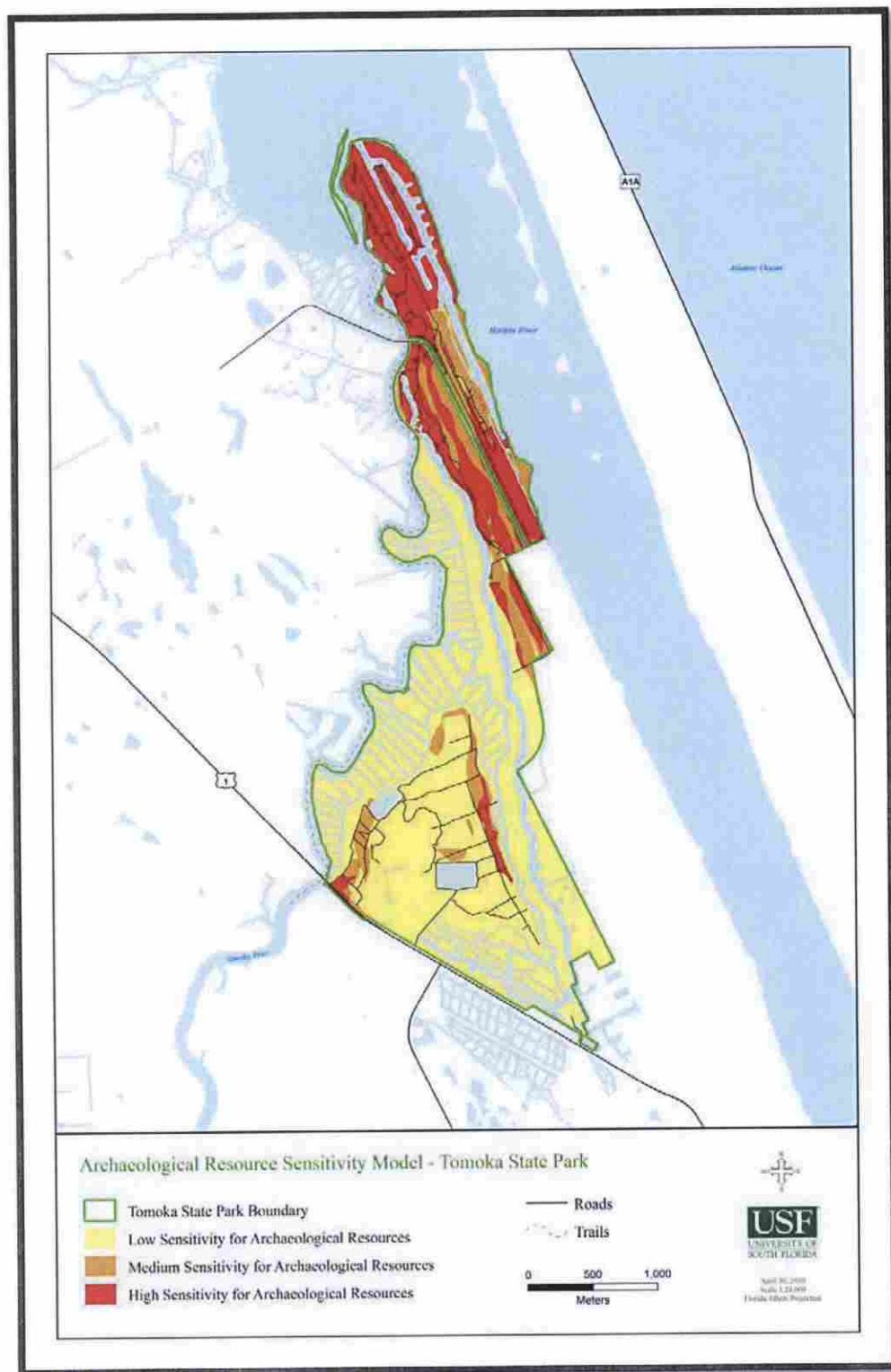


Figure 155. Map showing the archaeological resource sensitivity model developed for Tomoka State Park

Table 26. GIS model performance calculations for Tomoka State Park

Tomoka Sensitivity Model	Acres	Percent		FMSF Acres	Percent
High Sensitivity Area	296.09	19.77%		46.81	63.48%
Medium Sensitivity Area	193.58	12.93%		9.46	12.83%
Low Sensitivity Area	1,007.86	67.30%		17.47	23.69%
Total	1,497.52	100.00%		73.74	100.00%

Washington Oaks Gardens State Park

The Washington Oaks Gardens State Park is a 430.16 acre parcel is located in Flagler County, between the Matanzas River and the Atlantic Ocean. The park is part of the Eastern Flatwoods District physiographic region, within the Central Atlantic Coastal strip that is a ridge system with typical beach sands over older coquina (Brooks 1981). Elevations within the park unit range from 0 to 10 feet above mean sea level (Figure 156). Much of the original land formation has been altered through mosquito ditching and borrow pit construction, changing the topography from the the relict dune and swale features, to a more flatted terrain (FDEP 2005e). Soils within the present-day park boundary include an area in the western half that are defined as Cocoa-Bulow Sands. These soils are important historically for agricultural as well as for settlement both historic and prehistoric in the area. These soils are characterized as being well-drained sandy soil underlain with coquina rock, giving it a high-nutrient value. Natural communities of note include 164.34 acres of maritime hammock with a coquina, Anastasia Formation outcrop on the beach (FDEP 2005e).

The Washington Oaks Gardens State Park falls within the East Central Archaeological Region (Milanich 1994). The regional area in and around the park saw a full range of occupation and use from Paleoindian to regional cultures. Additionally, Seminole sites are known (Carr and Stelle 1993; Milanich 1994). There are a total of 11 recorded cultural resource areas in the park, four are archaeological sites, six are structures, and one is a recorded resource group (Figure 157). The site types range from prehistoric middens, campsites, artifact scatters and habitation sites, to plantation and historic scatter areas. The temporal range for prehistoric sites at the park span from the Archaic (8500 BC – 1000 BC) to the St Johns II period (AD 800 to 1500). Historically, sites date from the Spanish 1st period to Plantation 19th century (1821-1899). One site, 8FL11 (Washington Oaks Midden) has not been evaluated for NRHP eligibility, but does contain human remains. Additionally, the Owen D. Young residence of circa 1937 (8FL271) was found by the survey evaluation to be eligible for NRHP listing (Piatek 1993). The six structures all date from 1924-1953. The Big Oak Site (8FL175) is discussed in the park unit management

plan as being worthy of nomination for the NRHP (FDEP 2005e); however, the FMSF indicates insufficient information from the survey evaluation (Piatek 1993), and no evaluation has been made by the SHPO. The historic period designed landscape resource group is the Washington Oaks Gardens and Groves locale.

Archaeological surveys within and adjacent to the park have included several development impact studies (Miller 1977, 1982; StClair 1998), a park-wide cultural survey (Piatek 1993), and two park infrastructure cultural monitoring projects (Woodbury 2006; Woodbury 2007). Our GPS work and reconnaissance survey of the Washington Oaks Gardens State Park consisted of acquiring sub-meter GPS locations for several of the known archaeological and historical features. Points were taken for spatial location of prehistoric midden sites at 8FL32, 8FL175 and 8FL176, and line data was recorded to mark the southwest extent of the 8FL11 site. We also mapped in the original A1A pavement area that runs linearly north to south through the park. Additional points were taken on garden gate column areas and 5 of the structures listed on the FMSF (Figure 158).

In 1803, Juan Bautista Ferreira, a Portuguese merchant who had moved to St. Augustine from Charleston, received a Spanish land grant of 300 acres. This grant was followed in 1805 by an additional grant of 75 acres. This grant is related to the present-day location of the Washington Oaks Gardens tract. In 1818, the property was sold to Jose Mariano Hernandez, the oldest son of a Minorcan family of New Smyrna refugees. Hernandez called the grant “Bella Vista” (FDEP 2005e; Piatek 1993). Our review of historical land grants for the park boundary area shows that Section 39 is largely park property today, with the exception of the southeast quadrant. The GLO Dependent Resurvey of 1850 suggests a field in the southwest, likely belonging to the Mala Campra plantation immediately to the south in section 40 (Figure 159). This property was another land grant given to J.M. Hernandez. The Original Survey of 1835 does not reflect a field, although Mala Campra is represented by one large structure and three smaller structures. The park’s unit management plan contains a historical overview of the land ownership and transfers from the Seminole War period of Hernandez through to ownership transfer to the State of Florida (FDEP 2005e). No areas identified with the Plantation era work sites or slave quarters have been documented, and only the 8FL11 Washington Oaks Midden site is shown on the FMSF to relate to the Plantation temporal range.

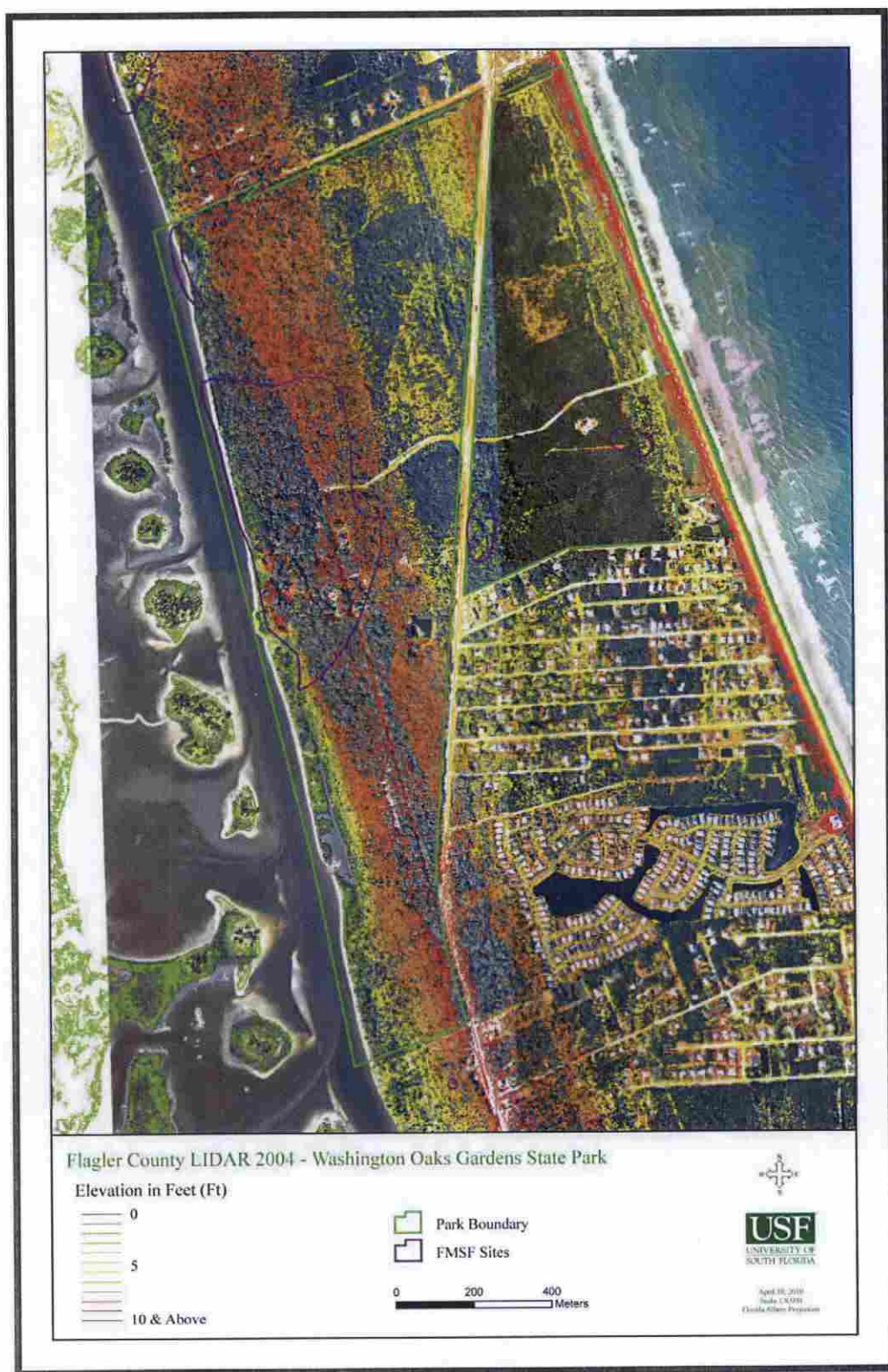


Figure 156. LiDAR data for the Washington Oaks Gardens State Park area

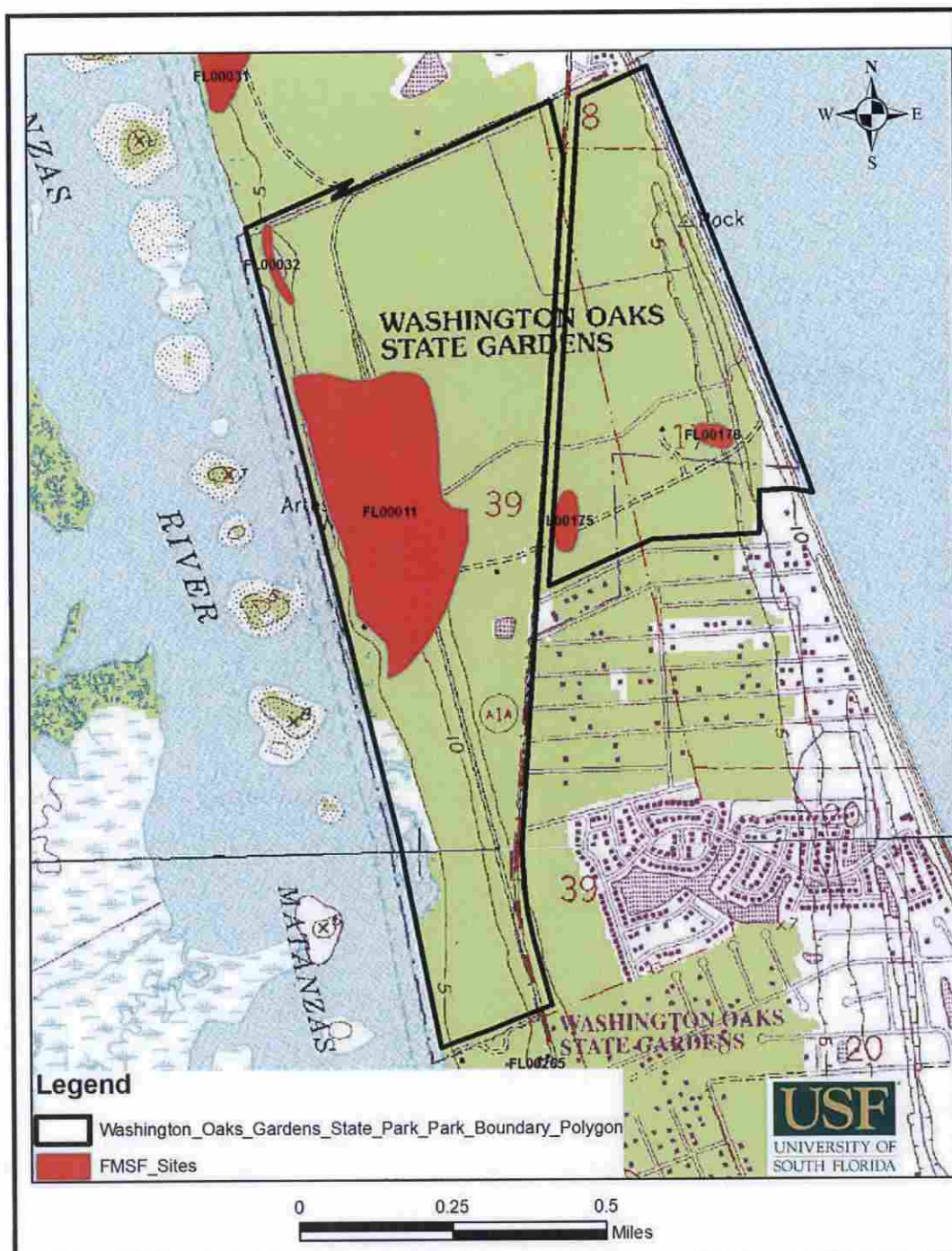


Figure 157. Recorded archaeological sites within the Washington Oaks Gardens State Park area

Results and Discussion

The archaeological sensitivity model development for Washington Oaks Gardens State Park included factors that took in a variety of environmental and cultural variables that account for the presence of sites through time and space and account for the variability of site types known to occur within the park as demonstrated through previous surveys and recorded archaeological sites as listed on the FMSF. Primary factors for archaeological sensitivity in this park included the created historic garden landscape location, relationship to historic land grants, presence of human remains, and environmental characteristics such as well-drained soils, relative elevation and proximity to water. Data layers utilized include aerial LiDAR, aerial imagery, historical maps and references, and environmental layers such as the National Wetlands Inventory, hydrology, and SSURGO soil information. The GPS field truthing and ground control points were useful. The FMSF data was used in the model and assisted with the matrix evaluation in terms of sites that were eligible or likely eligible for the NRHP, contained human remains, or were representative of an area of site significance. Other factors used in the sensitivity model development included distance to rivers and permanent streams, distance to wetlands, relative elevation, adjacency to lagoons, estuaries, embayments, bayous, ocean, and soil drainage characteristics.

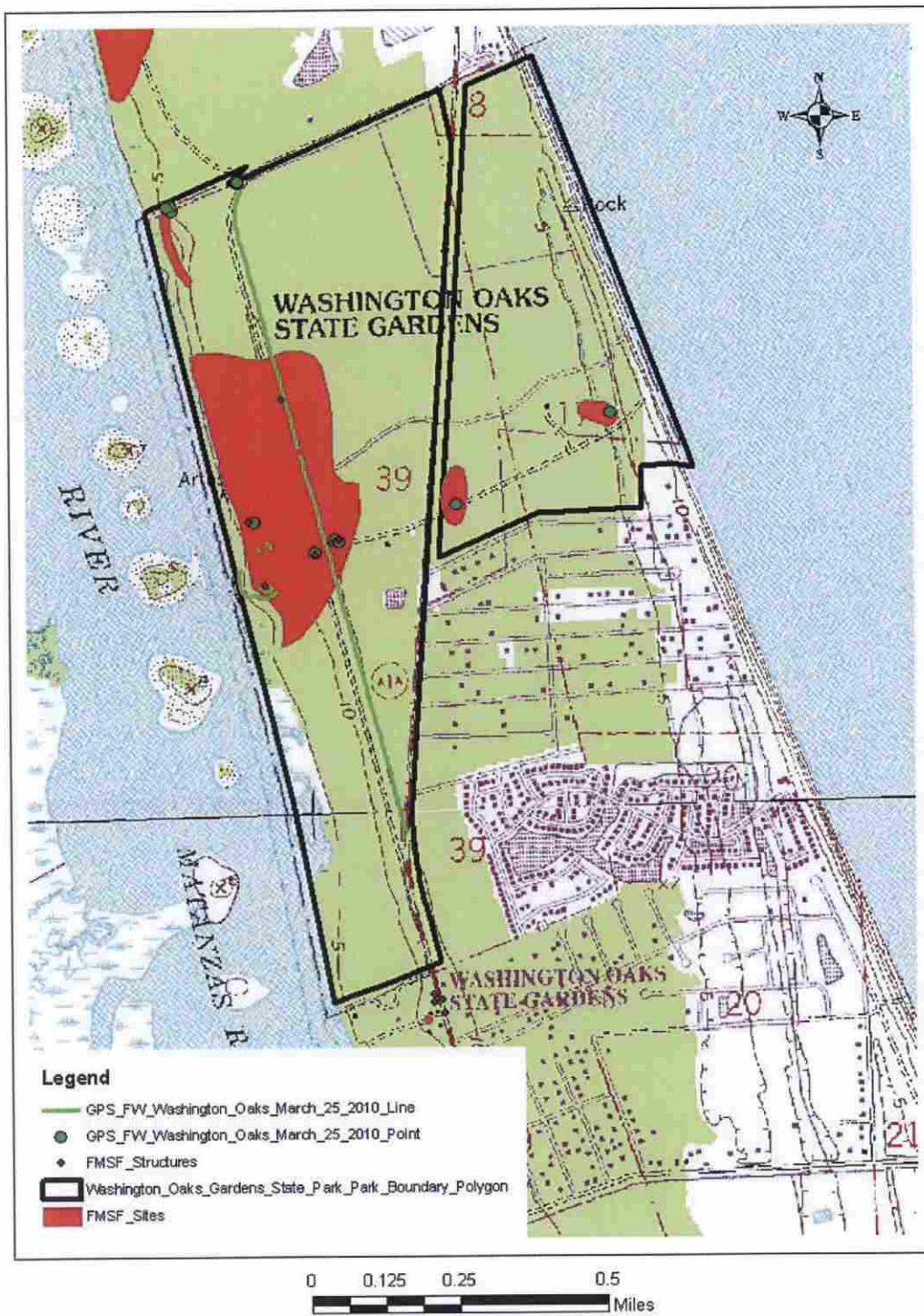


Figure 158. GPS survey of sites within the Washington Oaks Gardens State Park area

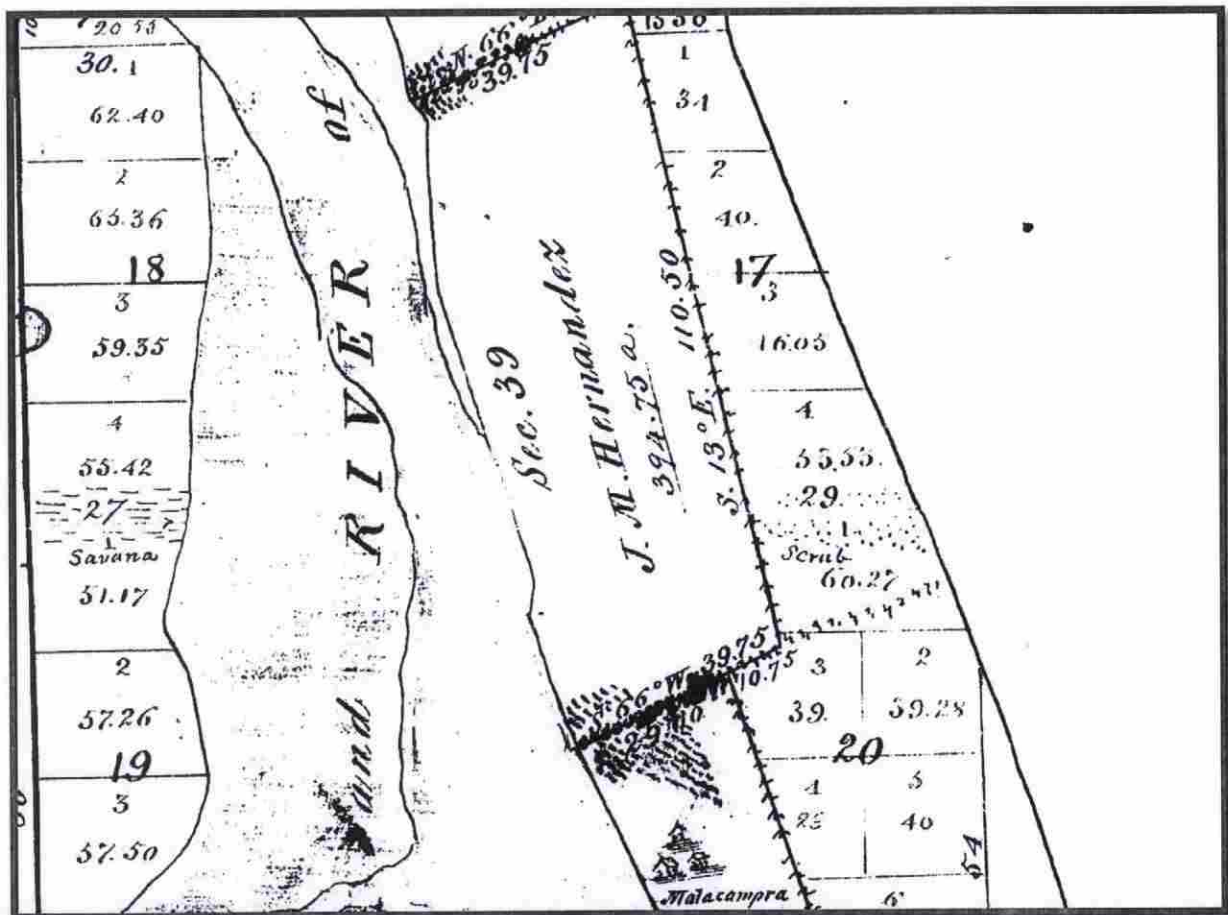


Figure 159. 1850 historic map showing the JM Hernandez land grant within the present-day Washington Oaks Gardens State Park area

Model Performance

Our archaeological resource sensitivity model for the park is shown at a 1:12,000 scale (Figure 160). When this model is verified using the FMSF polygonal site location data, the model captures 9 out of 11 recorded sites at least partially, in the designated high and medium sensitivity areas. The model misses sites primarily due to their recording on the FMSF as general vicinity and having large vaguely defined spatial extents. These problems with the accuracy of site boundaries also show up with several sites occurring in more than one sensitivity zone. The 8FL32 site was also examined for any surface artifact exposure. There is some debate as to whether or not the site 8FL32 is a refuse midden or a spoil pile (Piatek 1993). We located no surficial artifacts in our visit. The site is incorrectly plotted in the FMSF, and shows a correspondence to our low sensitivity area modeled and is partially submerged according to the FMSF GIS data (Figure 161). The site (if it is indeed a midden) is more likely associated with our modeled medium sensitivity area and is inaccurately plotted. Expressed as spatial percentages, the high archaeological resource sensitivity area at Washington Oaks Gardens State Park only accounts for 30% of the land surface area (Table 3), however, more than 89% of the recorded archaeological spatial extents are found to correlate with these modeled areas, representing a 60% improvement over chance of locating archaeological sites within our designated high probability area (see Kvamme 2006:28).

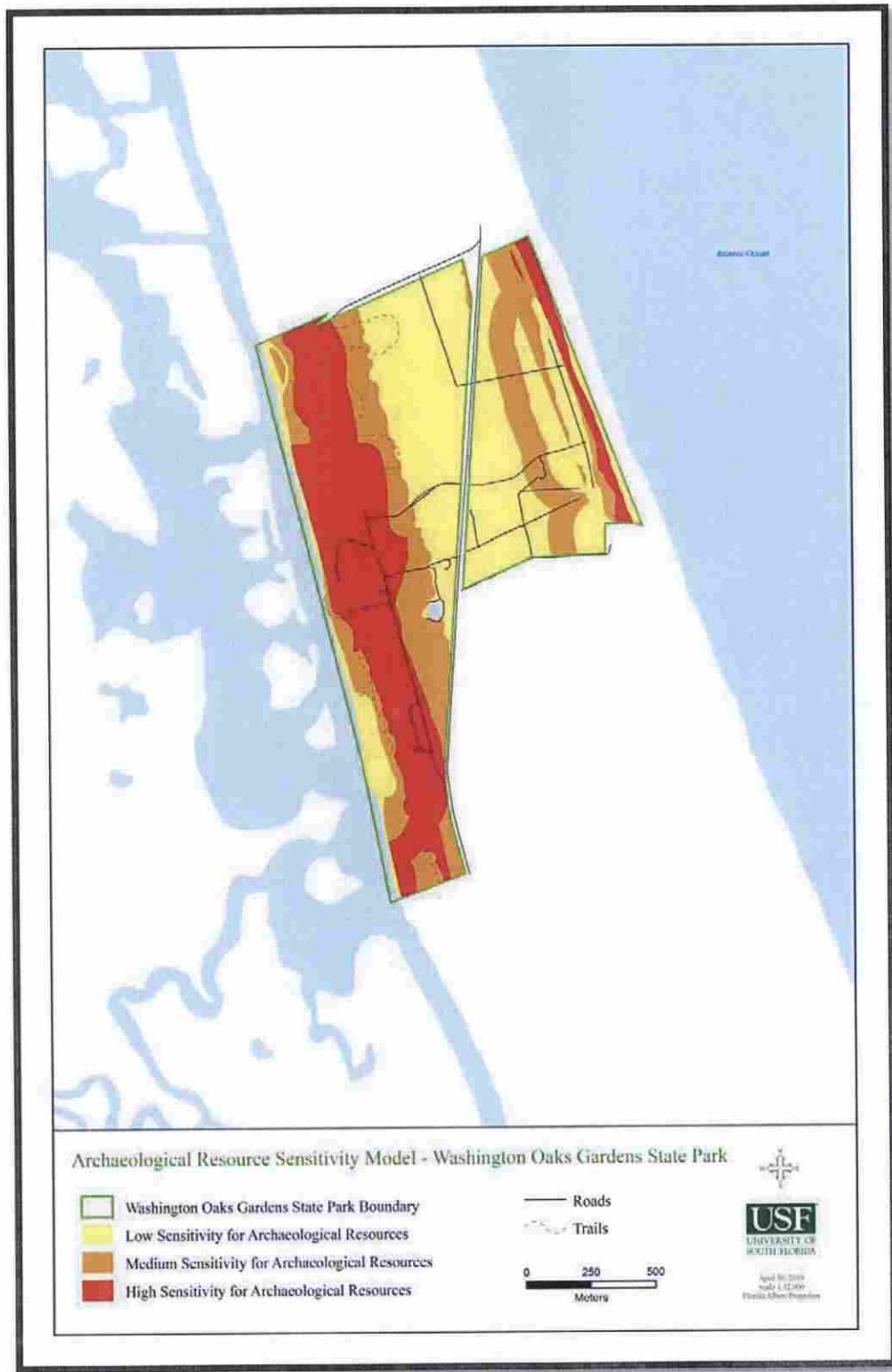


Figure 160. Map showing the archaeological resource sensitivity model developed for Washington Oaks Gardens State Park



Figure 161. Map showing the FMSF plot data against aerial imagery and sensitivity model for section of Washington Oaks Gardens State Park

Table 27. GIS model performance calculations for Washington Oaks Gardens State Park

Washington Oaks Gardens Sensitivity Model	Acres	Percent		FMSF Acres	Percent
High Sensitivity Area	128.26	29.82%		53.06	89.70%
Medium Sensitivity Area	110.19	25.62%		0.68	1.15%
Low Sensitivity Area	191.72	44.56%		5.41	9.15%
Total	430.16	100.00%		59.15	100.00%

Wekiwa Springs State Park

The Wekiwa Springs State Park is part of the larger Wekiva River Basin State Parks that also includes Rock Springs Run Reserve and the Lower Wekiva Preserve. Wekiwa Springs is a 9,508.63 acre parcel within the present-day boundary. The preserve is located in the Central Lakes District physiographic area, and is in a sub-area that is nearly level to rolling with slopes from 0 to 8 percent (Brooks 1981), and elevations in the park parcels that range from a low of 45 feet above mean sea level in the eastern parcel to 90 in the large central parcel and 120 ft amsl in the western parcels (Figure 162). Prevatt Lake on the southwest border of the park is a large hydrological feature. There are also several ephemeral streams and unnamed creeks. Mesic flatwoods are a predominant natural community in the central parcel of the Wekiwa Springs State Park. These flatwood areas have faced historic pressures of dewatering through ditching and draining to facilitate easier timber harvest, and remnants of historic timber practices are still evident on the landscape. Wekiwa Springs is a special natural feature at the park (FDEP 2005f) and is a second magnitude spring (Rosenau, et al. 1977). The Wekiwa Springs Run and the Rock Springs Run combine to form the Wekiva River. Another designated special natural feature at Wekiwa Springs State Park is the sandhills that make up about 1500 acres on the western edge of the central parcel (FDEP 2005f).

The Wekiwa Springs State Park has 20 recorded archaeological sites, one historic cemetery, and one resource group as listed on the FMSF (Figure 163). The site types include prehistoric mounds and middens, artifact scatters, prehistoric campsites and habitation sites, lithic scatters and quarries, a historic cemetery, building remains, a submerged ferryboat site, and tram lines that were part of timber harvesting activities in the park area. The temporal range of use for these recorded sites show that occupation here occurred in the Orange and St. Johns periods prehistorically, and historically to the 20th century (1900-present). Most sites are multi-component, and the artifact assemblages collected are not diagnostic of a temporal affiliation. The preserve is within the East Central Florida cultural area, which is known to have occupation for the full cultural sequence from Paleoindian, Archaic, Mount Taylor, Orange, Transitional, St.

Johns, First Spanish Period, British Period, Second Spanish Period, Territorial and Seminole (Milanich 1994). There are no sites within the park that contain human remains and all of the sites have not been evaluated by the recorder or the SHPO, or contain insufficient information, or are ineligible for NRHP designation. The historic cemetery location 8SE567 is known as the Pinnie Ridge cemetery. This site is an African American burial area located south of Lake Markham, that is unmarked and unkempt and is thought to have 24 to 75 burials and has not been evaluated by the SHPO for the NRHP and warrants further investigation (Estabrook 1991). The Wekiva Basin GeoPark Tram Roads are a linear resource group in the park, but they are being removed to restore the hydrology.

There have been no professional archaeological surveys in the central parcel portion of the Wekiwa Springs State Park. The western properties have been included in the area of potential effect (APE) for two recent surveys for development and road projects and a cellular tower survey (Janus 2008; Parker 2001). The eastern Plantation Tract parcel of Wekiwa Springs State Park has been the subject of at least four surveys, including a parcel-wide survey by CARL archaeologists (Christine Newman and B. R. Weisman 1993), and several CRM development projects (Estabrook 1991; Pope 1988). Additionally, much is known about the area surrounding Wekiwa Springs State Park, with surveys on park lands in the Wekiva River Basin State Parks including one park-wide survey for cultural resources for the Lower Wekiva River preserve (Lammers et al. 1999), and several that have looked at specific tracts comprising portions of the Lower Wekiva Preserve State Park and adjacent to the preserve boundaries (Newman and Weisman 1993; Dunbar and Newman 2004). There has been no park-wide survey for cultural resources for the nearby Rock Springs Run Reserve State Park, but several surveys have looked at specific tracts and archaeological features comprising portions of that park reserve as well as adjacent to the reserve boundaries (Dunbar and Newman 2004; Estabrook 1988; Handley, et al. 2007; Janus 2008; Christine Newman and B. R. Weisman 1993; C. Newman and B. R. Weisman 1993; Weisman and Newman 1990).

Our GPS work at this preserve consisted of collecting a point location for two hunt camp building remain areas that have known well features. One of these GPS positions correlates with 8OR2229, the Witherington hunting cabin site area. We also collected line data on trails in the park to assist with georeferencing (Figure 164). High water at many of the areas made it difficult to access sites.

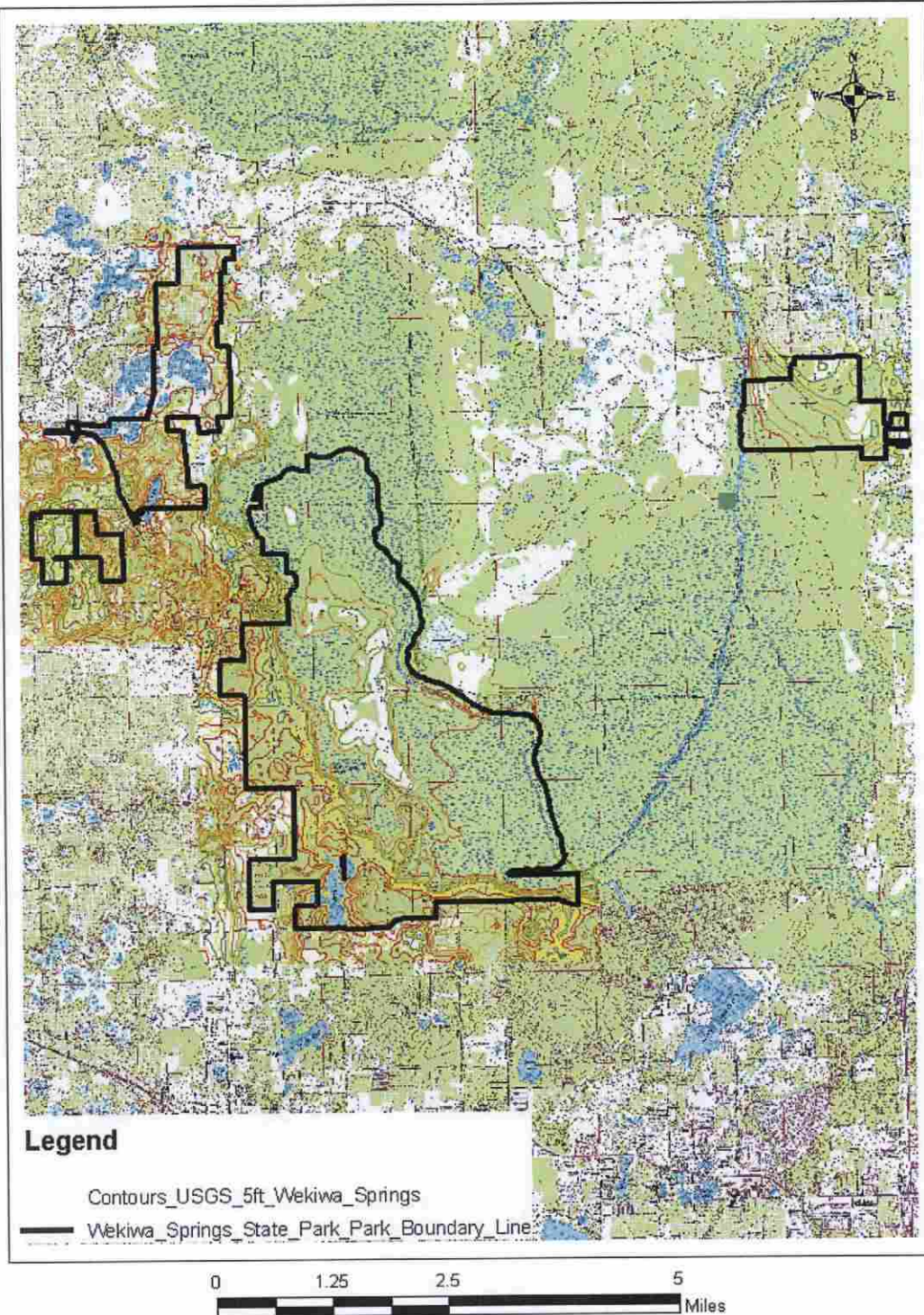


Figure 162. Map showing the FMSF plot data against aerial imagery

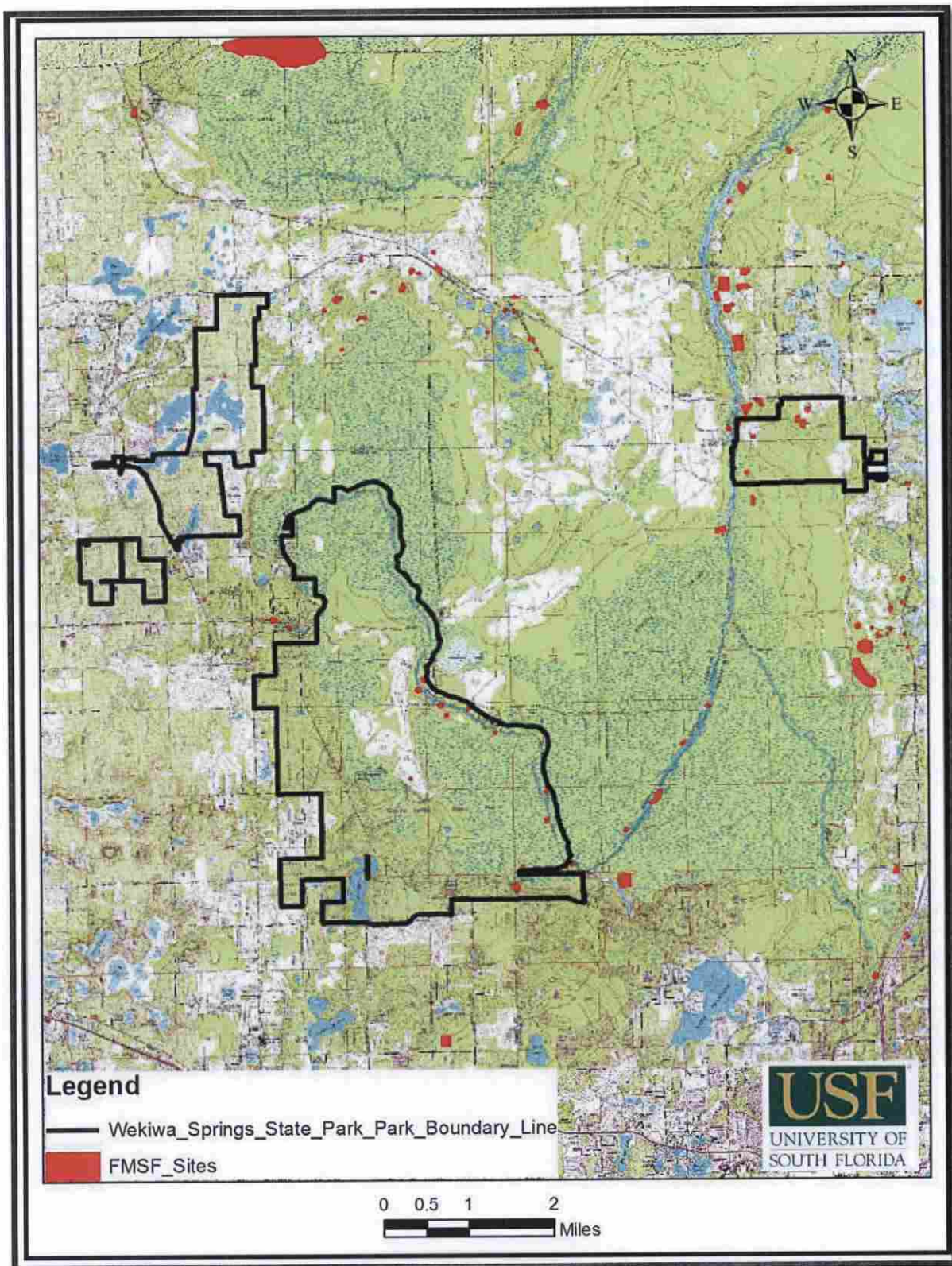


Figure 163. Florida Master Site File data for the Wekiwa Springs State Park area

Results and Discussion

The archaeological sensitivity model development for the Wekiwa Springs State Park included factors that took in a variety of environmental and cultural variables that account for the presence of sites through time and space and account for the variability of site types known to occur within the park as demonstrated through previous surveys in and within the regional vicinity to the preserve. A primary factor for cultural site locations in this park included historic and prehistoric utilization of the St. Johns and Wekiva Rivers, streams, creeks and marsh systems associated with diverse wetland habitats, blackwater streams and flatwoods lakes. The poor soil drainage and seasonal and year-round flood plain areas are negative settlement factors and create large expanses of low sensitivity areas in our model. Many of the recorded midden sites along the Wekiva River are in fact inundated most of the time, and inaccessible. Many sites were inadequately plotted and no evaluations or insufficient information exist in regard to the NRHP, although a greater understanding for site types and their general locations were helpful for our modeling ((Estabrook 1991; Newman and Weisman 1993; Lammers et al. 1999). Matrix factors utilized for model evaluation included distance to wetlands, distance to ponds or lakes, relative elevation, soil drainage characteristics, and presence of flood plain and zone areas. Knoll swamp islands and stable riverine island areas were utilized from our matrix list, as were presence of relic springs, caves, sinkholes and outcrop areas. Relative elevation, utilizing the available LiDAR data in conjunction with 5 ft. contours for this park area was examined. Additionally, areas defined through surveys and the FMSF data as having high likelihood of containing significant sites based on recorded or archival data or oral tradition (survey evaluations from FMSF = likely or eligible for the NRHP) was also used as a matrix evaluation, as was presence of human remains (cemetery) and high previously recorded site densities. Our archaeological resource sensitivity model for the park is shown at a 1: 24,000 scale, with two park level maps produced to cover the parcel areas (Figures 165 and 166).

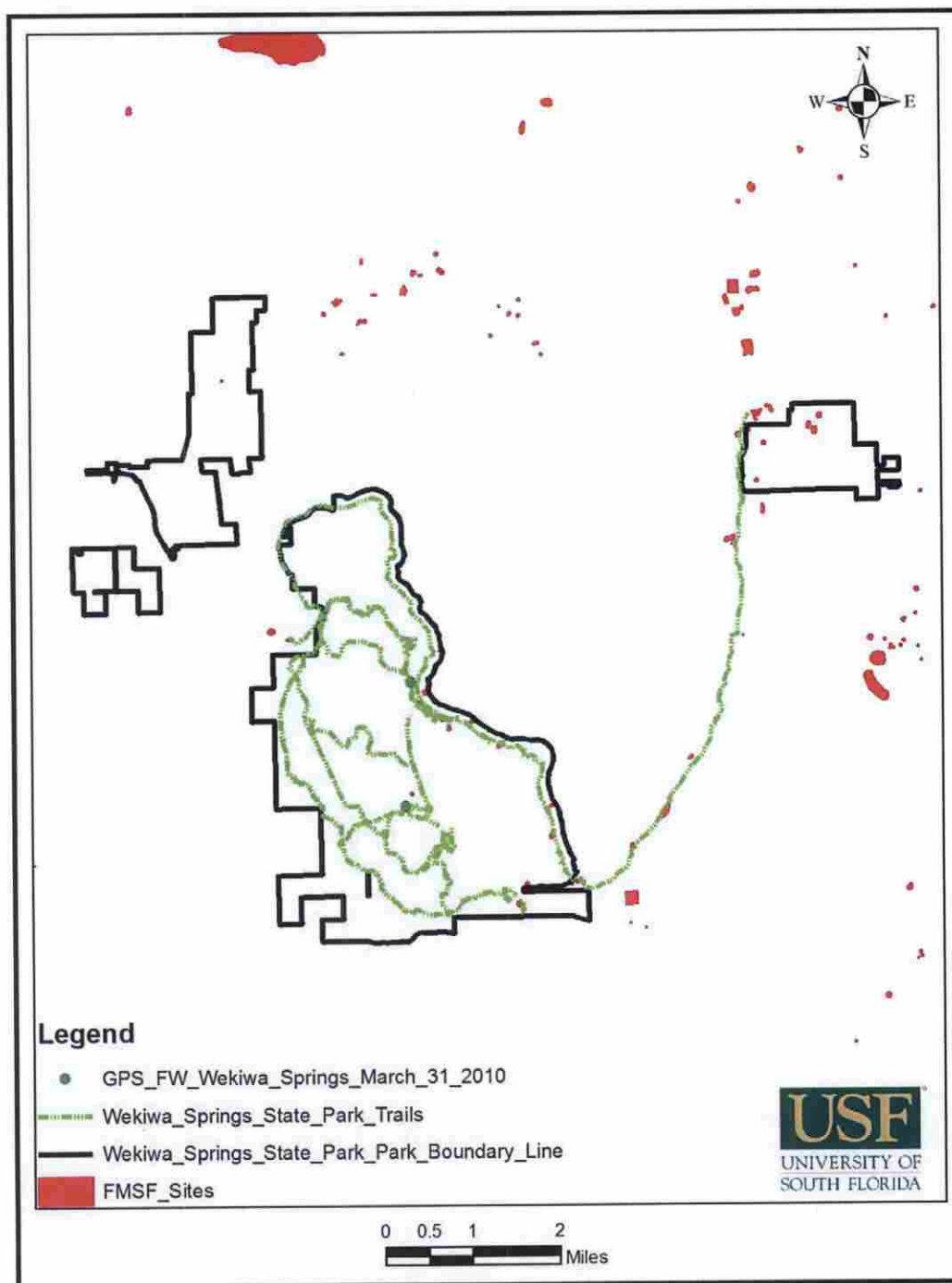


Figure 164. GPS survey data collected at Wekiwa Springs State Park showing GPS data collected, trails, and FMSF recorded locations

Model Performance

When this model is verified using the FMSF polygonal site location data, the model captures 17 out of 22 recorded sites at least partially, in the designated high and medium sensitivity areas. The model misses sites primarily due to their polygonal extent recording on the FMSF showing large and vaguely defined spatial extents. The site types that our model misses include lithic scatters of low density (8SE1096 and 8SE565), one mound site that has no recorder evaluation for the NRHP eligibility and is in an area of poor soil conditions (8OR2089), a 20th century hunting cabin (8OR2229) and a prehistoric mound and midden site (8OR450). Spatial location improvement can be made using available LiDAR data over portions of this park, in combination with sub-meter GPS. Many of the mound sites can be more accurately plotted to increase the validation potential of the model (Figure 167).

Expressed as spatial percentages, the high archaeological resource sensitivity area at Wekiwa Springs accounts for approximately 5% of the land surface area (Table 28), but have over 35% of the recorded archaeological spatial extents correlating with these modeled areas. Using statistics ($p[MIS]-p[M]=.30$), our model represents a 30% improvement over chance of locating archaeological sites within our designated high probability area (see Kvamme 2006:28). Combining the high and medium sensitivity areas shows that 66% of recorded archaeological spatial extents occur within our sensitivity areas, showing a 39% overall improvement over chance. These sensitivity areas can be best refined by conducting a Phase 1 archaeological field survey that combines field verification with use of the model and direct remote sensing observations using high resolution aeriels and LiDAR data. Additionally, spatial locations of sites listed within the FMSF can be further verified to offer even more improvement.

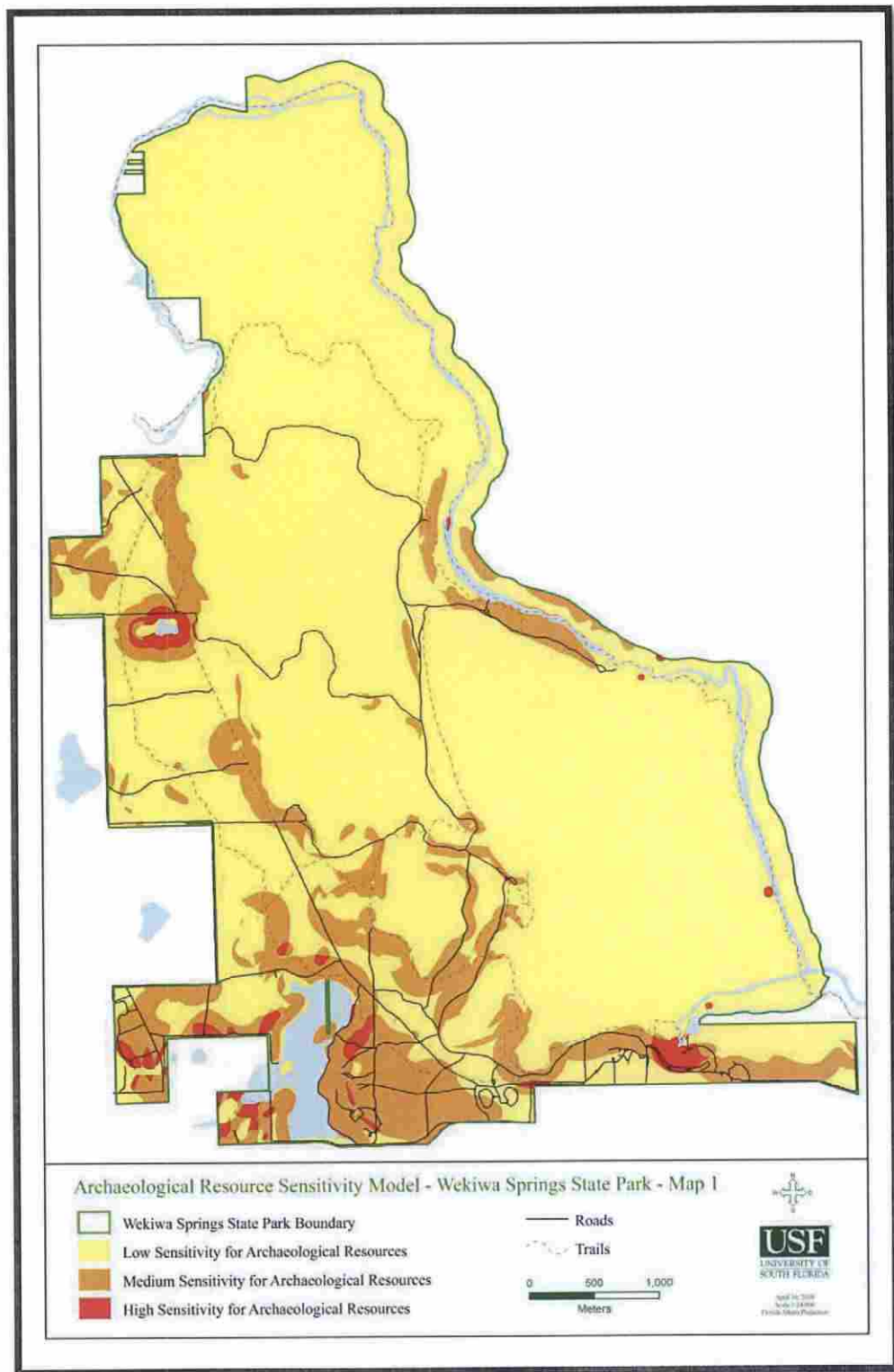


Figure 165. Map showing the archaeological resource sensitivity model developed for Wekiwa Springs State Park

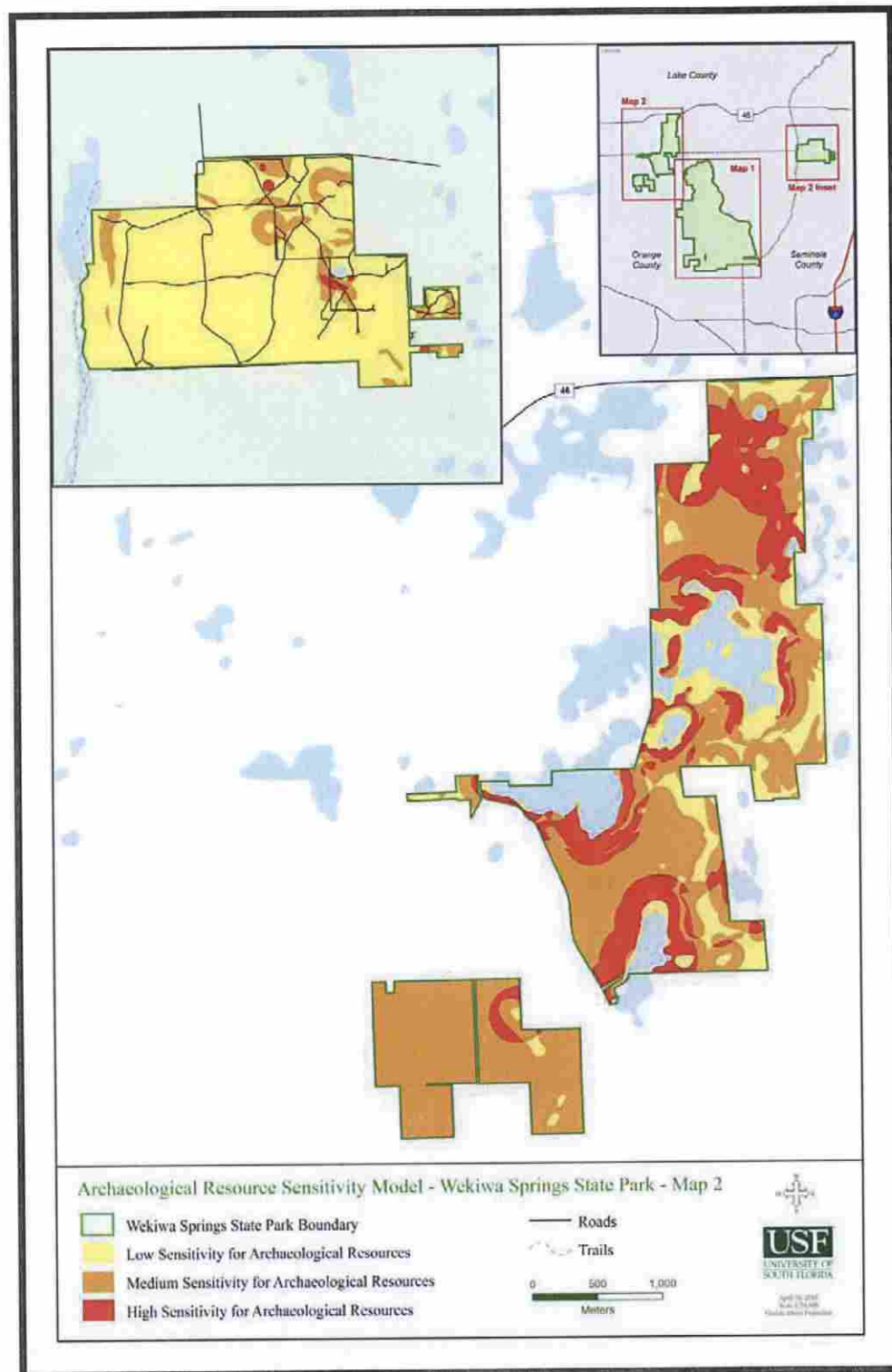


Figure 166. Map showing the archaeological resource sensitivity model developed for Wekiwa Springs State Park

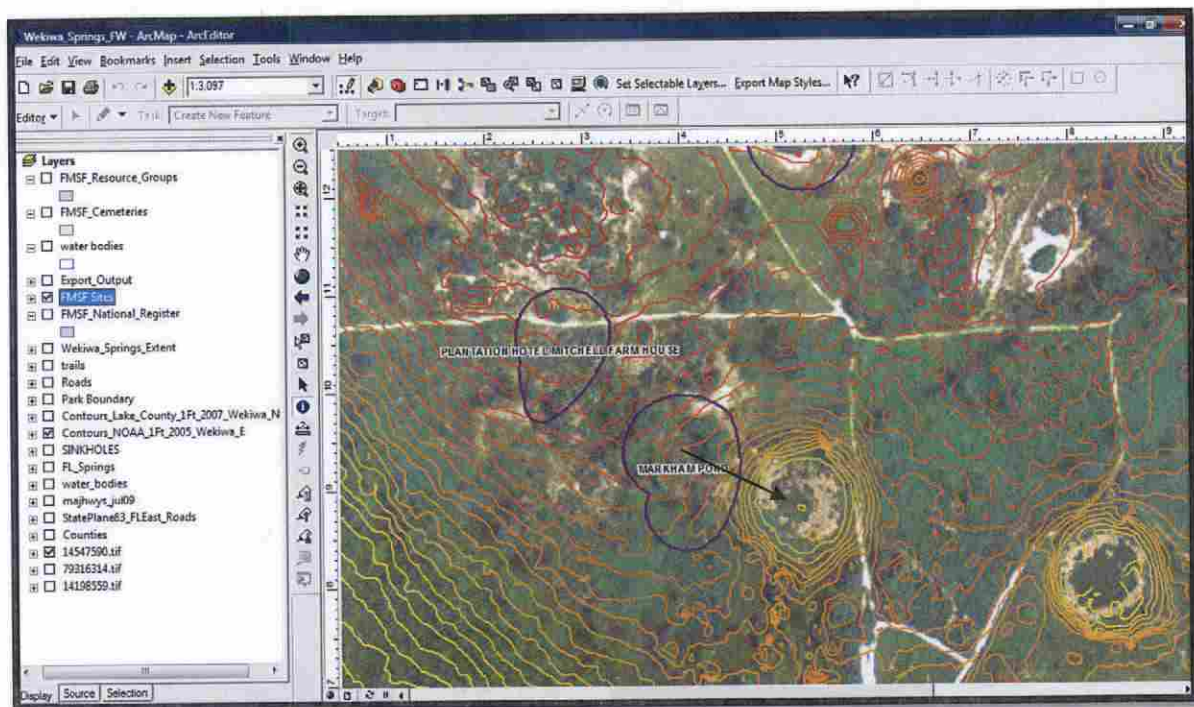


Figure 167. LiDAR data for Wekiwa Springs State Park showing incorrect plotting from the FMSF data (purple) and likely location and configuration shown in the yellow contour intervals

Table 28. GIS model performance calculations for Wekiwa Springs State Park

Wekiwa Springs Sensitivity Model	Acres	Percent		FMSF Acres	Percent
High Sensitivity Area	480.95	5.06%		6.60	35.13%
Medium Sensitivity Area	2,065.29	21.72%		5.83	31.03%
Low Sensitivity Area	6,962.38	73.22%		6.36	33.84%
Total	9,508.63	100.00%		18.79	100.00%

Conclusions and Implications of the Research

John Goggin in his influential work on the St. Johns region envisioned the archaeological understanding of the past as encompassing environmental and cultural areas (Goggin 1952). Landscapes are spatial manifestations of the relationship that exists between the environment and people (Ashmore and Knapp 1999). Landscapes are studied by looking at the material signature that is left behind, and these can be fundamentally different for various time periods, even within the same spatial area (Crumley and Marquardt 1987; Deetz 1990; Fisher and Feinman 2005). For example, a Plantation-era site might have a totally different usage for the land and resources than did prehistoric people living in the same location, and their archaeological signatures on the land and modifications may be very diverse in comparison. To deal with these social dynamic issues, we have not attempted to delineate between shifts in the landscapes temporally, but rather have captured the areas of archaeological sensitivity that contained the landscape variables throughout the history of the defined park boundary area.

In Florida archaeology, there have been many predictive models developed for the understanding of settlement patterns within regions. Many of these models were preformed pre-GIS software, and used a series of tabular datasets and plat maps to draw areas where archaeological potential was greater. The scale of their approaches was often county-wide or regional and district-wide. These larger scales often do not provide the resolution that is necessary for greater specificity of models and to adequately assess and understand archaeological phenomena and to address specific research and management concerns (Collins 2007; Kvamme 2006). Additionally, humans do not always make settlement and land use choices based on solely environmental reasons. Many past attempts at modeling look at settlement choice based primarily on factors such as relative elevation and distance to water. Social data are rarely utilized in GIS modeling, primarily because environmental data sets are more readily available and formatted for GIS (Kvamme 2006; Lock 1995).

In our modeling effort for the District 3 Florida State Parks, rather than taking a regional or district-wide scale of analysis, we have chosen to model the individual parks, considering them as landscapes with a modern defined boundary. Parks are ideal for this type of site-level study. They are often purchased because of the cohesive environmental landscapes they contain. They have been well defined through characterization and study assessments including unit management planning, and they often contain critical and representative resources that are often well preserved. We have integrated environmental and social environment data in our matrix evaluation. We have also utilized better data that is now available through technological improvement. Aerial LiDAR elevation data, sub-meter GPS ground-truthing, high resolution aerial imagery, and datasets derived from satellite and aerial reconnaissance of environmental

variables were utilized. These data were combined with historically-relevant materials and cultural information such as historical maps, FMSF, and related grey literature and information about the cultural landscapes.

We developed a matrix of multi-criteria variables to be utilized in the models also based in part on known factors and established distances to resources that have been considered in previous predictability studies for archaeological resources in Florida (ACI 2005; Ashley 1996; Austin 1987, 1989; Austin, Lizabeth Carlson, et al. 2001; Collins and Weisman 2005) (Austin and Collins 2003; Deming, et al. 1999; East 1999; Horvath 1986; Madry, et al. 2001; Sassaman, et al. 2000; B.R. Wharton 1984). The extent of these available previous surveys and predictability factors were utilized to create a synthetic approach, allowing for the resources of this project to be effectively applied to the GIS model development by using data known for this region as a foundation referent for the development of our GIS matrix.

A factor of consideration in our modeling is that there are known problems with using existing datasets for GIS modeling (Kvamme 2006). The FMSF GIS data layers are based on more subjective information than those of environmental resources for example. Temporal affiliations and site type designations are often variable depending on the recorder and level of survey detail, and significance determination through NRHP evaluation is also often lacking or inconsistent (Collins 2007). Additionally, the way in which archaeologists spatially record sites, based on hand drawn plots or UTM determination on 1:24,000 scale topographic maps make for inaccurate plot locations in the GIS data layers that are digitized from this information. USGS topographic contour maps are not accurate enough to begin with in terms of how the contours are created. New technology such as LiDAR can greatly improve our understanding of elevation features and can assist in relating archaeological sites with actual locations. The FMSF does contain valuable information, and understanding the limitations and the way in which the data was collected and brought into a GIS format was critically important.

Using model validation techniques, we show the overall results for our sensitivity modeling of District 3 lands (Table 29).

Table 29. GIS total District 3 model performance calculations

Area Breakdown for all State Parks	Acres			FMSF Acres	
High Sensitivity Area	5,348.29	7.33%		369.61	53.49%
Medium Sensitivity Area	9,729.31	13.34%		133.74	19.36%
Low Sensitivity Area	57,840.92	79.32%		187.63	27.15%
Total	72,918.52	100.00%		690.98	100.00%

This model validation table does not include the six preserve properties, as most of the preserves were lacking archaeological survey data. We find that our model totals for District 3 State Parks correctly indicated 53.49% of known sites in a mapping that covers 7.33% of the model area. Therefore, using statistics ($p[MIS]-p[M]=.46$), our model represents a 46% improvement over chance of locating archaeological sites within our designated high probability area. Combining medium and high sensitivity areas: $(0.73 - 0.20) = 0.53$ or 53% improvement over chance.

Needs for Further Research

Some of the areas noted for improvement and needed implementation that emerged from this project included GPS and spatial standards and the development of metadata for GPS-gathered information. Numerous reports from the FMSF, field notes, and discussions with field personnel as part of this project, showed that there is not a clear understanding or distinction that is made between different types of GPS and no accuracy standards are employed. The FMSF data includes general vicinity plots and only requires a 1:24,000 scale plot on a USGS topographic map. If GPS is being utilized for archaeological site location, it is almost always in the form of hand-held GPS units, which can be in error from 10s to 100s of meters depending on a variety of conditions. GPS standards need to be implemented across the park system for projects on park lands. State archaeologists doing surveys of these lands, or researchers or CRM representatives, should use 3 meter or better systems (sub-meter for more detailed area surveys). Also, the recordation of the type of model used and methods employed should become part of the reporting standard. In this way, park data concerning environmental and cultural resources can begin to be cleaned up and if data is collected in this way, it will prove much more useful for future analyses and management purposes. Submission of spatial re-plots should be made to the FMSF, and a mechanism for transferring spatial data rather than hand-drawn plots should be encouraged.

We also recommend a district by district analysis of the FMSF data in relation to remote sensed data such as LiDAR and high resolution aerial imagery. GPS field-truthing in conjunction with these types of surveys can greatly improve and clean up existing data. Remote sensing surveys can also serve as a way to target future archaeological work, providing a much more effective first effort than standard shovel sampling surveys. These methods can be especially effective in areas that are being re-surveyed. Our sensitivity models can also be utilized to look for as yet unrecorded sites within areas defined as high and medium sensitivity, improving the ability to effectively locate and delineate archaeological sites. Continuation of the use of the Geodatabase structure established as part of this project is recommended. These files and folders are organized by park and can be used as a living digital document with new data added

as it becomes available. The sensitivity models should be utilized in conjunction with planning for management and use activities, and can also assist with long-range acquisition targeting and land use considerations such as impacts from infrastructural development. Our sensitivity modeling for District 3 should also be extending to incorporate the other districts in the Florida Park System. This modeling project not only offers solutions for effective management of state land, but also will allow the continuing clean up of the FMSF data for state lands. The models are also useful for the development of new research directions and questions concerning settlement patterns, landscapes, and land use through space and time.

References Cited

Abt, T. F., M. MacRorie, B. Moore and J. J. Sinclair

2003 *Florida East Coast Shipwreck Project Mel Fisher Center, Inc. 2002 Season Report*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

ACI

1987 *Archaeological Resource Maps for Marion County: A Guide for Users*. Ms on file with the Florida Division of Historical Resources.

2005 *Cultural Resource Predictive Model Ocala Springs, Marion County, Florida*. Submitted Carlton, Fields, Ward, Emmanuel, Smith & Cutler, PA, Tallahassee on behalf of Avatar Properties, Inc.

Adams, W. R.

1989 *Historic properties survey, Volusia County, Florida*. Ms on file Florida Division of Historical Resources.

American Preservation Consultants, I.

2006 *Cultural Resource Monitoring for Excavation at the Exhibit Hall Land Clearing, Drainage Ponds and Utility Trenches in Fort Mose State Park, St. Augustine, Florida* Ms on file Florida Division of Historical Resources.

Ashley, K. H.

1996 *A Study of Archaeological Resources and Site Sensitivity Areas in the City of Port Orange, Volusia County, Florida*. ESI Report of Investigations No. 83. Environmental Services, Inc., Jacksonville. Submitted to The City of Port Orange, Port Orange.

Ashmore, W. and A. B. Knapp (editors)

1999 *Archaeologies of Landscape: Contemporary Perspectives*. Blackwell, Oxford.

Austin, R. J.

1987 *An Archaeological Site Inventory and Zone Management Plan for Lee County, Florida*. Submitted to the Lee County Department of Community Development.

1989 *An Archaeological Site Inventory and Zone Management Plan for Volusia County, Florida*. Ms on file Florida Division of Historical Resources.

1996 Ceramic Seriation, Radio Carbon Dates, and Subsistence Data from the Kissimmee River Valley: Archaeological Evidence for a Belle Glade Occupation. *The Florida Anthropologist* 49(2):65-87.

Austin, R. J., L. Carlson and L. Collins

2001 *An Archaeological Survey of Unincorporated Alachua County, Florida (Phase I)*. Southeastern Archaeological Research, Inc. Submitted to the Alachua County Board of County Commissioners

- Austin, R. J. and L. Collins
2003 *A Preliminary Cultural Resource Assessment of the Lake Okeechobee Watershed Project* Conducted for HDR Engineering, Inc.
- Austin, R. J., Lizabeth Carlson and L. Collins
2001 *An Archaeological Survey of Unincorporated Alachua County, Florida (Phase 1 and 2)*. Report on file SEARCH, Inc.
- Austin, R. J. and J. Piper
1986 *A preliminary cultural resource assessment survey of the Avon Park Air Force Range, Polk and Highlands Counties, Florida*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.
- Baker, H. A.
1988 *An Archaeological Survey of Selected Portions of Silver River State Park, Marion County, FL*. Bureau of Archaeological Research, Division of Historical Resources, Florida Department of State, Tallahassee, FL.

1991 *Archaeological excavations at the Bulow dwelling house, 1982*. Florida Division of Historical Resources Bureau of Archaeological Research, Tallahassee, Florida.

1999 Fifteen Years on Bulow Creek: Glimpses of Bulowville. *The Florida Anthropologist* 52((1-2)):116-123.
- Bense, J. A. and J. C. Phillips
1990 *Archaeological Assessment of Six Selected areas in Brevard County: a First Generation Model*. Ms on file with the Florida Division of Historical Resources, Tallahassee, FL.
- Benton, F.
1934 *A Reconnaissance of the Volusia Coastal Hammocks to Determine the Most Suitable Location for a State Forest Park*. Submitted to the Florida Forest Service. Copies available from the Department of Environmental Protection.
- Blakney, J. A. and B. J. Erbe
2002 *TITLE Cultural Resources Survey and Assessment Gardner Marsh/Rough Island - Kissimmee Chain of Lakes, Osceola and Polk Counties, Florida*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.
- Bland, M. a. R., Vicki
2004 *Limited Archaeological Investigation of the Addison Blockhouse, Volusia County, Florida*. Ms. on file with the Florida Master Site File, Tallahassee, Florida.
- Blonder, B.
1990 Memo on Radiocarbon Dating.
- Boyd, M. E. M.
n.d. *The Legend of Tomokie*. Brochure flyer, Tomoka State Park, Florida Department of Environmental Protection, Ormond Beach, Florida.

- Boyer, W. A.
2006 *Final Report on Pedestrian Survey: Ocklawaha Survey Project, June 2006-December 2006*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.
- Brooks, H. K.
1981 *Physiographic Divisions of Florida*. FL Cooperative Extension Service, Inst. Food Agric. Sci., Univ. of Florida, Gainesville, FL. .
- Bullen, R. P.
1955 Carved Owl Totem, Deland, Florida. *The Florida Anthropologist* 8(4):61-73.
- Carr, R. and W. Stelle
1993 *Seminole Heritage Survey, Seminole Sites of Florida*. Ms. on file Division of Historical Resources.
- Carton, A. R.
2002 *The Rental Cabin Site at Silver River State Park*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.
- Cockrell, W. A.
2003a *Archaeological and Historical Survey: A Preliminary Assessment, Katie's Wekiva River Landing, 8SE1177, Lower Wekiva River Preserve State Park, Seminole County, Florida*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

2003b *Archaeological and Historical Survey: Cabin Area (Cabin Nine & Vicinity) And Museum Parking Lot Silver River State Park Marion County, Florida*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.
- Collins, L. D.
2007 *Understanding and Closing the Gaps: A GAP audit approach linking archaeology and land acquisition strategies in Florida* Doctoral dissertation, University of South Florida, Department of Anthropology, Tampa.
- Collins, L. D. and T. F. Doering
2008 The High Definition Digital Documentation (H3D) Survey of the Tomokie Statue at the Tomoka State Park, Ormond Beach, FL, Ms on file: Florida Park Service, Tallahassee, Florida.

2009 *Terrestrial Laser Scanning 3D Survey of the Bulow Plantation Ruins and the Dummett Sugar Mill Ruins, Florida*. Ms on file Florida Department of Environmental Protection, Tallahassee, FL.

2009 *Terrestrial Laser Scanning, GPR, and CAD Stabilization Survey, of the Dummett Mill Ruins, Florida (8VO241)*. Ms on file Florida Department of Environmental Protection, Tallahassee, FL.
- Collins, L. D. and B. Weisman
2005 *A GIS Archaeological Model and Testing of Nine ELAPP Preserves, Hillsborough County, FL*. Ms. On File: Department of Anthropology, University of South Florida.

Crumley, C. L. and W. H. Marquardt (editors)

1987 *Regional Dynamics: Burgundian Landscapes in Historical Perspectives*. Academic Press, San Diego, CA.

Daniel, R., Frank Sicius, David Ferro

1980 *An Archaeological and Historical Survey of the Proposed Halifax Plantation Development, Volusia and Flagler Counties, Florida*. Florida Division of Archives, History, and Records Management, Bureau of Historic Sites and Properties.

Deagan, K.

1991 *Fort Mosé, America's First Free Black Community", Spanish Pathways in Florida: 1492 - 1992*. University of Florida Press, Gainesville, FL.

Deetz, J.

1990 Landscapes as Cultural Statements. In *Earth Patterns: Essays in Landscape Archaeology*, edited by W. M. Kelso and R. Most, pp. 1-4. University Press of Virginia,, Charlottesville.

Deming, J., E. Horvath and L. Hutchinson

1999 *Archaeological Site Location Predictive Model for the City of Lakeland*. Archaeological Consultants Inc., Submitted to the City of Lakeland, Community Development Department

Denson, R. L.

1992 *The Oklawaha River Survey (Final Report)*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

Denson, R. L., G. D. Ellis and R. Russell

1995 *Archaeological survey of De Leon Springs State Recreation Area*. . Ms. on file, Florida Department of Environmental Protection, Tallahassee.

Dickinson, M. F.

2002 *Cultural Resources Survey and Assessment, DeLeon Springs, Volusia County, Florida*. Ms on file Florida Division of Historical Resources.

Dickinson, M. F., G. J. Waters and L. B. Wayne

2005 *Cultural Resources Survey, Carter Property, Marion County, Florida*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

Dickinson, M. F. and L. B. Wayne

1997 *The Palatka Water Works (8PU103): An Architectural and Archaeological Study*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

1998 *Ravine State Gardens: An Archaeological and Historical Study*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

Division_of_State_Planning

1974 *Final Report and Recommendation for the Proposed Green Swamp Area of Critical State Concern, Lake and Polk Counties, Florida*. Florida Department of Administration.

- Dore, C. D., Wandsnider, LuAnn
2006 Modeling for Management in a Compliance World. In *GIS Archaeological Site Location Modeling* edited by M. W. Mehrer, Wescott, Konnie L., pp. 75-96. CRC Press, Boca Raton.
- Douglas, A. E.
1882 A Find of Ceremonial Axes in a Florida Mound. *American Antiquarian and Oriental Journal* 4:100-109.
- Driscoll, K. and L. Jones
2008 *An Archaeological and Historical Survey of the Indian River lagoon Preserve State Park*. Ms on file Florida Division of Historical Resources.
- Dunbar, J., S. Lockwood and T. Neilson
1978 *Huntoon Island State Park Cultural Resource Survey*. Ms on file with the Florida Division of Historical Resources.
- Dunbar, J. S.
1980 *Ponce DeLeon Springs*. Ms on file Florida Division of Historical Resources.
- Dunbar, J. S. and M. Glowacki
2008 *Assessment and Documentation of Cultural Resources in Dunns Creek State Park, Putnam County, Florida*. Ms on file Florida Division of Historical Resources.
- Dunbar, J. S. and C. Newman
2004 *Assessment and Documentation of Cultural Resources in Seminole State Forest, Lake County, Florida*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

2006 *Assessment and Documentation of Cultural Resources on the Hilochee Wildlife Management Area in units in Lake and Polk Counties, Florida*. MS on file Florida Division of Historical Resources, Tallahassee, FL.
- East, A.
1999 *Rethinking Compliance Archaeology: A GIS Study of the Validity of Using FDOT Road Right-of-Ways as Research Transects*. MA, University of South Florida.
- Ellis, G. D.
1994 *Cultural Resources Study of Seminole County, Florida: Archaeology*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.
- ESRI
2006 *Modeling Archaeological Sensitivity in Vermont with GIS*.
<http://www.esri.com/news/arcnews/spring06/articles/modeling-archaeological.html>.

2009 *GIS Best Practices: GIS for Archaeology*.
<http://www.esri.com/library/bestpractices/archaeology.pdf>.

Estabrook, R. W.

1988 *Cultural resource assessment of the Heathrow West Project site, Seminole County, Florida*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

1991 *Cultural Resource Assessment of the Plantation PUD Project Site, Seminole County, Florida*. Ms on file Florida Division of Historical Resources.

2000 *Cultural Resources Assessment Survey of the Proposed Buccaneer Gas Pipeline, Florida [Volume 1: Final Report of Findings; Volume 2: Appendices]*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

2002 *A Cultural Resource Assessment Survey of the Blue Spring State Park Roadway and Cabin Sites project in Volusia County, Florida*. MS on file with the Florida Division of Historical Resources.

2004 *Phase 1 Cultural Resource Survey for the CR 466A PD&E Study from the Lake/Sumter County Line to US 27/441, Lake County, Florida*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

Estabrook, R. W. and C. Sims

2002 *A Cultural Resource Assessment Survey of the Lake Louisa State Park Roadway and 60 Campsites (Phase IIIa) Project in Lake County, Florida*. Ms on file Florida Division of Historical Resources.

Faught, M. and D. Thulman

2009 *Silver Spring Paleoindian Research Project, Report of Field Operations, December 2003*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

FDEP

2002 *Silver River State Park Unit Management Plan*. Ms on file Florida Department of Environmental Protection, Tallahassee, FL.

2003a *Addison Blockhouse Historic State Park, Bulow Creek State Park, Bulow Plantation Ruins Historic State Park, Tomoka State Park, Multi-Park Unit Management Plan* Florida Division of Recreation and Parks.

2003b *Haw Creek Preserve Unit Management Plan*. Ms on file Florida Department of Environmental Protection, Tallahassee, FL.

2004a *Allen David Broussard Catfish Creek Preserve State Park Unit Management Plan*. On file with The Florida Department of Environmental Protection, Tallahassee, FL.

2004b *Dunns Creek State Park Unit Management Plan*. Ms on file Florida Department of Environmental Protection, Tallahassee, FL.

2004c *Indian River Lagoon State Buffer Preserve Land Management Plan*. Ms on file Florida Department of Environmental Protection, Tallahassee, FL.

2004d *Lake Griffin State Park Unit Management Plan*. Ms on file Florida Department of Environmental Protection, Tallahassee, FL.

2004e *Lake Kissimmee State Park Unit Management Plan*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

2005a *Blue Spring and Hontoon Island Unit Management Plan*. Ms on file Department of Environmental Protection, Tallahassee, FL.

2005b *Kissimmee Prairie Preserve State Park Unit Management Plan*. Ms on file Florida Department of Environmental Protection, Tallahassee, FL.

2005c *Lake Louisa State Park unit Management Plan*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

2005d *St. Sebastian River Preserve State Park Unit Management Plan*. Ms on file Florida Department of Environmental Protection, Tallahassee, FL.

2005e *Washington Oaks Gardens State Park Unit Management Plan*. Ms on file Florida Department of Environmental Protection, Tallahassee, FL.

2005f *Wekiva River Basin State Parks: A multi-unit management plan*. Ms on file Florida Department of Environmental Protection.

2006a *DeLeon Springs State Park Unit Management Plan*. Ms on file Florida Department of Environmental Protection, Tallahassee, FL.

2006b *Gamble Rogers Memorial State Recreational Area at Flagler Beach*. Ms on file Florida Department of Environmental Protection, Tallahassee, FL.

2008 *Ravine Gardens State Park*. Ms on file Florida Department of Environmental Protection, Tallahassee, FL.

FDHR

1991 *National Register of Historic Places Registration Form: Twin Mounds Archaeological District 8OR3230*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

1993 *Florida's Comprehensive Historic Preservation Plan (Historic Contexts, Version of 9-27-93)*. Florida Division of Historical Resources.

FDOT

1998 *Cultural Resource Assessment Survey for the State Road 25 (US Highway 27) Project Development and Environmental (PD&E) Study from US 192 to SR 91 (Florida's Turnpike) in Lake County, Florida [Volume I;II]*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

FGS

2002 *First Magnitude Springs of Florida* Open file report no. 85 on file Florida Geological Survey, Tallahassee, FL.

2003 *Florida Spring Classification System and Spring Glossary*. Ms on file Florida Geological Survey, Tallahassee, FL.

Fillman, J. and S. L. Richards

1995 *Cultural Resources Assessment Request Specifically Addressing Archaeological and Historic Data USACOE Individual Permit ECOBANK Green Swamp Property, approximately 1,007 acres, and Phase I Site, approximately 260 acres, Lake Lousia and Green Swamp*. Ms on file Florida Division of historical Resources, Tallahassee, FL.

Fisher, C. T. and G. M. Feinman

2005 *Landscapes over Time: Resilience, Degradation, and Contemporary Lessons In Focus American Anthropologist* 107(1):62-69.

Florida_Department_of_Environmental_Protection

2008 *Sebastian Inlet State Park Unit Management Plan*. Ms on file with the Florida Department of Environmental Protection.

Gillgrass, C., Brown, Tom, McDougall, Gary

2007 *What's New with Geodatabases*. In http://esri.com/events/uc/07_workshops/whats_new_geodb_arcsde.pdf. ESRI. Accessed October 15, 2009.

Gluckman, S. J., Baker, Henry A.

1967 *Archaeological Investigations at Bulow Plantation Ruins State Park: A Preliminary Report*.

Goggin, J. M.

1952 *Space and Time Perspective in Northern St. Johns Archeology, Florida*. Yale University Publications in Anthropology 47. Yale University Press, New Haven.

Griffin, J. W.

1949 *Nocoroco, A Timucua Village of 1605 Now in Tomoka State Park. Florida Historical Quarterly* 27:340-361.

1952 *The Addison Blockhouse. The Florida Historical Quarterly* 30(3):276-293.

1952 *Bulow House Ruins*. Unpublished drawings on file, St. Augustine Historical Society, St. Augustine, Florida.

Griffin, J. W. and H. Smith

1946 *Field Notes: V-44* Ms on file Florida Museum of Natural History, Gainesville, FL.

Griffin, P. a. T. P.

2000 *Preliminary Archaeological Investigations at the Carter and Hernandez Plantations along with St. Johns Culture Habitation Complexes at the Faver-Dykes State Park, St. Johns County, Florida*. Ms on file with the Florida Division of Historical Resources.

Handley, B., T. J. Kozma and B. S. Marks

2007 *An Intensive Cultural Resource Assessment Survey of the Wekiva Mitigation Bank Tract, Lake County, Florida [and ADDENDUM]*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

Handley, B. and J. Nash

2005 *An Intensive Cultural Resource Assessment Survey of the Karlton Tract, Orange and Lake Counties, Florida*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

Harvey, B. G.

1996 *Phase I Historic Resources Survey, Kissimmee River Restoration Project, Osceola and Polk Counties, Florida*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

Hemmings, E. T.

1975 *The Silver Springs Site: Prehistory in the Silver Springs Valley, Florida*. *The Florida Anthropologist* 28:141-158.

Horvath, E.

1986 *The Archaeological Resources of Hernando County: A Site Location Predictive Model*. M.A., University of South Florida.

2001 *Cultural Resource Assessment Survey Substantial Deviation the Villages of Sumter DRI Sumter County, Florida*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

Janus Research

1996 *Cultural Resource Assessment Survey of the Lake Louisa State Park 3.5 Mile Road/Ranger Station Project, Lake County, Florida*. Ms. on file, Department of Environmental Protection, Tallahassee.

1998 *A Cultural Resource Assessment Survey and Phase II Investigation for SR 5/US-1 Bridge Replacement in Volusia County, Florida*. Ms on file Florida Division of Historical Resources.

2001 *Cultural Resource Survey of SR 500 (US 441) from Picciola Rd to County Rd 42, Lake, Sumter, and Marion Counties*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

2008 *ADDENDUM Cultural Resource Assessment Survey Wekiva Parkway (SR 429)SR 46 Realignment Project Development & Environment (PD&E) Study Orange, Lake and Seminole Counties, Florida*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

Johnson, R. E.

1998 *An Archaeological Site Assessment Survey of the Inland Navigation District, SJ-1 New Roadway Easement, St. Johns County, Florida*. Florida Archaeological Services, Inc., Ms on file Florida Division of Historical Resources, Tallahassee.

Johnson, W. G.

1986 *The Archaeology of the Green Swamp: A Predictive Model for a Swamp Environment*, University of South Florida.

Jones, J. S.

1981 *An Archaeological Site Predictive Model for Marion County, Florida*. M.A. Thesis on file University of South Florida, Tampa, FL. Submitted to M.A.

Kvamme, K. L.

2006 *There and Back Again: Revisiting Archaeological Locational Modeling*. In *GIS and Archaeological Site Location Modeling*, edited by M. W. Mehrer, Wescott, Konnie L., pp. 3-38. CRC Press, Boca Raton.

Lammers, J., C. Newman and S. W.

1999 *Inventory and Assessment of Cultural Resources the Fechtel Tract and Lower Wekiva River State Reserve, Lake and Seminole Counties, Florida*. Ms on file Division of Historical Resources.

Lock, G.

1995 *Archaeological Computing, Archaeological Theory and Moves Towards Contextualism*. In *Computer Applications and Quantitative Methods in Archaeology*, edited by J. Huggett and N. Ryan, pp. 13-18. BAR International Series 600. Tempus Reparatum, Oxford.

Madry, S., G. Smith and C. Whitehill

2001 *Archaeological Survey and Development of A GIS-Based site Probability Model, St. Johns County, Florida*. Environmental Services Inc. Submitted to the St. Johns Growth Management Services.

Marron, J.

1988 *Preliminary Report on Excavations at the site of Fort Mosé, 1987*. Ms on file with the Florida Museum of Natural History, University of Florida, Gainesville.

Memory, M. and C. Newman

1998 *Inventory and Assessment of Cultural Resources on the Allen David Broussard Catfish Creek State Preserve, Polk County, Florida*.

Memory, M., C. Newman and B. Swann

2002 *Assessment and Documentation of Cultural Resources of the Kissimmee Prairie Preserve State Park, Okeechobee County, Florida*. Ms on file Florida Division of Historical Resources.

Milanich, J. T.

1994 *Archaeology of Precolumbian Florida*. University Press of Florida, Gainesville.

1995 *Florida Indians and the Invasion from Europe*. University of Florida Presses, Gainesville.

Milanich, J. T. and C. Payne

1993 Introduction to Historic Contexts. In *Florida's Comprehensive Historic Preservation Plan (Historic Contexts, Version of 9-27-93)*, edited by FDHR. Florida Division of Historical Resources, Tallahassee.

Miller, J. J.

1977 *Cultural Resource Assessment of the Palm Coast Property: Phase I Results*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

1982 *Archaeological and historical assessment of two tracts in Flagler County, Florida (Matanzas Shores DRI)*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

Mink, P. B., Stokes, B., Pollack, David

2006 Points vs. Polygons: A Test Case Using Statewide Geographic Information System. In *GIS and Archaeological Site Location Modeling*, edited by M. W. Mehrer, Wescott, Konnie L., pp. 219-240. CRC Press, Boca Raton.

Mistovich, T.

1986 *A cultural resources and magnetometer survey, Indian River County, Florida*. MS. on file, Florida Division of Historical Resources

Mitchem, J. M.

1989 *Redefining Safety Harbor : Late Prehistoric/Protohistoric Archaeology in West Peninsular Florida*, University of Florida.

Myers, R. L. and J. J. Ewel (editors)

1990 *Ecosystems of Florida*. University of Central Florida Press, Orlando.

Neill, W. T.

1958 A Stratified Early Site at Silver Springs, Florida. *The Florida Anthropologist* 11 (2):35-52.

Newman, C.

1998 Memorandum and field notes from first phase of C.A.R.L. investigation of Kissimmee Prairie State Preserve. on file Florida Division of Historical Resources, Tallahassee, FL.

2003 *Field Notes: Matanzas State Forest and Faver Dykes State Park Addition*. CARL Cultural Resources Management Program, Bureau of Archaeological Research.

2005a *Florida Master Site File Record for FL263*. Ms on file Florida Division of Historical Resources.

2005b *Limited Testing and Monitoring at the Bulow Plantation Ruins State Historic Site, Flagler County, Florida*. CARL Archaeological Survey.

Newman, C. and M. Glowacki

2003 *Inventory and Assessment of Cultural Resources in the Archie Carr Sea Turtle Refuge, Brevard County, Florida*. Ms on file Florida Division of Historical Resources.

Newman, C., B. Swann and P. Vojinovski

2001 *Historical and Archaeological Investigations within the St. Sebastian River State Buffer Preserve, Brevard and Indian River Counties, Florida*. Ms on file Florida Division of Historical Resources.

Newman, C. and P. Vojinovski

2002a *Archaeological Testing at Silver River State Park, Ranger Residence, Site B, in the Vicinity of Ishti-Semoli (8MR2703) with Listing of Additional Artifacts Found at Site by Park Personnel*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

2002b *Archaeological Testing for the Proposed New Day Use Area, Silver River State Park, Marion County, Florida*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

Newman, C. and B. R. Weisman

1993 *An Archaeological Assessment of the Wekiva River Buffers Property (Plantation Tract), Seminole County, Florida*. Ms on file Florida Division of Historical Resources.

1993 *An Evaluation of the Potential for Archaeological Site Discovery on the Seminole Forest Wildlife Management Area (Seminole State Forest) and Certain Adjacent Portions of the Lower Wekiva River State River State Reserve*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

NPS

1994 *Site Investigation: Fort Mosé (Gracia Real de Santa Teresa de Mose: A Free Black Town in Spanish Colonial Florida)*. Ms on file with the Florida Division of Historical Resources.

Overstreet, C.

2004 *Gator Creek*. Florida Classics Library, Port Solerno, Florida.

Parker, B. T.

2000 *Cultural Resources Phase I Assessment of the Proposed Roadway, Parking, Bridge, and Boardwalk Project (Phase III), Lake Louisa State Park, Lake County, Florida*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

2001 *Historic Properties Survey and Assessment Within the One Mile Area of Potential Effects of the Proposed 200ft Rock Springs/ Bunker Telecommunications Tower, Orange County, Florida*. Ms on file Florida Division of Historical Resources.

Payne, T. M.

1996 *Limited archaeological investigations at 8VO244 to establish a construction date for Structure 1; Bulow Creek State Park, Volusia County, Florida* Report prepared for the Florida Department of State, Bureau of Archaeological Research by American Preservation Consultants, Inc., St. Augustine, Florida.

1998a *Investigations at the Moultrie/Bunch/Dummett plantations of the British through Territorial periods: a preliminary report*. In *48th annual meeting of the Florida Anthropological Society*, Sarasota, Florida.

1998b Some insights into the lifeways of the owners and workers while residing at the Bunch and later Dummett plantations on Tomoka Basin during the early nineteenth century. In *48th annual meeting of the Florida Anthropological Society*, Sarasota, Florida.

1999 Preliminary archaeological investigations at the Moultrie/Bunch/Dummett British through Territorial-period plantations. *The Florida Anthropologist* 52(1-2):103-113.

Payne, T. M. and P. Griffin

2002 *Archaeological Investigations at the Nineteenth Century Sugar Boiling Facility and the Immediate Area in De Leon Springs State Park, De Leon Springs, Florida*. Report on file. Florida Department of Environmental Protection. Tallahassee, Florida.

Payne, T. M., Griffin, Patricia C.

2001 *Sugar Making in East Florida and the History of Eight Plantations*. American Preservation Consultants, Inc. Submitted to the Volusia Anthropological Society. Copies available from the Department of Environmental Protection.

Piatek, B.

1992 *The Tomoka Point Archaeological Survey, Tomoka State Park, Volusia County, Florida*. Ms on file Division of Historical Resources.

1993 *The Washington Oaks Archaeological Survey, Washington Oaks State Gardens, Flagler County, Florida*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

1995 *Tomoka Archaeological Survey II, Tomoka Basin Geopark, Volusia County, Florida*. Ms on file Florida Division of Historical Resources.

Piper, H. M., Jacquelyn G. Piper

1980 *An Archaeological Survey of the Levee Corridors of the Proposed Green Swamp Flood Detention Area, Polk, Sumter, and Lake Counties, Florida*. Report prepared for Southwest Florida Water Management District, Brooksville.

Pope, C.

1988 *A cultural resources assessment survey of the proposed plantation PUD*. Ms on file Florida Division of Historical Resources.

Purdy, B.

1990 *Wetsite Archaeology*. Telford Press, New Jersey.

Purdy, B. A.

1981 Investigations into the Use of Chert Outcrops by Prehistoric Floridians: The Container Corporation of America Site. *The Florida Anthropologist* 34:90-108.

1986 Memo on file, DeLeon Springs State Recreation Area.

Randall, A. R. and K. E. Sassaman

2009 *Cultural Resource Assessment Survey of Infrastructure Repair and Trail Rebuilding within Hontoon Island State Park*. Ms on file with the Laboratory of Southeastern Archaeology, Department of Anthropology, University of Florida, Gainesville.

Richards, S. L.

2001 *A Cultural Resource Assessment Survey of the Proposed Chelsea's Run Development Site Located in Section 3, Township 19 South, Range 24 East, Lake County, Florida*. Ms on file Florida Division of Historical resources, Tallahassee, FL.

Rosenau, J. C., G. L. Faulkner, C. H. Hendry and R. W. Hull

1977 *Springs of Florida*. Florida Department of Natural Resources Geological Bulletin No. 31 (revised): Florida Department of Natural Resources: Tallahassee, FL. .

Rouse, I.

1951 *A Survey of Indian River Archaeology, Florida*. Yale University Publications in Anthropology 44. Yale University, Department of Anthropology, New Haven

Russo, M. and D. StClair

1990 *Tomoka Stone: Testing seasonality and settlement during the Orange Period along Florida's East-Central Coast*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.

Sassaman, K. E.

2003a *Crescent Lake Archaeological Survey 2002: Putnam and Flagler Counties, Florida*. Ms on file Florida Division of Historical Resources.

2003b *St. Johns Archaeological Field School 2000-2001: Blue Spring and Hontoon Island State Parks*. Ms on file Laboratory of Southeastern Archaeology, Department of Anthropology, University of Florida, Gainesville.

Sassaman, K. E. and D. G. Anderson

1996 The Need for a Regional Perspective. In *The Paleoindian and the Early Archaic Southeast*, edited by K. E. Sassaman and D. G. Anderson, pp. 215-221. University of Alabama Press, Tuscaloosa.

Sassaman, K. E., Blessing, Meggan E. , Randall, Asa R.

2006 Stallings Island Revisited: New Evidence for Occupational History, Community Pattern, and Subsistence Technology *Society for American Archaeology* 71(3):539-565.

Sassaman, K. E., C. Russell and J. C. Endonino

2000 *St. Johns Archaeological Project Phase I: A GIS Approach to Regional Preservation Planning in Northeast Florida*. Ms on file Laboratory of Southeastern Archaeology, Department of Anthropology, University of Florida, Gainesville.

Spencer, L. G.

1971 History, Site Survey, and Ceramics of Fort Mose. on file Florida Museum of Natural History, Gainesville, FL.

- Stanton, E. P.
1949 Early Plantations of the Halifax Concerning the Ruins. In *N. P. Ormond Village Improvement Association*.
- Stanton, W.
2002 *Field Visit to Katie's Landing Site (8SE1177)*. Bureau of Natural and Cultural Resources, Ms on file Florida Department of Historical Resources, Tallahassee, FL.
- StClair, D.
1998 *Cultural Resource Assessment Survey of the Wratschko Residential Development, Flagler County, Florida*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.
- Stevens, J.
1997 *Draft Phase I Archaeological Survey Management Unit 10A Avon Park Air Force Range, Avon Park, Florida*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.
- Stipp, J. J.
1991 Memo and Radiocarbon Dating Analysis on file, De Leon Springs State Recreation Area.
- Stokes, A. V.
1999 *A Cultural Resource Assessment Survey of Anastasia State Recreation Area, St. Johns Country, Florida*. Survey number 5571, conducted for the Florida Park Service as listed in the FMSF. Date unknown. Tallahassee, Florida.
- Strickland, A.
1980 *Ormond-On-The-Halifax: A centennial History of Ormond Beach, Florida*. Southeast. Printing and Publishing Company, Holly Hill, Florida.
- SWFWMD
2009 Green Swamp Interactive.
<http://www.swfwmd.state.fl.us/education/interactive/greenswamp/greenswamp.html>.
- Tamers, M.
1986 Memo and Radiocarbon Dating Analysis. on file, De Leon Springs State Recreation Area.
- Tesar, L. D.
2003 *Blue Spring State Park Archaeological Sites, VO40, VO41, VO42 and VO43: Resolving locational confusion*. Ms on file Florida Division of Historical Resources.
- Triel, L.
2004 *Silver River State Park Archaeological Resource Monitoring Report: Boardwalk and Canoe Launch Project*. Ms on file Florida Division of Historical Resources, Tallahassee, FL.
- Wayne, L. B., Dickinson, Martin F, Hall, Gregory A
2001 *Sugar Plantation Heritage Tourism Plan: Structural Stabilization Study*. SouthArc, Inc. . Submitted to the Volusia Anthropological Society. Copies available from the Department of Environmental Protection.

Weisman, B. and W. H. Marquardt

1988 *Archaeology of the SWFWMD Projects : A Comprehensive Archaeological Resource Inventory for the Southwest Florida Water Management District, Brooksville.* Dept. of Anthropology, Florida Museum of Natural History, University of Florida.

Weisman, B. R.

1999 *Archaeology at the Crossroads: New Directions in Transportation Archaeology in Florida: An introductory companion report for the seven-volume FDOT series.* University of South Florida.

2002a *Pioneer in Space and Time : John Mann Goggin and the Development of Florida Archaeology.* The Ripley P. Bullen Series. University Press of Florida, Gainesville.

2002b Using an Evaluation Matrix to Manage Archaeological Sites: An Alternative to Significance? In *Thinking About Significance. Papers and Proceedings, Florida Archaeological Council, Inc., Professional Development Workshop*, edited by R. J. Austin, K. Hoffman and G. Ballo, pp. 187-198. Florida Archaeological Council, Inc, Tampa.

Weisman, B. R., S. Hopper and A. and East

1999 *Managing Archaeological Significance: Recommended Strategies for FDOT District 1.* Prepared for the Florida Department of Transportation, Central Environmental Management Office. University of South Florida.

Weisman, B. R. and C. Newman

1990 *Archaeological Investigation at Twin Mounds, Rock Springs Run State Reserve.* Ms. on file, Florida Division of Historical Resources, Tallahassee, FL.

Wharton, B. R.

1984 *Archaeological Resources of the Upper Hillsborough Flood detention Area, Pasco and Hillsborough Counties, Florida.* Southwest Florida Water Management District.

1984 *The Presettlement Forest Cover of the Green Swamp Flood Detention Area, Central Florida.* Southwest Florida Water Management District.

White, W. A.

1970 *The Geomorphology of the Florida Peninsula.* Florida Geological Survey Geological Bulletin No. 51.

Wilson, R.

1945 The Bulow Plantation, 1821-1835. *The Florida Historical Quarterly* 23((4)):228-241.

Wisembaker, M.

1997 *An Archaeological Survey of the Proposed Entrance Road and Trailhead at Silver River State Park in Marion County, Florida.* Ms on file Florida Division of Historical Resources, Tallahassee, FL.

1999 *An Archaeological Survey of a Proposed New Camping Area at Silver River State Park, Marion County, Florida.* Ms on file Florida Division of Historical Resources, Tallahassee, FL.

2000 *An Archaeological Survey of a Proposed Area for Cabins at Silver River State Park, Marion County, Florida.* Ms on file Florida Division of Historical Resources, Tallahassee, FL.

Woodbury, J.

2006 *Replacement Shop Building Project # 60601 Washington Oaks Gardens State Park, Flagler County.* Ms on file Florida Division of Historical Resources, Tallahassee, FL.

2007 *The Planting of Eight 65 Gallon Camellia Bushes, Washington Oaks Gardens State Park, Flagler County, Florida.* Ms on file Florida Division of Historical Resources, Tallahassee, FL.

APPENDIX A

FMSF Forms

List of corrected archaeological site plots and newly recorded archaeological sites

District 3 State Park	FMSF Number	Site Name	Corrected Plot	New Site
Addison Blockhouse State Park	8VO193	Addison Blockhouse	Yes	
Addison Blockhouse State Park	8VO7496	Addison Sugar Mill	Yes	
Anastasia State Park	8SJ3483	St. John Electric Railroad Line	Yes	
Anastasia State Park	8SJ69	Spanish Coquina Quarries	Yes	
Anastasia State Park	8SJ3536	Sand Groin	Yes	
Bulow Creek State Park	8VO244	McHardy Plantation	Yes	
Bulow Plantation Ruins State Park	8FL7C	Bulow Plantation Slave House Ruins	Yes	
DeLeon Springs State Park	8VO5277	Ditch Site	Yes	
DeLeon Springs State Park	8VO5279	Mined Mound	Yes	
Gamble Rogers State Park	8FL263	House of Refuge	Yes	
Gamble Rogers State Park	8FL897	No name		Yes
Lake Griffin State Park	8LA2366	Jenna T Site	Yes	
Lake Louisa State Park	8FL896	Lake Louisa Saw Mill		Yes
Lake Louisa State Park	8LA4238	No name		Yes
North Peninsula State Park	8VO7315	Gamble Boiler	Yes	
Rock Springs Run Reserve State Park	8OR449	Rock Springs Run 3/Haystack	Yes	
Rock Springs Run Reserve State Park	8OR3230	Twin Mounds	Yes	
Rock Springs Run Reserve State Park	8OR9987	Wekiva River Barge		Yes
Sebastian Inlet State Park	8BR1694	O'Toole/Woehle Site	Yes	
Sebastian Inlet State Park	8IR26	Spanish Fleet Survivor's and Salvor's Camp	Yes	
Sebastian Inlet State Park	8IR42	North of Sebastian Inlet McLarty Museum	Yes	
Silver River State Park	8MR532	Silver River 2	Yes	
Silver River State Park	8MR1878	Cactus Flower Site	Yes	

APPENDIX B

Environmental and Cultural Criteria Matrix for GIS Model

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – Addison Blockhouse Historic State Park

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide (0-30 m) | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|---|----|
| 1. Excessively well-drained and Well-drained upland areas | 12 |
| 2. Moderately well-drained or Somewhat-poorly drained soils | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20%)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score –Allen David Broussard Catfish Creek Preserve

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide (0-30 m) | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|---|----|
| 1. Excessively well-drained and Well-drained upland areas | 12 |
| 2. Moderately well-drained or Somewhat-poorly drained soils | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – Anastasia State Park

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|--|----|
| 1. Highest: Well-drained (moderately, well-drained, and excessively) upland areas | 12 |
| 2. Well-drained (moderately, well-drained, and excessively) or Somewhat-poorly drained | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – Blue Spring State Park

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide (0-30 m) | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|---|----|
| 1. Excessively well-drained and Well-drained upland areas | 12 |
| 2. Moderately well-drained or Somewhat-poorly drained soils | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – Bulow Creek State Park

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide (0-30 m) | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|---|----|
| 1. Excessively well-drained and Well-drained upland areas | 12 |
| 2. Moderately well-drained or Somewhat-poorly drained soils | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20%)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – Bulow Plantation Ruins Historic State Park

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide (0-30 m) | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|---|----|
| 1. Excessively well-drained and Well-drained upland areas | 12 |
| 2. Moderately well-drained or Somewhat-poorly drained soils | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20%)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – Colt Creek State Park

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|--|----|
| 1. Highest: Well-drained (moderately, well-drained, and excessively) upland areas | 12 |
| 2. Well-drained (moderately, well-drained, and excessively) or Somewhat-poorly drained | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – De Leon Springs State Park

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|---|----|
| 1. Excessively well-drained and Well-drained upland areas | 12 |
| 2. Moderately well-drained or Somewhat-poorly drained soils | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – Dunns Creek State Park

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide (0-30 m) | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|---|----|
| 1. Excessively well-drained and Well-drained upland areas | 12 |
| 2. Moderately well-drained or Somewhat-poorly drained soils | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20%)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – Faver-Dykes State Park

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|--|----|
| 1. Highest: Well-drained (moderately, well-drained, and excessively) upland areas | 12 |
| 2. Well-drained (moderately, well-drained, and excessively) or Somewhat-poorly drained | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – Fort Mose Historic State Park

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide (0-30 m) | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|---|----|
| 1. Excessively well-drained and Well-drained upland areas | 12 |
| 2. Moderately well-drained or Somewhat-poorly drained soils | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20%)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – Gamble Rogers Memorial State Recreation Area

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide (0-30 m) | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|---|----|
| 1. Excessively well-drained and Well-drained upland areas | 12 |
| 2. Moderately well-drained or Somewhat-poorly drained soils | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20%)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – Haw Creek Preserve State Park

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide (0-30 m) | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|---|----|
| 1. Excessively well-drained and Well-drained upland areas | 12 |
| 2. Moderately well-drained or Somewhat-poorly drained soils | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20%)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – Hontoon Island State Park

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide (0-30 m) | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|---|----|
| 1. Excessively well-drained and Well-drained upland areas | 12 |
| 2. Moderately well-drained or Somewhat-poorly drained soils | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – Indian River Lagoon State Park

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide (0-30 m) | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|---|----|
| 1. Excessively well-drained and Well-drained upland areas | 12 |
| 2. Moderately well-drained or Somewhat-poorly drained soils | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20%)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – Kissimmee Prairie Preserve State Park

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide (0-30 m) | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|---|----|
| 1. Excessively well-drained and Well-drained upland areas | 12 |
| 2. Moderately well-drained or Somewhat-poorly drained soils | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20%)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – Lake Griffin State Park

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide (0-30 m) | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|---|----|
| 1. Excessively well-drained and Well-drained upland areas | 12 |
| 2. Moderately well-drained or Somewhat-poorly drained soils | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – Lake Kissimmee State Park

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide (0-30 m) | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|---|----|
| 1. Excessively well-drained and Well-drained upland areas | 12 |
| 2. Moderately well-drained or Somewhat-poorly drained soils | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – Lake Louisa State Park

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide (0-30 m) | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|---|----|
| 1. Excessively well-drained and Well-drained upland areas | 12 |
| 2. Moderately well-drained or Somewhat-poorly drained soils | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – Lower Wekiva River Preserve State Park

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide (0-30 m) | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|---|----|
| 1. Excessively well-drained and Well-drained upland areas | 12 |
| 2. Moderately well-drained or Somewhat-poorly drained soils | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20%)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – North Peninsula State Park

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|--|----|
| 1. Highest: Well-drained (moderately, well-drained, and excessively) upland areas | 12 |
| 2. Well-drained (moderately, well-drained, and excessively) or Somewhat-poorly drained | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – Ravine Gardens State Park

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide (0-30 m) | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|---|----|
| 1. Excessively well-drained and Well-drained upland areas | 12 |
| 2. Moderately well-drained or Somewhat-poorly drained soils | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20%)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – Rock Springs Run State Park

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide (0-30 m) | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|---|----|
| 1. Excessively well-drained and Well-drained upland areas | 12 |
| 2. Moderately well-drained or Somewhat-poorly drained soils | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – Sebastian Inlet State Park

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|--|----|
| 1. Highest: Well-drained (moderately, well-drained, and excessively) upland areas | 12 |
| 2. Well-drained (moderately, well-drained, and excessively) or Somewhat-poorly drained | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – Silver River State Park

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|---|----|
| 1. Excessively well-drained and Well-drained upland areas | 12 |
| 2. Moderately well-drained or Somewhat-poorly drained soils | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – St Sebastian River Preserve State Park

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide (0-30 m) | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|---|----|
| 1. Excessively well-drained and Well-drained upland areas | 12 |
| 2. Moderately well-drained or Somewhat-poorly drained soils | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20%)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – Tomoka State Park

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide (0-30 m) | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|---|----|
| 1. Excessively well-drained and Well-drained upland areas | 12 |
| 2. Moderately well-drained or Somewhat-poorly drained soils | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20%)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – Washington Oaks Gardens State Park

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide (0-30 m) | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|---|----|
| 1. Excessively well-drained and Well-drained upland areas | 12 |
| 2. Moderately well-drained or Somewhat-poorly drained soils | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20%)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

Environmental and Cultural Criteria Matrix for GIS Model

Project: Archaeological Resource Sensitivity Modeling in Florida State Parks District 3: the East and Central Florida Region

Environmental Variable Proximity Value Assigned Score – Wekiwa Springs State Park

A. RIVERS and STREAMS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to River or Permanent Stream (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to Intermittent Stream (0-100 m, 100-200 m) | 12, 6 |
| 3. Knoll or swamp island | 30 |
| 4. Stable Riverine Island | 30 |

B. LAKES and PONDS (EXISTING or RELICT):

- | | |
|---|-------|
| 1. Distance to Pond or Lake (0-100 m, 100-200 m) | 12, 6 |
| 2. Distance to marsh or cypress head/swamp or slough (0-100 m, 100-200 m) | 12, 6 |

C. COASTAL:

- | | |
|--|-------|
| 1. Previously recorded or suggested occurrence of submerged or inundated resources | 30 |
| 2. Offshore island or keys | 30 |
| 3. Adjacency to lagoons, estuaries, embayments, bayous, ocean (0-100 m, 100-200 m) | 12, 6 |

D. WETLANDS:

- | | |
|--|-------|
| 1. Distance to Wetland (wetland > one acre in size) (0-100 m, 100-200 m) | 12, 6 |
|--|-------|

E. TOPOGRAPHY:

- | | |
|---|----|
| 1. High elevated landform such as ridge or knoll | 12 |
| 2. Top/Ridge Crest | 12 |
| 3. Relative elevation (relational to surrounding terrain) | 12 |

F. GEOMORPHOLOGY AND GEOLOGY AND OTHER ENVIRONMENTAL FACTORS:

- | | |
|---|--------|
| 1. Sinkholes, Caves, outcrops present | 12 |
| 2. Travel Corridor (0-30 m) | 30 |
| 3. Sole or important access to another drainage | 12 |
| 4. Ecotonal divide (0-30 m) | 12 |
| 5. Existing or Relict Spring | 30 |
| 6. Potential or Apparent Quarry for stone or coquina procurement (0-100 m, 100-200 m) | 30, 12 |
| 7. Special Environmental or Natural Area (these may be historic or prehistoric sacred or traditional site locations and prehistoric site types as well) | 30 |
| 8. Lake Cove/Peninsula/Head of Bay | 30 |

G. SOILS:

- | | |
|---|----|
| 1. Excessively well-drained and Well-drained upland areas | 12 |
| 2. Moderately well-drained or Somewhat-poorly drained soils | 6 |

H. OTHER HIGH SENSITIVITY FACTORS:

1. High likelihood of burials (Human Remains noted on FMSF)	30
2. High Previously-Recorded Site Density (Sites and/or Resource Groups)	30
3. High likelihood of containing significant site based on recorded or archival data or oral tradition (survey evals from FMSF = likely or eligible for the NRHP)	30
4. High likelihood of historic sites or (noted on FMSF or other informant data)	30
5. High likelihood of historic land use activities (e.g. Early Agriculture and Agro-industries)	12

I. NEGATIVE FACTORS:

1. Excessive Slope (>15%)	-30
2. Steep Erosional Slope (>20)	-30
3. Poor Drainage (poorly drained and very poorly drained)/flood zone	-30
4. Previously disturbed land as evaluated by a qualified archeological professional or engineer based on coring, earlier as-built plans, or obvious surface evidence	-12
5. Soils with an organic pan, underlying marl or clays, and slow to moderate internal drainage	-30
6. Landform modification (e.g. Dredge, Fill, Erosion, Accretion)	-30

Other Comments :

12 or below = Low Sensitivity

13-29 = Medium Sensitivity

30 and above = High Sensitivity

APPENDIX C

Survey Log