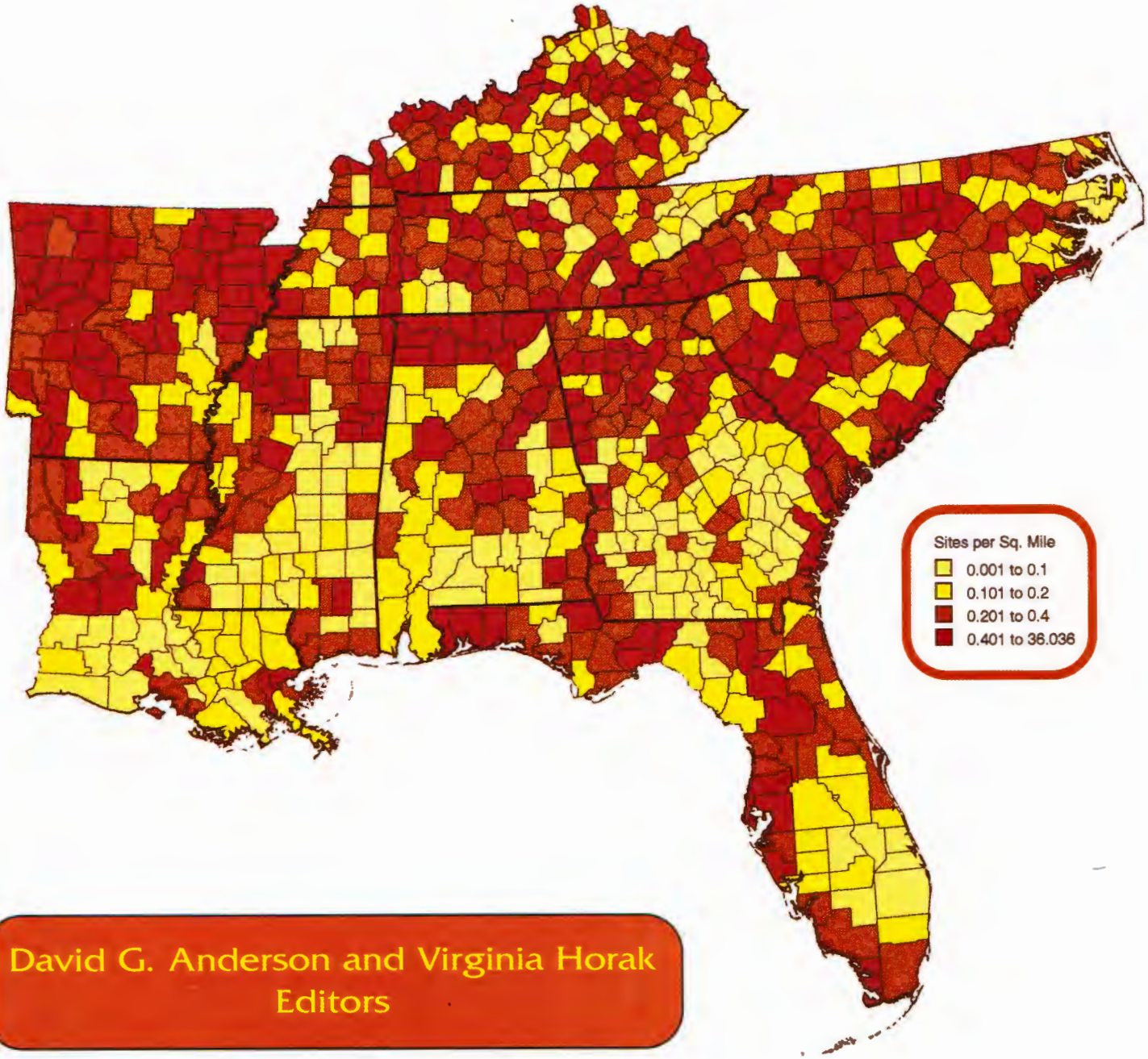
ARCHAEOLOGICAL SITE FILE MANAGEMENT: A SOUTHEASTERN PERSPECTIVE



David G. Anderson and Virginia Horak
Editors

The ***Readings in Archeological Resource Protection Series,*** published by the Interagency Archeological Services Division, is an outgrowth of the "Coping With Site Looting: Southeastern Perspectives" symposium held during the 54th Annual Meeting of the Society for American Archaeology.

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Cover map courtesy Anne Gisiger, Center for Advanced Spatial Technologies, University of Arkansas.

READINGS IN ARCHEOLOGICAL RESOURCE PROTECTION SERIES

No. 1 *Coping With Site Looting: Southeastern Perspectives* — John E. Ehrenhard, Editor

No. 2 *Site Destruction in Georgia and the Carolinas* — David G. Anderson and Virginia Horak, Editors

No. 3 *Archaeological Site File Management: A Southeastern Perspective* — David G. Anderson and Virginia Horak, Editors

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A SOUTHEASTERN PERSPECTIVE

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INTRODUCTION

David G. Anderson and Virginia Horak

The articles in this volume derive from a workshop of southeastern site file managers that took place March 22–23, 1995, at the GIS laboratory in the Department of Anthropology at the University of Georgia, Athens. The workshop was jointly sponsored by the National Park Service's Interagency Archeological Services Division (IASD), the Lamar Institute, and the Department of Anthropology at the University of Georgia. Funding for the workshop and this resulting publication came, in part, from a fiscal year 1995 grant from the National Park Service's Partnerships in Cultural Resources Training Initiative.

The workshop participants were: David G. Anderson, Keith Baca, Miguel (Mickey) Bonini, Terry Childs, Berle Clay, Keith Derting, Lela Donat, Eugene Futato, Joe Giliberti, Dolores Hall, Virginia Horak, Suzanne Hoyal, Sharon Pekrul, Philip (Duke) Rivet, Almeta Rowland, Kevin Smith, Marion Smith, Lee Tippett, and Mark Williams. Their addresses are included in the *Contributors* section at the end of this volume. David J. Hally, Steve Kowalewski, and Robert Rhoades, all from the Department of Anthropology at the University of Georgia, also attended part of the workshop.

Most of the workshop participants contributed papers for this volume. Jim Scurry and Michael Trinkley, both of whom had been invited to attend but had other commitments, also provided articles. The workshop was organized by Anderson and Horak. Mark Williams of the Lamar Institute and LaBau Bryan of the Department of Anthropology at the University of Georgia assisted with local arrangements. In producing this volume, Anderson handled technical coordination while Horak assumed primary responsibility for copyediting and manuscript assembly. Assistance from within the National Park Service in completing this project was provided by John E. Ehrenhard, Chief, IASD in Atlanta, and from Michael Auer, Sylvia Rose Augustus, and Rowland Bowers in the Washington Preservation Assistance Division.

This volume is the third in the *Readings in Archeological Resource Protection Series* published by IASD. It serves as a companion to earlier volumes dealing with site looting (Ehrenhard 1990) and site destruction (Anderson and Horak 1993).

PROJECT OBJECTIVES

As of early 1995, over 180,000 historic and prehistoric archaeological sites have been recorded in the Southeast—a figure that is growing at a rate of almost 10,000 sites a year. Site files are a critical aspect of our nation's cultural heritage, the primary and, in many cases, only records documenting the location, content, and condition of cultural resources in an area. The ability to access and use this information efficiently is critical to the effective management of cultural resources in the region. Furthermore, when subject to technical analysis, these site file records are capable of providing important insights about where past human populations lived and where significant, yet currently unrecorded, cultural resources may be found.

The March 1995 workshop and this subsequent publication are intended to foster communication between southeastern site file managers and their data providers. The ultimate goal is to help improve the regional database. Another related purpose is to present information on the state of archaeological site file management in the Southeast to a broad national audience. The articles herein illustrate current information management practices in the region; strengths and weaknesses of the systems that are in use; and some of the solutions that have been devised to deal with specific records

management problems. The articles also highlight the importance of site file data for both cultural resource management and research.

Other subjects that are touched on include the importance of site file data to successful review and compliance; the need to maintain accurate and up-to-date information (and how to do this); ways in which site file data is being integrated into geographic information systems (GIS); and the degree of accessibility of site file data. Appreciable attention is directed to pressing concerns facing site file managers, such as maintaining accurate data, dealing with massive backlogs, and properly utilizing staff resources. Increased awareness of the importance of site file data should, we believe, lead to an improvement in the forms being submitted by professionals and avocationals, as well as to an increased support for these systems. We also hope this volume will help information managers around the country justify greater effort on behalf of the professional and lay public to carefully record and update information on archaeological and historic sites. Southeastern archaeologists have long taken pride in the quality of their primary records and collections. While it may be presumptuous, we are proud of the work on site file management that has been done here in the Southeast and would like to think that the information in this volume will be of value and interest wherever people are trying to compile and work with site file data.

PROJECT HISTORY

Ongoing research exploring large-scale site and settlement distributions had resulted in archaeologists from IASD regularly contacting the region's site file managers in recent years (as reported in Anderson 1990, 1991, 1996). The data they graciously provided, when combined and plotted at large scale, revealed patterns of past land use that had never been seen before. Working with data from across the Southeast, however, also led to the realization that records management practices varied widely. Bringing the region's site file managers together, accordingly, could help foster both a greater awareness of the approaches employed in each state and better communication between the people responsible for maintaining these systems. This could lead, over time, to the site file data from state to state becoming more comparable and accessible and, as a result, more useful for research and resource management purposes.

In mid-1994, the editors of this volume submitted a proposal entitled *Site File Management and the Technical Review Process: Inventorying Cultural Resources at the State and Federal Level* to the National Park Service's Partnerships in Cultural Resources Training Initiative program. The proposal was accepted in late 1994, leading to the ensuing workshop and this publication in March and September 1995, respectively.

The workshop was a combination roundtable and symposium, with informal presentations by representatives of each organization, followed by open discussions. The meeting opened with welcoming remarks by Dr. Robert Rhoades, Chairman of the Department of Anthropology, University of Georgia, who noted the important role that archaeology and site file data linked to GIS technology can play in exploring global and regional patterns of change in environment and ecology. He also brought up the practical question of how state site files should be financed, based on the situation in Georgia, where minimal funding is available.

Mark Williams, Georgia Site File Director, then offered his own welcome to the group, giving a brief history of the University of Georgia campus and the GIS laboratory. Steve Kowalewski, an archaeologist in the Department of Anthropology, offered a number of remarks about the importance of systematic collections and records management for resolving large-scale patterning and explanation. Once the prefatory remarks were completed, attention shifted to individual presentations. Over the next day and a half, each participant gave a brief (fifteen- to thirty-minute) verbal presentation on the history of site file management in their state or locality, followed by a review of conditions and strengths and weaknesses of the current system.

Each presentation was followed by another ten to fifteen minutes of open discussion. A great deal of informal discussion also took place during coffee breaks, which were held about every hour. The final two hours of the workshop were devoted to an open and somewhat freewheeling discussion. Opportunity for further interaction was facilitated by a banquet held Wednesday night at the hotel where most of the participants were staying. The Lamar Institute helped handle local arrangements, providing coffee and refreshments throughout the workshop and setting up the dinner meeting.

Holding the workshop in a GIS lab permitted several on-line demonstrations, which were interspersed amid the state presentations. The conference participants had an opportunity to see the Georgia Site Files/GIS mapping system; an example of multimedia records management prepared by the University of Alabama (including on-line film clips of excavations in progress and images of individual artifacts, maps, and field notes); the National Archeological Database (NADB); and various World Wide Web (WWW) home-page sites, such as the one posted by the Center for Advanced Spatial Technologies (CAST), University of Arkansas, where NADB and many other cultural resources data reside. The entire meeting was video filmed, and the tapes are curated at the National Park Service's Southeastern Archeological Center in Tallahassee, Florida.

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THE SITE FILE AS A RESEARCH DATABASE: THE ALABAMA EXPERIENCE

Eugene M. Futato

INTRODUCTION

Q: I'm working on a paper about regional Middle Archaic settlement patterns. Can you give me a breakdown for Alabama of recorded Middle Archaic sites in riverine settings as opposed to the uplands?

A: I can give you Middle Archaic sites in alluvial valleys versus uplands.

Q: I'm really most interested in Morrow Mountain. Can you give me information for just the Morrow Mountain sites?

A: Sure.

Q: Also, I'm focusing on the interior Southeast, can you leave out sites in the Coastal Plain?

A: So, you want the number of Morrow Mountain sites in alluvial valleys versus the uplands, excluding all sites in the Coastal Plain?

Q: Can you do that?

A: Yes.

Q: How long will this take? Should I call you back in a couple of days; will you mail me the answer; or what?

A: I'm running the two queries now. They'll take about a minute and a half each.

Since its inception in July 1931, the Alabama State Site File, as it is now called, has been managed by research archaeologists at the University of Alabama. As a result, the site file has always been seen as a research tool. This is not incompatible with cultural resource management, however. The file is structured to provide the data necessary for cultural resource management, and the very reason we manage archaeological resources is for their research value. Perhaps this just indicates a slightly different perspective and emphasis.

Several considerations went into the 1988 creation of the present site file database. Our foremost concern was to create a true database. The ability to conduct somewhat sophisticated queries and analyses was seen as crucial. Use of a word processor, which would permit data input and output with only rudimentary search capacity, was deemed insufficient. Ease of file modification and data revision was a second major consideration.

We also believed that the entire site form, except the map, should be entered. Moreover, the entry should be in a file structure that maximized the amount of data suitable for query. For ease of use, all data was to be uncoded. For example, drainage basins would be entered as ALABAMA, COOSA, or CHATTAHOOCHEE, not 1, 2, or 3. Each of these considerations resulted in a larger file. At this time, the file contains 17,715 records comprising just over 26 megabytes. But the truth is that today even a fairly modest PC has no trouble handling this much data.

Another important consideration was data reliability on several levels, from data entry and editing to acceptance of data for entry, to verification of data using additional sources. Handling redundant site numbers for a single site or the duplication of a number for multiple sites was another concern. Standardization of data was also important.

The scope of a site file is broad but not very deep. Site files contain information about

many sites over a large area, but generally do not contain a great deal of information about any one site. As such, the natural focus of a site file is somewhat geographical. Site files may be seen as registers of places containing selected information about those places. This is how the Alabama file is viewed. The most crucial data about a site is location. Where is this site in both legal and environmental terms? The second set of data concerns significant site characteristics, for example, preservation, midden, mounds, glyphs, and human remains. Another set of data deals with components present. The file also includes fields for National Register of Historic Places (NRHP) status, date recorded, and recorder, along with text fields for site description, comments, and additional component information. The final fields, many of which do not appear on the site form, concern data reliability and status of the computer record.

THE DATABASE

The database for the Alabama State Site File is maintained in dBase. Each record has 241 fields comprising 608 bytes, plus text. The number of fields seems excessive to some people but is necessary to perform the level of queries we desire, such as the number of sites with Morrow Mountain components located in alluvial valleys outside of the Coastal Plain.

Each record begins with the site number and name. Site numbers are actually entered twice, as SITENO and as COUNTY and NUMBER. SITENO is an index field and is used for various report forms. The individual entries under COUNTY and NUMBER facilitate identifying blocks of site data.

The next section of data is for site size and location. Fields specify the site location by quadrangle map, UTM coordinates, and township and range. Data on elevation and site length, width, and depth follow. Site impacts and percent of destruction are next. NRHP eligibility is listed in this section. After this come fields concerning the level of archaeological investigation of the site.

A number of fields describing the site's environmental setting come next. These include the topographic setting; the physiographic district (and from this the physiographic section); the nearest water source type, distance, and direction; drainage basin; ground cover; and soil type and texture. Soil type and texture are separate fields, again to facilitate queries. They are followed by a checklist of some twenty-two selected site characteristics and/or site types, each as a separate field.

The majority of the fields, about 150 of the total 241, are for component data. Component data is entered by individual phase or horizon, if available, but in an upwardly hierarchical manner. For example, if the phase MOUNDVIL3 is entered, then LATEMISS, ANYMISS, and ANYABO are also entered. Where specific phases or horizons cannot be identified, data is as specific as possible. If the only diagnostic artifact is a limestone tempered cord-marked sherd, which may be Middle Woodland or Late Woodland, UNIDWOOD, ANYWOOD, and ANYABO are entered. A few residual fields are also provided for horizon markers that are important but more vague. Included in these are unidentified ceramics, small triangular points, and steatite or sandstone bowl sherds. A final option is UNKNOWNABO. Nonaboriginal sites are broken down by century, sixteenth through twentieth, and by date range. This data is also coded for historic aboriginal sites.

Next are two memo fields, COMPONENTS and COMMENTS. The former provides the data to support the checklist, while the latter is for comments, site description, references, and other text. They are followed by the date the site was recorded, the type and identity of the recording individual, agency, or institution, and the date the computer record was last revised.

DATA MANAGEMENT

As noted in the introduction, we believe it is important for the database to be reliable and to include information on the status of data collection and verification. This is done through a

series of special codes in standard fields, as well as through a series of special tracking fields.

Two key fields for this are STATUS and EDITED. Office staff enter newly received forms onto diskettes as they are received. Data on the form is entered as is; blank fields are left blank. At the end of each calendrical quarter, all new records are processed into the database, at which time some basic cleanup is performed. Staff looks for problems, such as spelling errors; incomplete, illogical or inconsistent data; unsubstantiated component assignments; or impossible UTM coordinates. At this time X is entered into the EDITED field and N, for new, into the STATUS field.

As resources permit, additional verification of the site form or the collection of missing data may be undertaken. Most often this work is supported by matching grants for site file updates from the Alabama Historical Commission. An alternate funding source is project specific funding, such as agency sponsored literature search, overview, or database projects.

The process of data verification and collection is generally broken down into two tasks, map search and literature search. The map search collects or verifies all geographic data available from such sources as quadrangle sheets, county soil surveys, and geologic maps. The literature search collects whatever other information can be obtained from available reports on the site. During these searches, all relevant fields are filled. If data is unavailable for a character field, UNAVAILABLE—or as much of the word as fits—is entered into the field. The code -1 serves the same purpose for numeric fields. For yes/no fields, such as components, a period (.) is used to indicate that the field does not apply. At the end of this process, an M, to indicate map data, or a T for text data, is entered into the field EDITED to indicate that the verification has been completed. When both the supplemental map and literature searches are complete and all fields have been accounted for, F for final is entered into the EDITED and STATUS fields.

A few other special codes and fields indicate form status. For example, COMPSDONE and SOILDATE indicate that just those sections of the form are complete and checked—subtasks that are often done separately.

Dealing with synonyms is an important aspect of data control. Some sites have more than one number, some numbers have been used more than once. These relationships are handled through a FLAG field. A blank field or a C indicates that the number is clear. No other site has been given this number; no other number has been given to this site. If a site has been given multiple numbers, one is called the master number or M in the FLAG field. The other number is reduced to a synonym, S in the field. For synonymous records, only the site number, flag, revision date, and comments are filled. Other character fields are filled with dashes, all numeric fields are filled with -9, and the date recorded is 11/11/1111. The appropriate cross references are described in the comments. Synonymous records do not carry other data because counting the same site twice in a query would skew the result. If two sites have been assigned the same number, one is given a new number, the cross references are added to the comments, and both numbers are considered master numbers.

In another attempt to reduce skewed data, a number of sites were reduced to synonyms when the database was initially created. It was common practice in Alabama in the 1930s and 1940s to assign separate site numbers to each individual mound at multimound sites; to separate areas of shell midden within a larger village midden, as they were called; or to mound and village pairs. We have since combined many of these and will likely combine others as we continue to update the database. A mound and village are one site, not two.

ENHANCEMENTS

A few simple dBase applications have been written to supplement the database. One is called ADDSITES. This is a simple sorting routine provided to the Alabama Historical Commission. Each quarter, all new or revised

records are sent to the Commission for entry into their copy of the database. ADDSITES locates records with the same site number, eliminates the oldest one, and recompiles the file and associated indexes.

Two other programs, also provided to the Alabama Historical Commission, were written to search the file for sites within defined areas. CIRCLES first asks for a centroid, as a site number or UTM coordinate. Search options are for all sites within any specified radius of the centroid, or for the nearest sites with the number of sites specified by the user. Sites within a specified radius are listed as encountered. Nearest sites are listed in rank order from 1 to n, with the site number and distance in meters provided. BOXES operates in a similar fashion. The box may be drawn by providing four UTM boundaries—north, south, east, and west. Alternately, a centroid may be provided as in CIRCLES, and a distance north, south, east, and west of the centroid specified. Sites are listed in the order encountered. Either program may be tailored for sites meeting specific criteria by setting a filter on the file prior to running the application. Also, the results for each may be sent to the printer or screen.

SOME FINAL CONSIDERATIONS

What are the future options for the Alabama State Site File database? Interface with Geographic Information System software is one direction in which we are moving. Atlas GIS has been obtained specifically for use with the site file. We chose Atlas for a number of reasons, including its relative simplicity, easy interface with dBase, and demonstrated utility with site file data at the University of Georgia (see Williams, this volume).

Another option under consideration is the development of a multimedia site file database. The Office of Archaeological Services is already developing several multimedia databases in conjunction with the Advanced Technology Group from the University of Alabama Seebeck Computer Center. This is being done for several teaching, research, and collections management needs, including the Dust Cave project, the Moundville site, and our inventory for compliance with the Native American Graves Protection and Repatriation Act (NAGPRA). A multimedia site file could include all the existing data, plus maps, photographs, plans and profiles, along with a multimedia front end to simplify the system's use.

As technologies for information management improve at an ever accelerating rate it is difficult to guess what the Alabama State Site File will be like in ten years, or even five years. Will site files, with appropriate safeguards, be available on the World Wide Web? Will there be a national site database? Form is hard to predict. But whatever its form, we hope there is no change in the substance of the Alabama State Site File. We hope the Alabama State Site File is, and remains, a useful information source for researchers and managers concerned with the archaeological resources of Alabama.

COMPUTERIZED SITE FILES IN ARKANSAS: UTILIZING NEW TECHNOLOGIES

Lela Donat

PART I — A GIS ENHANCED CULTURAL RESOURCE MANAGEMENT SYSTEM*

INTRODUCTION

In May 1993, the Arkansas Archeological Survey entered into a cooperative agreement with the Department of Arkansas Heritage (DAH) to develop an integrated digital information infrastructure. This project combined innovative data management technologies, long-distance networking potentials, and extensive statewide archeological and environmental data. The integrated system was designed to enable government agencies and other organizations to use computer-based mapping and analytical tools for management, planning, and research activities within the state of Arkansas. The project was made possible in large part by an Intermodal Surface Transportation Efficiency Act (ISTEA) grant from the Department of Transportation, and administered by the Mack-Blackwell National Rural Transportation Study Center, University of Arkansas, Fayetteville.

PROJECT OBJECTIVE

The primary objective of the GIS Enhanced Cultural Resource Management System project was the development of a computer-based geographic information system (GIS) map layer and an associated digital database containing comprehensive information on all archeological projects, surveys, and excavations in Arkansas. A second objective was to provide accessibility to other decision making agencies for their planning needs. This was accomplished by the recent technological advances in telecommunications and networking.

PROJECT PURPOSE

Section 106 of the National Historic Preservation Act requires federal agencies and state agencies using federal money to assess the effects of their projects on archeological and historic properties. Agencies must determine if archeological and historic properties exist within their project right-of-ways and consult with the State Historic Preservation Office (SHPO), which is part of the DAH. The SHPO and the requesting agency decide if new or additional archeological investigations are necessary before a project is initiated. It was a time-consuming process to determine where archeological projects had been undertaken in the state prior to the development of this archeological project database and GIS. Having this information readily available will save state and federal agencies time and money, and allow for more meaningful consultations between the SHPO and other agencies.

The developed integrated system was designed to augment the existing information system created and operated by the Survey. A key component of that original system is the Automated Management of Archeological Site Data in Arkansas (AMASDA) database. (See Part II of this article for more information on tracking projects with AMASDA.) This computerized

* Adapted from a technical report of the same name written by Thomas J. Green, Lela Donat, Jerry Hilliard, and Jami J. Lockhart. Arkansas Archeological Survey, 1995.

relational database management system consists of over 130 separate fields of information relating to each of the approximately 30,000 archeological sites in Arkansas (May 1995). AMASDA is coupled to a Geographic Resources Analysis Support System, or GRASS-based fully functional GIS, that provides the ability to digitize locational information, and to import existing digital data, such as digital line graphs, digital elevation models, and satellite imagery. Data can be manipulated, analyzed, and displayed as either color images, hard copy maps, or tabular information once it has been entered into the system. The Survey currently has a number of statewide GIS data layers on line. These include archeological, cultural and socioeconomic data themes, TIGER census data, transportation, hydrography, elevation, soils, and geology.

The AMASDA database standing alone was extremely useful in finding out where archeological sites were recorded. It could not provide information about where archeologists had looked for sites and found nothing. The Survey has compiled information on more than 3,265 archeological project reports statewide (May 1995). These archeological reports contain information on the location and extent of archeological investigations, even if no archeological sites were found. Knowing what areas have been surveyed for cultural resources and how the surveys were conducted are as important as determining the location of known archeological sites during the developmental planning process for highway construction, timber sales, or the placement of sewage treatment facilities. An agency may or may not be requested by the SHPO to do additional archeological work before construction begins. This depends on the type of surveys performed along with the information recorded about the project.

The integrated GIS relational database can display the locations and boundaries of these projects. This has the potential to greatly reduce redundant archeological investigations within the same location. Meaningful predictive models of archeological site location can be developed by using the existing information pertaining to the environmental and cultural characteristics associated with the presence or absence of sites.

PROJECT STEPS

Five steps were involved in the development and implementation of the archeological project GIS and accompanying relational database.

- The first step was the creation of a project database schema. The schema is the digital structure or framework designed to contain and manage the information. Decisions about the types of information to be included in the database were made in consultation with archeologists from the SHPO, since they are principal users of the system. Information encoded into the system includes the project name and AMASDA number, the name of the archeologist who performed the survey, the project dates, and the project's sponsor. The database also includes information on the project's size and location and the type of project, whether it is an intensive survey, archeological testing, or extensive excavation. Information on the field conditions, constraints, and subsurface indicators of archeological deposits allow reviewers to judge the adequacy of the investigation without imposing a judgmental confidence-level rating system. Along with the development of the database schema, an encoding sheet was designed. These forms mirror the database, thus reducing encoding errors (Figure 1).

- The second step was to gather all the reports of archeological projects completed in the state. Most of these were located in the Survey's archives. Approximately 350 reports not on file with the Survey were at the SHPO in Little Rock.

- Next, eight students from the Department of Anthropology, University of Arkansas, Fayetteville were hired to convert the information from written reports into digital

ARKANSAS ARCHAEOLOGICAL PROJECT AREA DATABASE

AMASDA Project No: _____ (to be assigned by AAS Registrar)

Project Name: _____

Report Available: yes ____ no ____ Submitted to AAS: yes ____ no ____

Year of Project: _____

Archeologist(s): _____

Investigating Entity: _____

Sponsor/Client: _____

Purpose of Project: Compliance ____, Research ____, Rescue ____

Type of Project: Judgmental Survey ____, Intensive/Systematic Survey ____, Field Survey with Site Testing ____, Site(s) Testing Only ____, Extensive Excavation ____, Mitigation ____, Remote sensing ____, Nautical Excavation _____

County(s): _____

USGS 7.5' Map Name(s) within Project Area: _____

_____

(please attach xerox of USGS map(s) with project boundary outlined)

Project Size: Total Hectares _____ No. Hectares Surveyed _____

If linear or segmented project area use Total length in Kilometers _____ and Total width of right-of-way in Meters_____. (For sewer or other projects where a portion of the project is described as a unit of hectares/acres and the remainder of the project area is linear, enter all data as noted above.)

Archeological Sites Investigated/Recorded During This Project:

Total Number of Sites Recorded/Investigated: _____

Number of sites determined by Principal Investigator to be potentially Eligible for inclusion in the National Register _____; Not eligible _____; Undetermined/unknown as to Eligibility _____

Figure 1 — The Arkansas Archaeological Project Area Database form (page 1 of 2).

Number of Crew Persons: _____ Number of Field Days: _____

Project Area Ground Cover: (check appropriate categories below)

Wooded ____, Pasture ____, plowed/disced ____, planted field ____, recently harvested field ____, rice field ____, secondary undergrowth vegetation ____, urban built environment ____, not reported/unknown ____

Restraints: (check appropriate categories below)

No major restraints ____, Flooding ____, Extreme slope ____, Secondary vegetation/ undergrowth ____, Hazardous materials ____

Subsurface Testing: (check appropriate categories below)

No subsurface testing ____, Shovel Tests ____, Auger Tests ____, Core Tests ____
Maximum Test Interval (in meters) _____ Screened ____ Unscreened ____

Controlled Excavation Units

Size of Unit: _____meters x _____meters, No. of units_____
_____meters x _____meters, No. of units_____
_____meters x _____meters, No. of units_____
_____meters x _____meters, No. of units_____

Feature Unit Excavation Only: _____ No. of Features Excavated: _____

Backhoe Trench(es): ____ No. of Trenches ____ Maximum Depth _____ (in meters)

Remote Sensing

Name Type: _____ Total Sq. meters Surveyed _____

Human Remains Reported: Yes ____ No ____ (includes historic cemeteries)

Figure 1 (cont.) — The Arkansas Archaeological Project Area Database form (page 2 of 2).

form. This was the most labor-intensive and time-consuming part of this project. First, each project was plotted on 7.5-minute USGS quadrangle maps. On the average, it took one hour per project to plot the boundaries and to extract project information from the report. Archeological excavations could be mapped relatively quickly, while right-of-way surveys for highways, power lines, pipelines, and large surveys took more time to interpolate and plot. Once plotted on USGS maps, the project boundaries were digitized into the GIS. Information for each project was encoded into the database. As of May 1995, there have been 3,263 projects entered into the system.

- The fourth step involved the conversion of U.S. Census TIGER data to a digital format for use in the Survey's integrated data management environment. The Center of Advance Spatial Technology at the University of Arkansas, Fayetteville, in cooperation with the Survey and DAH, supplied the raw TIGER files and programs to be used in the data conversion process. The TIGER data contains modern community boundaries, up-to-date highway maps, hydrographical coverage, and traditional census data. Knowledge of the modern environment is essential to the SHPO in making informed decisions concerning the need for archeological investigations prior to a project. These data layers provide the capability to cartographically overlay archeological project boundaries onto modern digital map layers for display and, more importantly, for analysis.

- The final step was the connection of the Survey and the SHPO to the Internet. The SHPO has a computer that can function as a GIS terminal (Figure 2). This computer connects via Internet to the Survey computer running the integrated data management system. Survey personnel not only provide on-site demonstrations and training, they maintain continuous communication and technical support for the SHPO staff.

The staff of the Registrar's Office and the Computing Services Program of the Survey maintain and update the project database. Access to add or delete information is restricted to these offices. Authorized on-line users are given a password to access the system. Currently, the primary user of the GIS component of the database system is the SHPO. Other agencies with access to the on-line project database include the Arkansas Highway and Transportation Department, the U.S. Forest Service, and the U.S. Army Corp of Engineers, Little Rock District. Each of these agencies must have an archeologist on staff. Archeologists not on line can request information about previous projects through the Registrar's Office. Hard copies of the archeological reports, site forms, site-related information, a list of all projects in the database, and two sets of 7.5-minute quadrangles maps—one with archeological projects plotted and one with sites plotted—are also available in the Registrar's Office for anyone with a demonstrated need to know.

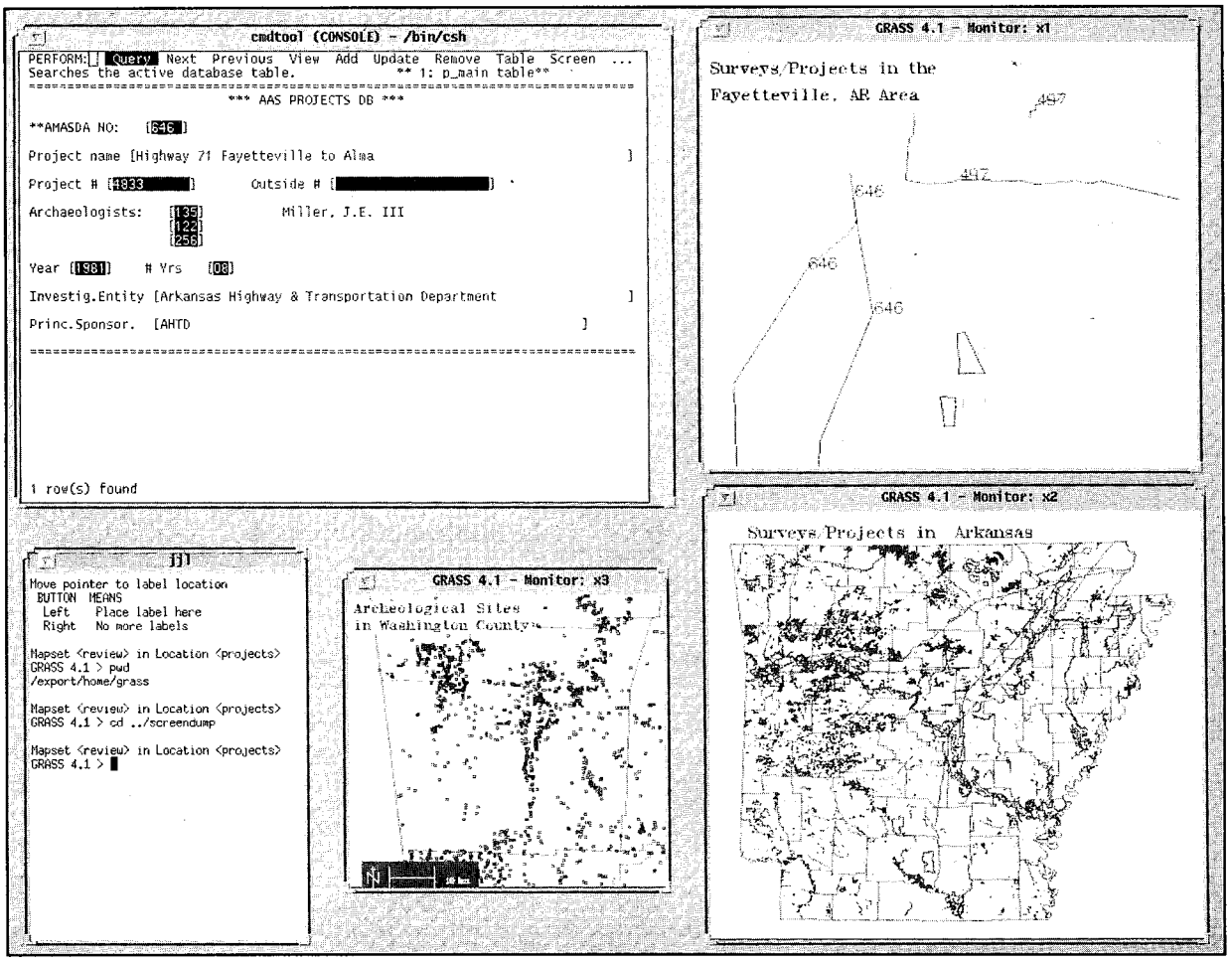

Figure 2 — An example of a computer screen depicting the Grass program using AMASDA.

PART II — TRACKING ARCHEOLOGICAL PROJECTS

HISTORY OF TRACKING SCREEN

The Arkansas Archeological Survey currently manages the records of approximately 30,000 archeological sites (May 1995). In the late 1970s, a relational database, the Automated Management of Archeological Site Data in Arkansas (AMASDA), was developed to handle site information more efficiently. This database allows the linkage of such information as site name to state site number, black and white photographs to specific projects or sites, and archeological projects to project related sites.

It was evident as more and more archeological projects were undertaken that a method for keeping track of the progress of each project was needed. In response to this need, the tracking screen was developed in the mid-1980s by Jerry Hilliard and Robert Harris.

The primary purpose of the tracking screen is to follow the progress of a project, along with the associated records and artifacts, from its conception to its completion. This database enables the Registrar's Office to determine the status of any project at any given time.

PROCESS OF TRACKING PROJECTS

All site and site related information is entered into the AMASDA database. Each archeological project is given a unique number called the AMASDA number. This number allows the tracking of a project through the project database, the site form, and the tracking screen databases.

The Arkansas Archeological Survey's tracking screen is written in Informix. A similar tracking screen can be developed in any relational database, such as Paradox or Lotus 123. The key to the success of this tracking system is the number assigned to each archeological project. This number allows the project to be tracked through each of the databases.

The tracking screen has proved invaluable in searching for a specific project and all the associated records pertaining to that project. Cultural resource managers, researchers, and graduate students can easily access the database and find pertinent information. Our office has used the tracking screen to locate forms, photographs, slides, and maps for gathering information for our Native American Graves Protection and Repatriation project. The number of artifact boxes from a project has been useful in planning future curation space.

The following table shows the fields in the tracking screen along with a brief explanation of the information recorded.

TRACKING SCREEN — AMASDA No. [641]		
DATE RECORDS CK	[01/03/94]	Check of archeological sites and reports in a project specific area.
DATE SITE FORM RECV	[03/05/94]	Date site forms are received in our office.
DATE SITE NO ASGN	[03/09/94]	Date site forms given permanent state site numbers.
ACCEPT/NO-ACCEPT	[Y]	Were site forms accepted? Yes/no.
DATE CURATION AGR	[02/03/94]	Date curation agreement signed.
PROP SUBMIT COLLECT	[06/30/95]	Approximate date that artifacts will be submitted for review.
ACCESSION YEAR	[1994]	Year artifacts will be accessioned under.
ACCESSION NO BEGIN	[325]	First accession number for this project.
ACCESSION NO END	[341]	Ending accession number for this project.
DATE REPORT RECV	[*]	Date report received for comment.
DATE DRAFT COMMENT	[*]	Date of comments.
DATE COLLECT RECV	[02/05/95]	Date artifact collection submitted.
COLLECT ACCEPTED	[Y]	Collection accepted? Yes/no.

TRACKING SCREEN (cont.) — AMASDA No. [641]		
DATE COLLECT ACCEPT	[03/05/95]	Date artifact collection accepted.
PROJE FILE EXTENSION	[Y]	Is additional information about this project stored in project file extension? Yes/no. This information is stored in numbered document boxes.
SITE FILE EXTENSION	[N]	Is additional information regarding the sites investigated stored in the site file extension? Yes/no.
PHOTO YEAR	[1994]	Year of black and white photos.
PHOTO NO BEGIN	[3130]	Beginning number of photos.
PHOTO NO END	[3202]	Ending number of photos.
SLIDE YEAR	[1994]	Year of slides.
SLIDE NO BEGIN	[25]	Beginning slide number.
SLIDE NO END	[56]	Ending slide number.
FIELD BOOK NO	[342]	Field book number.
MAP NO	[MP 321]	These maps are stored either in a map case or, if the map is very large, it is left rolled and assigned a map position within the storage area.
DATE FINAL REP	[04/05/95]	Date of final archeological report.
NUM SITES INVEST	[58]	Total number of sites investigated during this project.
PROJECT AREA	[40 HA]	Size of project area in hectares.
NUMBER OF BOXES	[6]	Total number of artifact storage containers.
DATE CLOSEOUT	[04/05/95]	Date the project was closed out.
* The State Archeologist reviewed archeological reports for compliance until 1987. These fields are no longer used.		

SITE FILE IN THE SUNSHINE: THE FLORIDA MASTER SITE FILE

Marion F. Smith, Jr.

The state of Florida maintains the Florida Master Site File (FMSF) in Tallahassee as its official inventory of cultural resources (archaeological sites and standing historical structures). The Site File is administered by the State Historic Preservation Officer (SHPO), the Director of the Division of Historical Resources under the Florida Department of State. Primarily, the FMSF is a clearinghouse for standardized information, unique in the Southeast in providing "one-stop shopping" for architectural and archaeological records.

The staff of the Site File currently consists of two career service and six temporary employees who maintain 100,000 files on sites, structures, and survey projects; who enter about 9,000 new files every year; and who service more than 2,500 information requests annually.

A SHORT HISTORY OF FLORIDA'S SITE FILE

Inception and Early Years, 1972–1985

The recording system that became the FMSF began in the 1940s as a card file on archaeological sites kept by University of Florida archaeologists, especially John Goggin. In 1950, Goggin suggested splitting responsibility for controlling Florida records geographically between the University of Florida—including the Department of Anthropology and the Florida State Museum (now the Florida Museum of Natural History)—and Florida State University (Goggin 1950). Until 1972, these institutions and, to a lesser degree, the Fort Walton Temple Mound Museum in Fort Walton Beach maintained regional site files (Fryman 1973).

In the fall of 1971, the Florida legislature funded systematization and automation of both site data and accession information for museum collections. The inventory was started as Florida's Master Site File in Tallahassee by the Division of Archives, History, and Records Management, predecessor of the current Division of Historical Resources. By 1973, under Frank Fryman, the Site File was documenting not only prehistoric and historic archaeological sites, including shipwrecks, but also historic properties, especially buildings, engineering structures, and districts (Fryman 1973). By the end of the 1970s, the FMSF was also maintaining files on the "gray literature" of Florida archaeology, especially field survey reports from cultural resource management activities.

The first fifteen years of the Site File were notable for a continuous increase in information curated (Figure 1) and for farsighted work to apply computer technology to the Site File's task (Fryman 1975). Early computer work at the FMSF was handicapped by the limited mainframe hardware and software technology of the day, as well as the location of computers at Florida State University two miles distant. While Fryman's ambitious plans were never fully realized, his successor M. Katherine Jones used the Site File's first desktop computers in auxiliary roles and continued to enter site and structure data on the mainframe. Data accumulated by Fryman and Jones formed the core of later computer databases at the Site File.

Recent Developments, 1986–1995

As at many other governmental institutions, a recent theme at the Florida Master Site File has been coping with fast-growing work by applying slow-growing resources to technological solutions. During the later 1980s, the pace of operations leaped forward at the Site File. Accelerating the input of new information, the

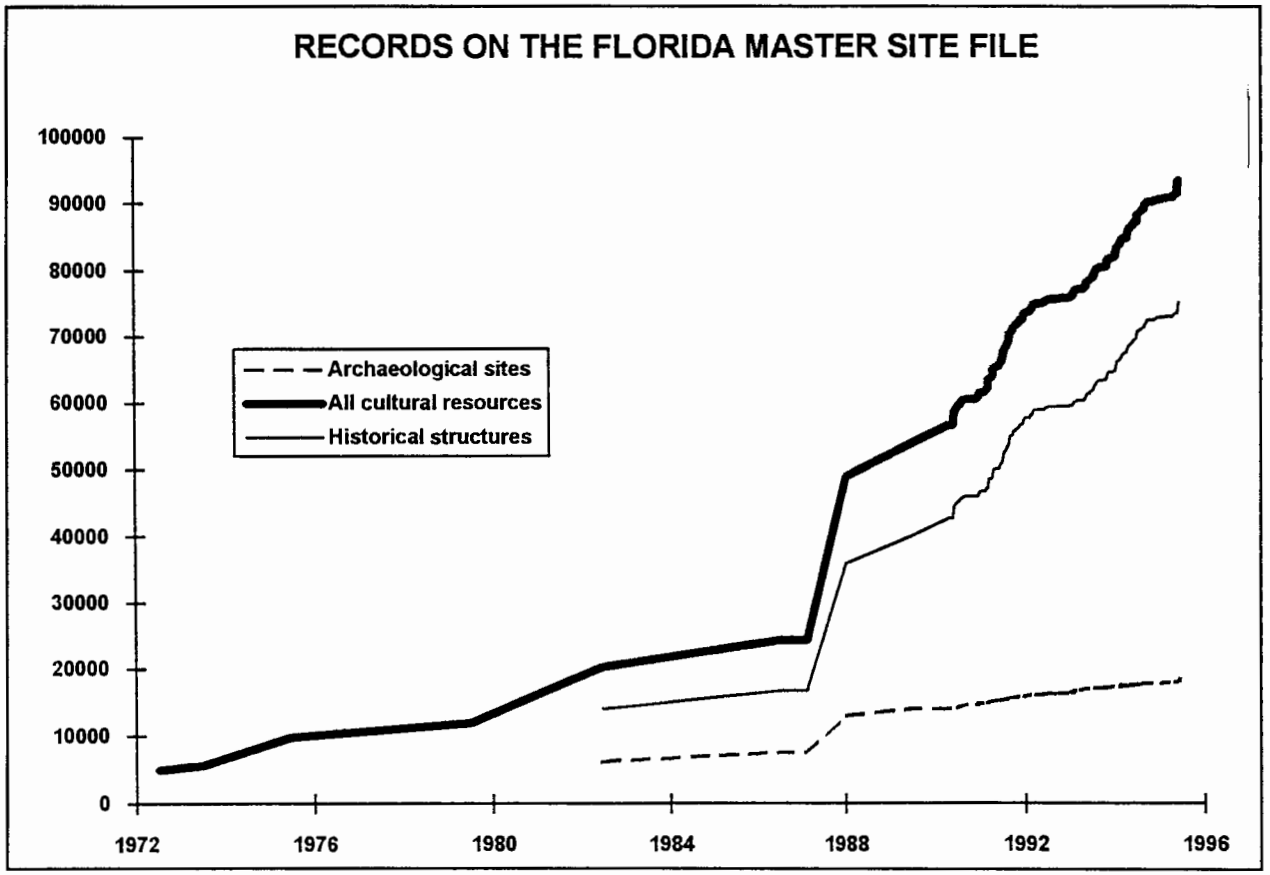

Figure 1 — Number of completely processed records on cultural resources. Files on hand but not processed are excluded (see Figure 4). Detailed figures were kept regularly starting in 1990; breakdowns by resource type are not available for the years preceding 1983.

state started a program to provide historic preservation grants for public and nonprofit institution planning preservation projects. One of the most important grant categories, "survey and registration" grants, matched funds for surveys proposed to record previously unknown cultural resources. This source of money has made a lasting change in the rate at which cultural resources, especially historical structures, are recorded in Florida. This is reflected in Figure 1 as a dramatically steeper slope for cumulative resources. From 1973 to 1986, about 1,500 new resource records were added yearly; from 1986 to 1995, the annual rate climbed to nearly 8,500. Unfortunately, as Figure 1 also suggests, the Site File has been boosted much less by archaeological than architectural recordings, partly because fewer applications for archaeological projects are received.

Not only maintenance but use of the Site File drastically expanded in the late 1980s, due largely to two factors. First, the state implemented a revised local government comprehensive planning process that required roughly 500 governmental entities to regularly query the Site File regarding cultural resources. Another factor in expanding use of the file has been Florida's rapid economic growth. This has tied in with increased development, leading, in turn, to more impact evaluations and more use of the file.

How has Site File workload been affected by user needs? While records were not kept before 1991, weekly inquiries in 1987 averaged about ten per week and rose fairly steadily over the next few years. Figure 2 shows user inquiries or "consultations" per working week

with detailed records for the last four years. The contrast is stark. We average as many information requests now per day as we did per week less than a decade ago. Figure 2 shows how this arose, from an early 1990s buildup peaking in 1993, falling off sharply, and then stabilizing or starting to edge up. The temporary drop-off is probably explained by policy changes at the Site File, which were announced in mid-1993. These were designed to cut staff time spent assisting users. However, the much publicized implementation of the second round of tightening in mid-1994 had little effect on workload. We expect use-related workload to resume the upsurge of the early 1990s.

Another measure of pressure on staff resources is offered by Figure 3, average staff time per consultation. The almost steady drop (the spike in 1995 reflects a single unusual consultation) may be another indicator of increasing workload. Overall, time per request decreased from twenty-five to ten minutes over a span of three years and held there, despite an increase in staffing—from between one and two in 1987, to between six and seven in 1993—and the pride that FMSF staff have always taken in providing quality assistance.

With the advent of powerful and cheap desktop computers in the 1980s, Jim Miller, Chief of the Bureau of Archaeological Resources, decided to emphasize local computer solutions for some FMSF problems. Marion Smith was brought in as supervisor in June 1986. His initial assignment was to oversee the conversion of Site File databases from mainframe databases at Florida State University to dBASE III databases running on a local IBM PC-compatible computer. The first desktop system used by Smith was a single IBM XT-compatible computer with 512 kilobytes of memory and ten megabytes of hard disk storage, used by a maximum of two persons. By 1991, five computers ranging from an XT-compatible to a 386-class machine were in use by as many as five employees. Yet the master computer files were still accessible only on the central computer station. This created an intolerable bottleneck. All global operations, including appending new

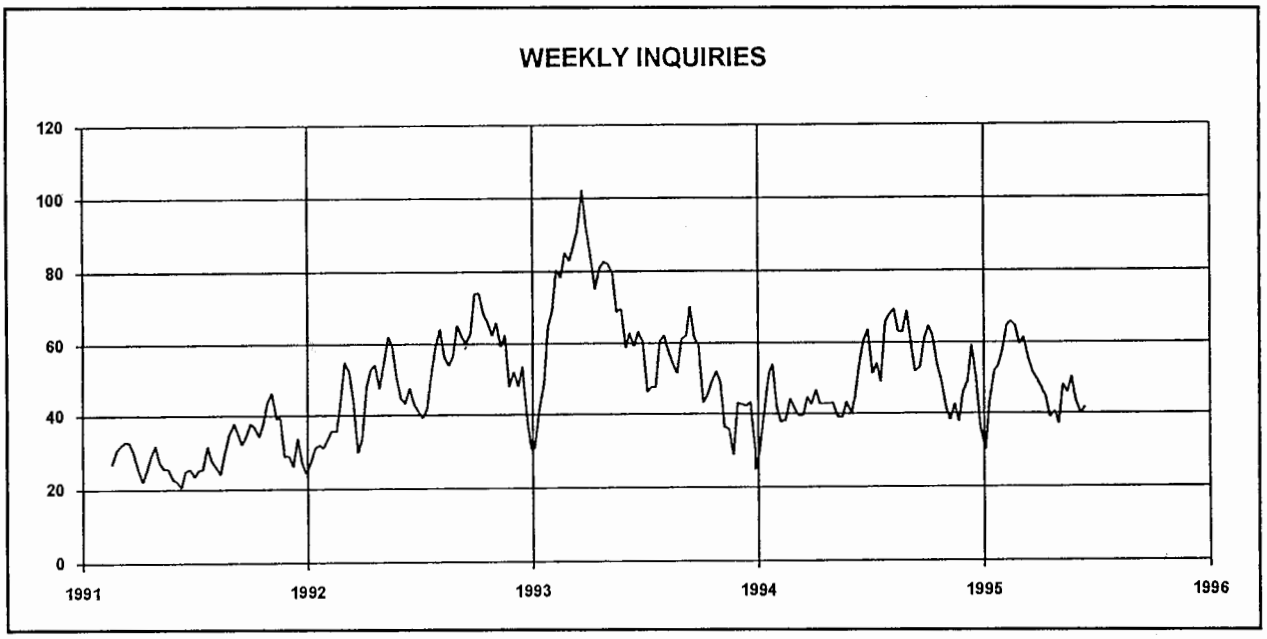

Figure 2 — Average weekly number of user inquiries requiring substantial staff assistance. Inquiries handled at once were excluded. Because the number of workdays per week was not recorded for the entire period, some weeks reflect as little as three workdays, helping to explain the correlation of "valleys" with the turn of the year. Figures have been smoothed by applying a sliding average: the figure used for week *i* is the average for weeks *i-l, i,* and *i+l.* Detailed records on inquiries were not recorded periodically before 1991.

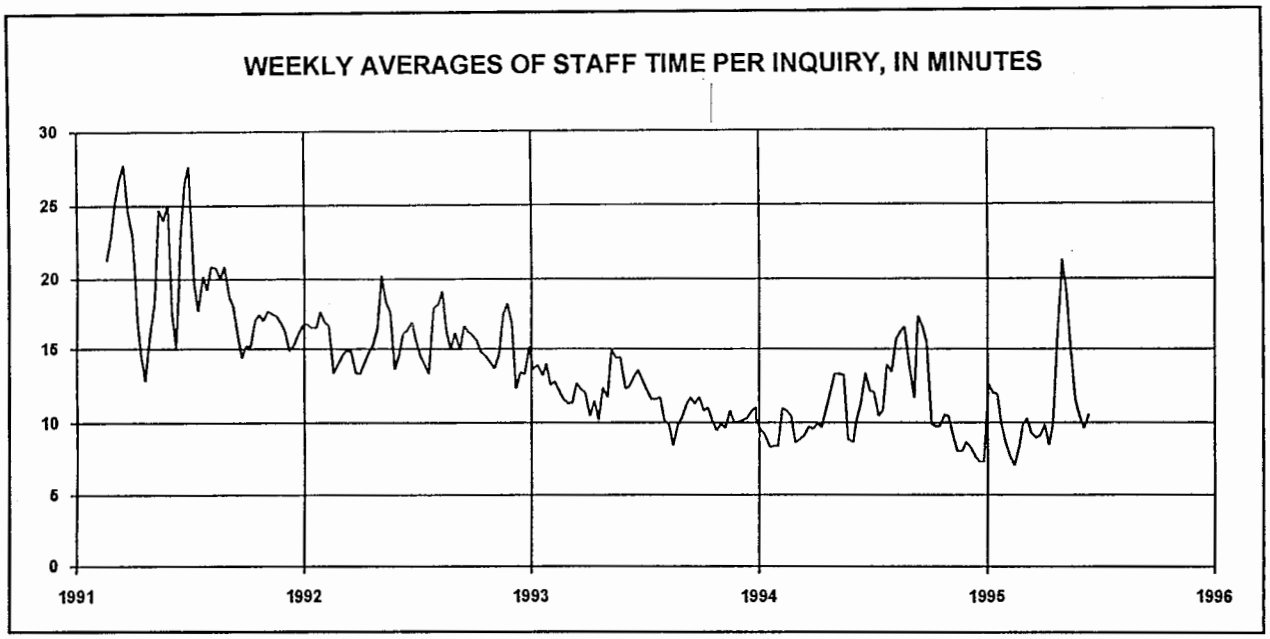

Figure 3 — Average duration of FMSF staff labor on user inquiries over a one-week period. The units are in minutes. Inquiries handled at once were not included. Figures have been smoothed by applying a sliding average: the figure used for week *i* is the average for weeks *i-l, i,* and *i+l.* Estimates of staff time were not regularly kept before 1991.

records, editing old records, reorganizing data, searching, and reporting, had to be done at one station. To allow simultaneous access from multiple stations, a LAN or Local Area (Computer) Network was set up at the Florida Site File in February 1993. The master files became available through any of the machines on the network, although physically located on the fileserver—the central machine dedicated to network operations. By 1995, the Site File network had been expanded to seven stations and had been connected, like other computers of the Division of Historical Resources, to the Department of State's Tallahassee area computer network. Experimental access to the Internet and to the World Wide Web is now available.

For more than a decade, one person—Jones or Smith—has constituted the entire permanent preservation staff of the FMSF. In late 1994, a computer expert was added, but much of his attention was devoted to assisting other offices of the Division of Historical Resources. Temporary staff without fringe benefits—called OPS in Florida, which is short for other personal services—have filled the gap, ranging in number from one in 1986 to a recent peak of eleven in 1993. Since 1990, the average number of OPS employees has been about five.

Compared to the archaeological records of many other southeastern states, Florida's site files have been consistently supported. However, two factors have reduced the progress made with archaeological records. First, a large and growing preponderance of resources has been allocated to maintain files on historical properties. In the Tallahassee files, historical properties outnumber archaeological sites in a ratio that has risen from three to one in 1986 to five to one in 1995. It is still rising. Second, dependence on rapidly turning over temporary staff has sapped Site File efficiency. During one recent year, every one of four temporary positions turned over—and three of these four turned over *twice*. Temporaries as individuals have done a superb job, but their average tenure has been just over one year—a laughably insufficient period of time to learn the convolutions of a Site File suddenly grown high tech.

TALLAHASSEE TODAY: CURRENT STATUS AND PROBLEMS OF THE FMSF

Philosophy

The corporate ideology of an institution is both cause and effect of the institution's official mission and of its daily performance. Floridians who operate and who use the Master Site File tend to regard it as a glorified checklist. Its nominal mission is to serve neither as a local National Register, nor as an archive of such scope and reliability as to support stand-alone research.

Thus the FMSF is not an inventory of Florida properties of historical or scientific significance—though many such properties are included—but a laundry list of sites and properties that appear old enough to deserve consideration when affected by modern activities. This perception recognizes both the impracticality of evaluating 9,000 properties annually and the volatility of evaluations of significance.

Compared to some other site files of the region, Florida's is oriented more toward planning and management of cultural resources than toward academic research. Context and history surely have factored into this, since the FMSF has always been an integral part of mainline state government in Tallahassee, directly under the SHPO and with archival responsibility for historic properties and Cultural Resource Management (CRM) literature, as well as for archaeological sites. This orientation was furthered by Florida's "Government in the Sunshine Law," which designated that state documents are fully public unless specifically exempted. Records on cultural resources have never been so exempted.

Scope of Records: Cultural Resources and Gray Literature

Primarily, the Florida Master Site File maintains information on cultural resources and on the gray literature of preservation, especially unpublished reports of CRM fieldwork. Cultural resources include: (1) prehistoric and historic archaeological sites on land, as well as inundated sites and historical shipwrecks; (2) historical properties, especially buildings and engineered structures, like bridges; and (3) multiple resource areas, like historic and archaeological districts. Cultural resources of all these types are filed in a single sequence according to the Smithsonian system for identifying sites: the prefix "8" for Florida, the county abbreviated as two letters, a serial number of accession within the county, and an optional letter suffix normally used for differentiating spatially or functionally related resources assigned the same serial number. For example, the Leon County house—occupied from 1933 to 1941 by John W. Martin, Florida's twenty-third governor—is recorded as 8LE00853A on an architectural recording form. In order, the elements of that file number indicate the state of Florida, Leon County's 853rd recorded cultural resource, and the fact that this is one of two related resources. There is a separate folder identified as 8LE00853B, documenting the archaeological remains of de Soto's winter encampment of 1539–1540; the folder was identified with a number differing only in suffix because the site spatially overlapped the lot on which the Martin house was later built.

Following the checklist philosophy, cultural resources need not meet any specific standard of historical or scientific significance, but are eligible if age and documentation standards are met. As to age, the FMSF applies the fifty-year standard suggested by the National Register, however, the supervisor makes exceptions at his discretion. Normal requirements for documentation include a completed standardized form, a plot of site boundaries or structure locations on a 24,000-scale topographic map, and, for structures, a photograph.

Tallahassee's gray literature consists primarily of documents reporting original archaeological, architectural, and historical research in Florida, especially, but not always, CRM research. The Site File maintains hard copies of these documents along with bibliographic and project information, which has been recorded preferably by the field surveyor on a standardized form called a Survey Log Sheet. Gray

literature manuscripts are filed and referenced by the Site File's statewide serial number, which is assigned in order of receipt at Tallahassee.

Information Media

As of 1995, the Florida Master Site File keeps information on four different media: paper text in manila file folders, site maps, survey maps, and computer records—mainly text data, both uncoded and coded, in database form. Paper text constitutes the primary and most complete information. One file room and part of the main Site File room are required to hold more than 96,000 resource folders on open library shelving. In addition, more than 3,900 foldered manuscripts are similarly filed in the main room. The boundaries of archaeological sites and significant historical properties (properties listed or eligible for listing on the National Register) are kept in eight map cabinets on 1,040 USGS topographic maps (1:24,000 scale). The areas covered by field surveys, which relate to reports of gray literature fieldwork, are plotted on about eighty sheets of county highway maps, organized in a tabletop shelving unit.

Electronic media of the Site File in Tallahassee carry partial information on cultural resources and manuscripts in database files using a dBASE IV/Clipper format. Over the last decade, the proportion of total information computerized for new records has climbed from 15 to 40 percent, although labor shortages have usually prevented newly defined computer fields from being filled in for "old" records. A reorganized database system will soon make it possible to computerize 100 percent of text information. Since Site File computers share databases and programs on an office network linked to a larger departmental network, resource and manuscript data can theoretically be searched, listed, or manipulated from any networked computer of the Florida Department of State.

Access and Policies

As a tax-supported state office falling under the Sunshine Law, public access to the Florida Master Site File cannot be restricted. A maximum photocopying charge of fifteen cents per page is fixed by Florida statute, and this is the fee charged by the FMSF for all copies if more than 100 pages are copied by a user in a day. Staff of the FMSF help users as time permits, but are encouraged to apply a nominal limit of fifteen minutes of help to routine inquiries. Visits in person or contacts by fax or letter are encouraged instead of telephone calls. We normally ask users to allow two weeks for responses. So far, the average time to answer inquiries has been less than one week.

INVESTING IN "FILE FUTURES" — GOALS AND STRATEGIES FOR FMSF DEVELOPMENT

Any site file has three main tasks. Two of these are related to maintenance, keeping the current system going. Maintenance ***input*** refers to the procedures needed to enter new documents and updates to previously recorded properties in the FMSF. Maintenance ***output*** relates to getting information to the many users of the Site File. The third task is development of the FMSF. Only through compounding improvements in all areas of the Site File can continuing increases in the input and output be accommodated without unreasonable leaps in funding.

Since most of the problems faced by the Florida Master Site File are common to all large and dynamic archaeological databases, I will outline the major problems that darken the horizon of the Site File, together with measures being taken to meet them.

Improving Efficiency: Workload and Staffing

The work expected of the Site File has strained available staff. Figure 4 shows one aspect of this trend—the recent history of the Site File's backlog of unprocessed forms. Note that labor shortfalls are reflected in a persistent backlog over the last decade at the FMSF. However, the Site File's mission has been trimmed over the same period, for example, by decreasing staff

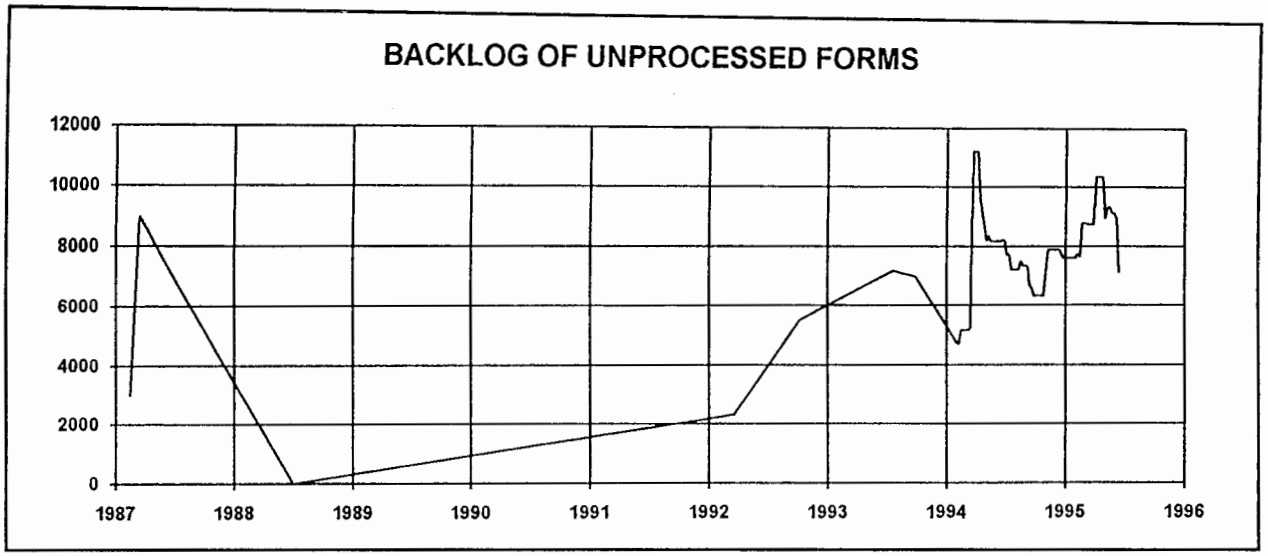

Figure 4 — Archaeological and historical property forms on hand but not processed for the period over which records are available—backlog data was not regularly recorded before 1993. To put the graph in administrative context, the time required for processing a single form has ranged between fifteen and thirty minutes.

time devoted to helping users (see Figure 3). Further reductions in the mission might unduly impede the management of cultural resources. Coping with a mismatch between mission and resources in Florida will involve raising workforce efficiency or size—yet staff increases are hard to win and impossible to plan upon.

The efficiency of the Site File must be increased so that Florida's information needs can be met by a stable staff despite stable or increasing input workloads, and despite remorseless increases in the number and complexity of information requests. In the long run, more expertise in information management and longer tenures for staff are needed so that best advantage is taken of technological developments. One important way to improve efficiency, then, is to replace high-turnover temporary positions with career service jobs.

Improving Efficiency: Reorganizing Computer Data

The current organization of computer data in Tallahassee is far from ideal. Rather, it is a palimpsest reflecting several episodes of superimposed partial changes. Clumsiness in data organization has subtle but large consequences, as it slows normal automated and manual operations, increases staff training needs and error rates, and complicates the task of changing the system. Site File staff have thoroughly redesigned data structures to take full advantage of parallelisms in the data for different types of cultural resources. The new data structures will also afford other opportunities: (1) to reduce labor and error rates by partly automating now-manual operations, such as the creation of new records and the assignment and confirmation of new file numbers; (2) to computerize 100 percent of information requested on paper forms in such a way that the integrity of individual recording forms is always preserved (information is attributable to a specific recorder); and (3) to refine the Data Dictionary.

The Data Dictionary of the Florida Master Site File is itself a database, a set of interrelated data files in the format of dBASE IV. The common theme of dictionary files is the description of each and every computer variable or field that is a part of the FMSF computer system. The dictionary defines parameters for a host of everyday operations at the Site File, as well as smart recording forms, semi-automated manuals describing the operations of the Site File and the completion of forms, regular semi-

automated data checks, and general help functions for in-house and external users. Levels of the computer Site File that are described by the Data Dictionary include databases, files, and standardized and custom forms for input and output.

The reorganization is being implemented gradually, as the staff's other responsibilities permit.

Improving Input: Smart Forms

Another step toward input efficiency will be the completion of computer programs that act like "smart" standardized forms. These forms have undergone two rounds of testing, and an operational version will be distributed by the end of 1995. Programs implementing smart forms will run on any DOS-compatible computer and will assist field surveyors in entering, checking, and printing information corresponding to standard Site File paper forms.

What standards should such interactive forms meet? For the user, several qualities would be helpful. Smart forms should:

- be friendly, with logical menus, context-sensitive help, and helpful error messages;
- incorporate detailed descriptions of the information requested, which can be called up with one keystroke if needed;
- automatically check data as it is entered, and optionally at any time desired;
- allow lengthy narratives, continuations, and supplements, so that noteworthy aspects of the resources can be documented free of arbitrary space or topical constraints;
- produce output files compatible with the FMSF system so that FMSF staff don't have to retype data and inadvertently introduce transcription errors;
- be developed and packaged so that the FMSF can distribute them free or nearly so;
- be capable of printing one, several selected, or all forms from a file using any ten-pitch dot-matrix printer, but taking advantage of features of better printers when they are present; and
- run on any 386-class, or better, DOS-compatible computer.

For the sake of the Site File, smart forms should:

- eliminate the need for paper forms or file space for their storage (hard copies of maps and photographs will still have to be submitted and filed manually);
- minimize input errors by checking data and instantly warning the user about errors;
- greatly reduce FMSF work by encouraging compatible data entry by the surveyors (they will still type information just once, but now directly into the smart form database rather than onto a dumb paper form); and
- when designed to use a central Data Dictionary, handle new forms and changes to old forms with no reprogramming.

Other state site files or any archaeological archives with large volumes of data from outside sources may be interested in modifying the programs making up the smart forms package for their own use. Some expertise in dBASE IV and Clipper would be necessary, since the system is still under development and is not especially friendly behind the scenes.

Improving Output and Efficiency: Electronic Document Management

Paper records suffer from being paper, which is so bulky that the Site File is running out of filing space for organizing all the paper file folders. This event reinforces staff efforts to research, plan, and implement electronic storage

of Site File documents (often called EDM or Electronic Document Management). Electronic storage will take vastly less space than the current open library shelves and will permit indefinite increases of stored information without enlarged floor space. This gets us off the "Tallahassee treadmill," whereby about two new library shelving units have to be added each year to accommodate new folders.

Paper has drawbacks other than bulk, notably lack of transmissibility, lack of portability, and difficulty of making backups to safeguard the data. Our file folders can be used only by one person at a time and, obviously, only in Tallahassee—either costing heavy users significant travel or costing the Site File extremely scarce staff time for transmission via slow and expensive photocopying and mailing. Another consideration is that backing up paper periodically requires repeated copying via photocopier, microfilm, or computer scanner. All of these are costly due to necessary manual handling, indeed so costly that primary paper records have ***never*** been backed up in Tallahassee. By contrast, after the expensive manual step of preparing and scanning paper files, an EDM system could be backed up at reasonable expense using media such as recordable compact disks.

Thus an EDM system would solve the space, transmission, portability, and backup problems now associated with approximately 1.5 million paper documents. Since each one of 1.5 million pages needs to be scanned, indexed for retrieval, held in a large storage device, and searched and displayed by expensive computer software at multiple computer stations, developing an EDM is a project certain to cost hundreds of thousands of dollars. Maintaining such a system will of course require substantial ongoing investments for staff payroll and training, as well as for computer hardware and software.

With in-house resources, the Site File has been researching the EDM field over the last two years. A request for seed money for serious development was denied by the Florida Legislature in spring 1995, but the request will be renewed next year. Other outside funding sources will also be explored. If the investment is large, so is the payoff—partly in terms of eliminating the burgeoning towers of unfilable forms sprouting on the Gray Building's fourth floor. In the long run, of course, an even greater payoff may be the progress toward converting all Site File information to digital format, with its virtues of compactness, low-cost storage and duplication, and transmissibility.

Improving Output: GIS Technology

A Geographic Information System, or GIS, is a sort of flexible electronic atlas, one that can not only be used as a digital map of cultural resources, but that can be superimposed on maps of other relevant cultural and natural features. Further, a GIS uses detailed database information about mapped features to select, process, and display them—all under the user's control. For example, all archaeological sites, all prehistoric sites, or just those prehistoric sites attributed to agricultural peoples, might be mapped with soil types superimposed. Finally, the utility of the GIS is vastly increased by its digital nature. GIS data can be transmitted over phone lines or computer networks, or carried about in portable media like computer diskettes.

The power and utility of GIS promise to make it easy for the Site File and other appropriate public and private organizations (1) to conduct traditional research and (2) to plan for and manage cultural resources. To illustrate its utility for planning, consider the early stages of a major residential development. A GIS for cultural resources would make it easy to see known sites together with soils, vegetation, topography, and alternative street layouts. Such a representation would make it much easer to plan greenspace for site preservation and to keep roads and houses off them. The value of GIS to the preservation and management of cultural resources goes beyond the preservation community. GIS is now the dominant way of organizing and presenting data for public agencies with concerns in land management. Full implementation of a GIS at the Site File will encourage the dissemination of our data to the "guys in white hats" as nothing has ever

done in the past.

Initial development of a Florida Cultural Resources GIS is underway in Tallahassee, starting with archaeological sites. Early development is being supported by a Transportation Enhancement grant administered by the Florida Department of Transportation for the federal ISTEA program. Funding to further develop the GIS is being sought, with special emphasis being placed on (1) acquisition of a fast UNIX workstation and suitable GIS software to manipulate records on over 100,000 properties statewide; (2) digitization of the locations of historical buildings, other historic properties, and field surveys; (3) improved electronic access by public agencies and others with a need to know; and (4) staff training to ensure that the complex system can be properly maintained as well as used.

Improving Output: Wires and Webs

Soon state site file managers seeking staff efficiency and user convenience will put in place the electronic transmission of ordinary database and GIS information and perhaps digital images of forms, maps and photographs. The takeover of the Internet and the World Wide Web by ordinary citizens in 1994 and 1995 suggests that these systems may become the preferred avenues for digital information. If the system includes interactive programs, outside users could conduct their own searches and download the specific information desired.

In this area, ethical and political factors will be harder to address than technical issues. No responsible person wants to set up a system whereby vandals of archaeological sites could download, with a few keystrokes, locations of archaeological sites. It would likely be almost as easy to download information on all of a state's sites as it would be for one site. Yet Florida's Sunshine Law opens all agency records to the public if they are not specifically exempted by statute. There is currently no such exemption for sensitive preservation information, such as the precise location of archaeological sites and shipwrecks. Another issue is fees charged by state agencies for computer data in order to recover the cost of building and maintaining their system. How much should be charged, if anything? The 1994 and 1995 Florida Legislatures have debated, though not settled, questions of public access and access fees for computer archives developed with taxpayer dollars.

COOPERATION, THE FLOWING TIDE RAISING ALL BOATS

State site files are important but scattered and small institutions. In these times of fiscal stringency for site files and of great hazard for cultural resources, "doing more with less" and "working smart" are more than annoying clichés. In Florida, we hope that our experience can guide others working with similar problems in similar settings; certainly we have learned much from colleagues in similar settings. Yet calling for cooperation, without elaboration, seems inadequate. Taking active steps to foster cooperation could make a great difference for site file managers and users, both within and across state lines.

Indeed, there are at least two spheres in which cooperation should be actively sought. Within a state, the user community—the raison d'être of the site file—can define its needs better than anyone else. Its members can also give moral, technical, and even political support to the central repository. In April 1995, the FMSF helped organize a roundtable discussion among users and maintainers of Florida archaeological databases, with emphasis on defining shared problems and concerns and on starting to address them cooperatively. The session, held in conjunction with the annual meeting of the Florida Anthropological Society, culminated in a consensus that such meetings should be held every year.

Extending this pattern to the regional and national levels would repay all players in the game of big archaeological archives. Regular meetings of maintainers and users of site files and other databases (for example, federal

databases associated with regional offices of the National Park Service) might be held in conjunction with archaeological meetings already attended by many players. Certainly there is no question of the benefit to Florida that accrued from participation in the workshop that climaxed in this volume. Technical cooperation is only one part of the rationale, of course; many research questions show an inconvenient tendency to ignore today's political boundaries.

For users and maintainers of large databases, a program of active cooperation will put little more at risk than the chains of parochialism and isolation.

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THE GEORGIA ARCHAEOLOGICAL SITE FILES AND GIS: A USEFUL BEGINNING

Mark Williams

BACKGROUND

The Georgia Archaeological Site Files have been located in Athens at the Department of Anthropology since their formal inception in the mid 1970s. At that time, data was gathered from the archaeologists and institutions in the state to create the state's first central archaeological site file. In addition to addressing the usual problems of eliminating redundancies in site numbers and resolving vague locations, we immediately began a project to computerize the files. A set of about sixty variables—generally reflecting the information on the site forms (single page, front and back)—was defined, codes selected, and coding of the information onto old-fashioned *Code Sheets* was initiated. At intervals, the data on the code sheets was typed onto punched cards, three cards per site. This system was set up by the late Donald Graybill, then on the Anthropology Department faculty, with input from Mike Baker, then a graduate student, and David Hally, also a faculty member. The goal was toward unspecified computerization of the files, and this was vaguely defined as a good thing to do.

I became involved with the Georgia Archaeological Site Files around 1981. At that time, punched cards were available for some 5,000 sites. None of the cards had ever been read into the mainframe computer at the university for any purpose, not even to be transferred to a magnetic tape. With help from Doug McLeod, building computer "guru," I was able to upload all these cards to the IBM mainframe and write a Fortran program to permit very simple examination of the data. By about 1983, I had implemented a system that allowed users from across the state to call the computer remotely by modem and examine the data. By that time, there were approximately 10,000 sites in the database. Unfortunately, this system was handicapped by several problems. First, communicating with the mainframe was extremely arcane and difficult for users. Second, the annual costs for keeping the data on the mainframe were high. Finally, not all the data had yet been coded for all the sites, thus the data was incomplete. By 1985, we abandoned the mainframe approach for a microcomputer environment, as personal computers became more available and affordable. One of the happiest days of my life was when I downloaded the data to the microcomputer (an IBM PC), deleted our mainframe account, and jettisoned the large magnetic tapes!

The growing site file database was then set up using the Paradox database (from Borland) in the PC environment, and this forms our primary database environment even at the present time. I found Paradox much easier to use than dBASE at that time, and am still quite happy with it. The current program is the DOS version 4.5. Compared to the DOS product, the Paradox Windows product is slow and clumsy, and we do not use it. Four backup copies of the data are maintained at all times, with at least two of the copies kept outside of the Site Files office. The data is kept in compressed format using the program PKZIP. The current size of the Paradox file is some 7.8 megabytes, which compresses to about 1.3 megabytes and still fits on a single high-density 3.5-inch floppy disk. The file presently includes some 25,245 sites and grows by about 1,500 sites per year. Virtually all data comes, of course, from CRM studies. Despite our consistently low funding, resulting in lack of staff, we were finally able to catch up on database entry for the first time in the spring of 1994. Since then, we have struggled, but have generally been able to stay caught up.

I have developed a Paradox macro program that permits the low-level user to examine the database to a limited degree in a user-friendly environment. The program welcomes the user and has a menu structure that permits one to conduct a few simple data queries. It does not, of course, give the user the power of the normal query mode of the full Paradox program.

GEOGRAPHICAL INFORMATION SYSTEMS (GIS)

I have no formal training in GIS, but have used a few of the currently available programs, learning them through their documentation and my own experimentation. I should add that I have used and programmed (Fortran, Basic, Pascal, C++) computers since 1974, and thus feel quite comfortable with them.

In 1993, at the request of Robert Rhoades, head of the Department of Anthropology, the University of Georgia essentially gave a GIS laboratory to the department. This laboratory included a wide variety of hardware and software for GIS application in Anthropology. The platforms provided included PC, Macintosh, and Sun Unix, all with adequate speed and storage. Digitizers and plotters were also included. The software included Atlas GIS, Idrisi, and Grass. ArcInfo will hopefully be installed in late 1995.

Atlas GIS (and ArcInfo) are vector-based programs, while Grass and Idrisi are primarily raster-based programs. My strong preference for site file use is a vector-based program. While both systems are capable of yielding similar analytical results, the aesthetics of a map derived from zooming-in using a vector-based program are far better than those from a raster-based program. This is ***not*** an insignificant factor since publishable maps form a real part of the advantage of a GIS for site file use. Grass could serve as a state site file GIS, but it is quite difficult to install and clumsy to use. Idrisi cannot serve as a state site file GIS since the maximum cell limitation in the program would mean that, for Georgia, the smallest cell would be on the order of one-half mile across—an unacceptably large value.

Although ArcInfo may be a better long-run choice, I decided to begin with Atlas GIS because of its availability, its ease of learning, and its cost advantages. I began attempts to import the existing Paradox database into Atlas GIS (DOS Version 2.1) in late 1993, and, with the help of Tom Foster, currently a graduate student at Penn State University, was successful after several frustrating weeks and many phone calls. With the fifty-three-step procedure determined, it currently takes about two hours to import the data each time we update it in Atlas GIS.

Briefly, to import the file, (1) the Paradox data files must be converted to dBASE files, and (2) the sites in the two separate UTM Zones for the state must initially be imported separately into a new Geographic File within Atlas GIS. Incidentally, those states that are wholly in a single UTM Zone are quite fortunate in this light! The initial importing is necessary to read the UTM locations per site in the Paradox database and create points in the Atlas GIS file that correspond to each UTM site location. The entire Paradox file (again converted to a dBASE file) is then reimported as an Attribute File in Atlas GIS, so all the data can be tied to each appropriate point (site) in the resulting Geographic File.

One of the most immediate advantages of importing the site file data into a GIS is that gross errors in site UTMs in the database are graphically revealed. In the Georgia case, for example, some sites were scattered from the Caribbean all the way to Pennsylvania! By selecting these sites within the program, their site numbers can be immediately determined and the cause of the errors found by going back to both the original Paradox database file and the paper records for such mislocated sites. Most of the errors, perhaps 70 percent, were derived from data entry into the computer, while the remainder were from errors on the site forms themselves. Once all the sites were brought back to within Georgia, I checked site distribution by each of the 159 counties in the

state to discover those sites that were not located within the proper county (Figure 1). Digitized county outline data for the entire United States comes as part of the Atlas GIS package itself. Again, most of these outside-the-correct-county errors were data-entry errors, while only a few were errors on the site form itself.

States putting extra effort into extensive checking of site forms before computer entry should be aware that many errors will still be present due to the unavoidable data-entry errors. I have found it much easier to locate and correct errors of all sorts in the data through its examination via GIS, than through a straight checking of the database file information itself.

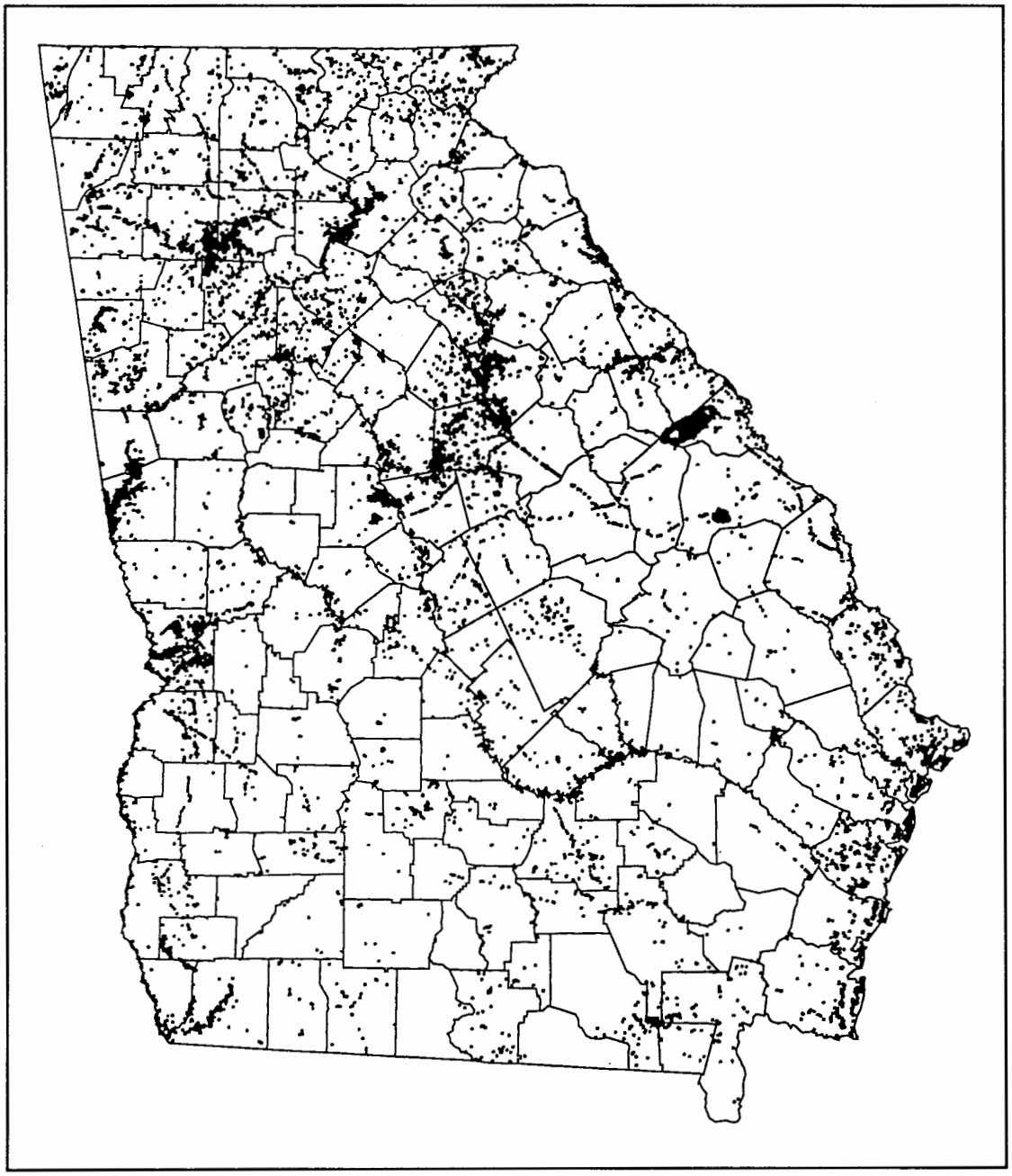

Figure 1 — All recorded archaeological sites in Georgia, with the county boundaries.

It has been suggested that we could maintain all the site file information within the Atlas GIS program from now on, and indeed this is possible. In the short run, however, there are several good reasons for continuing to maintain it within Paradox. Perhaps the most important is that users of the data in our state are comfortable with the Paradox format and, as yet, know little of Atlas GIS. Another reason is the data size. The Paradox file is about 7.8 megabytes, while the Atlas GIS file (admittedly with several other data layers) is now over 30 megabytes in length. Finally, the data-entry and editing tools of Atlas GIS are much cruder that those within Paradox.

I have obtained many other layers for our Atlas GIS Geographic File from a variety of sources. To date, these layers include: rivers and streams, man-made lakes, river valley outlines, major roads, county outlines, USGS 1:24000 quadrangle map outlines, physiographic provinces, geological zones, soil series, and resource areas. Many of these were supplied in ArcInfo format by the Georgia Department of Natural Resources. I digitized a few directly from *The Atlas of Georgia* (Hodler and Schretter 1986). We also augmented the river layer by adding many small streams through the digitizing process. Our GIS file became quite viable by the spring of 1994, and it has been used for several projects since then. A summary paper on the distribution of sites in Georgia by time period and physiographic province was published in the fall of 1994 (Williams 1994). This was done entirely with the Atlas GIS data file, and would have been next to impossible otherwise. In recent months, much work has gone into a project using the file to look at the distribution of sites by soil series within Georgia

CONCLUSION

I have found Atlas GIS to be an excellent beginning GIS program for site file use. Most of what, I believe, we presently want and need can be accomplished with the 3.0 Windows version, which is currently in the five hundred dollar price range, down from its earlier price of several thousand dollars. On the downside, Atlas GIS has little or no statistical capabilities. I don't consider this a major detraction at our initial level of development, however. The geographic files ***can*** be exported (with difficulty) into a format compatible with other GIS software, so one is not permanently locked into this particular program. Atlas GIS runs well on medium-speed machines in today's PC market (486-66 MHz) and takes under 10 megabytes of hard disk space. It is relatively easy to learn, and there is a growing community of GIS users familiar with it.

ArcInfo and Grass are programs that permit far greater possibilities for analysis, particularly on the statistical level, but each has significant drawbacks compared to Atlas GIS. ArcInfo is very expensive (in the twenty thousand dollar range) and has a slow learning curve. Grass, although provided free by the Corps of Engineers, is a cumbersome assortment of programs that collectively are limited in their display characteristics and time-consuming to learn. Both programs must run in a Unix environment to take advantage of their extra power. This alone can be expensive, running easily over twenty thousand dollars (and up-up-up).

Most site file coordinators are now aware of the possibilities of GIS systems. My experience has shown that they need not wait for that ideal system of ArcInfo on a Unix-based machine—a total investment, including software, hardware, and training and/or personnel, of perhaps well over fifty thousand dollars. With an investment of perhaps under one thousand dollars, they can accomplish many of their goals now. This is a more effective and perfectly rational short-term strategy for archaeological site file GIS development and management.

The new possibilities for research and management of our site file data using GIS are just beginning to be envisioned, and the future is bright indeed. Both research and data management have been made significantly easier in Georgia through its use, and we are committed to this, the most important new tool in archaeology since the invention of Carbon-14 analysis.

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ARCHAEOLOGICAL SITE FILE USERS OF ALL KINDS: A VIEWPOINT FROM KENTUCKY

R. Berle Clay

Site file information is compiled to be used, yet many factors conspire against this use. Often a cumbersome file system itself defies general use. Or the files may be overprotected by an archaeological bowerbird in a well-meaning but obstructive attempt to shield the data from those who might misuse it. At the worst, its use can be badly inhibited by official policy leading to self-defeating extremes. The real problem is how to persuade individuals and agencies to produce and ***use*** site information—hopefully without ***abusing*** the resource, but importantly to use it. The fear that site data will be misused is greatly overblown.

A major stumbling block is that those who desire information have various agendas. To get them to use site data, the file manager needs to treat them differently. Let's sketch several well-known users, how I interpret their needs and interests, and the pitfalls that exist in dealing with them.

THE TRADITIONAL RESEARCHER

Traditionalists are self-motivated in their research and, in fact, may have no well-defined problem in mind or may simply be in search of one. They may be driven by the need to get tenure at an institution of higher learning or to advance their agency career; they may be simply following intellectual interests, for whatever reason, or trying to wring palpable research results from a large data set from their latest CRM project. They need access to site survey files at various stages.

Traditional researchers, in particular, must paddle through files over and over, testing the quality of data against specific research questions. Quite literally, their success as researchers can be measured by how many times they fail. Unless familiar with the system, they are difficult individuals to please. Above all, these file users need a road map to the system and a hands-off attitude from the file manager. My advice, make the file system explicit and as user-friendly as possible.

It goes without saying that the file must be maintained in a computerized form and that the researchers must know how to use it, for they, among all users, will primarily put the power of a database to good use. This is a big order, for beyond providing file access, they must recognize the potential of the database and be willing to make the effort to learn how to use it. The opposite generally occurs; the files are ignored, important as they may be to research.

By contrast, these users are generally ill-equipped to provide site information back to the site manager. Their research is not funded to fill out a site form, and they seemingly have a hard time associating a state site number with a specific site. They opt for the more palatable site names honoring, for example, the owner. Why call 15Bn22 by its Smithsonian designation when it can justifiably be called the Jewell Site after its owner? Traditional researchers may be so focused that they may work a lifetime at their site and never see the need for completing a site form or updating the existing form to reflect their intensive research. The file manager gleans few crumbs in the interaction, although this should not impede the relationship.

State site files often stem from beginnings within an academic context, if they are not actually within an academic department or museum, as in Kentucky. These are the files that traditional, academic-bound researchers remember. Too often, the academically based state site file has been maintained as the chattel property of a particular institution of higher learning. The file was generally ignored because its maintenance was never adequately funded. It was consigned,

at best, to a jealously guarded card file system inherited from WPA days. While such dated systems are of historical interest, things must change. Strange as it may seem, the academically based archaeologist may often have little comprehension of the location of the present database and its power. The file manager's task is to demonstrate this.

THE AVOCATIONAL ARCHAEOLOGIST

Avocational archaeologists pose the apparent exception to the rule that site files are meant to be used by all concerned. Most site files are protected by state "sunshine" laws; the grounds exist for denying the non-professional—indeed anyone—access to the information they contain. To actually do so in the case of avocationals can be decidedly unfair reinforcing their worst fears about the exclusiveness of the archaeological profession. I have no problems in allowing the non-professional to look over the quad sheets in my state. But, with the exception of landowners who wish to know about sites that have already been recorded on their property, I balk at letting avocationals transpose site locations to their own maps. Any access, furthermore, is accompanied by a stiff lecture on the evils of collecting from private property without landowner permission.

The threat that the collector will visit a site in the files without first asking permission is somewhat overblown. I find students and others in the academic context as guilty of this breach of etiquette as the avocational, in part because they tend to have free and unlimited access to site information. As a guide, know your person, and if you do not, err on the side of restricting site information, from avocationals, students, and professionals alike.

The avocational takes many forms, perhaps mainly the incidental collector—a sympathetic and interested layman—rarely the dyed-in-the-wool collector, and hardly ever the truly destructive pothunter. Incidental collectors who want to record their finds with the state site file, perhaps motivated by a stimulating statewide archaeological week, are individuals to be cherished and nurtured. It is a matter of strategy to develop this type person into an informed recorder, but it is very difficult for the file manager to accomplish this without help.

Unfortunately the avocational's interest lags when faced with the "professional" site form. The rewards for completing it pale when the actuarial drudgery becomes apparent. More should be done to develop a simplified short form for such contingencies. In my own state, the professional site form (eight pages with a Xerox of the topographic sheet) takes about forty-five minutes to fill out completely and carefully. Layman and professional eyes alike glass over when it is produced.

But there is a downside to the short form in a loss of information. Herein lies an interesting paradox. Much of the day-to-day preservation archaeology involves the identification and recording of the "minimal" site. Because of lack of experience, the incidental collector tends to recognize a site only when the data are overwhelming. When the collector walks through the file manager's door with news of a find, it generally indicates that there is a very significant site out there. A simplified short form simply won't do in this case, and, when completed, it is often painfully obvious that the truth is ***still*** out there. So the volunteered site report may represent the most significant site you will encounter for many a month. But, short of visiting the site itself, which you may not be financed to do, it is difficult to do it justice with the avocational's information.

If there is one paramount rule when dealing with anyone who reports a site, and perhaps most importantly the non-professional, it is that all deserve a site number as soon as possible, preferably on the spot. This in itself is a considerable reward for the layperson, which makes the visit to the site file office worthwhile. With a little careful explanation, this collector will label the artifacts with the site number. Score a point for archaeological science!

Serious collectors, walkers, or diggers tend to shun the state site file office for two reasons. First, they believe that their record of site locations, in whatever part of the state that

interests them, is far better than any public record—and they are probably right. Then, like all too many professional colleagues, they would like to keep their information out of the public record so that others cannot use it. Both the professionals and avocationals are concerned with their pet sites. Possibly on their death bed, they would unload exquisitely recorded site information on the latest 7.5-minute quadrangle sheets—most likely not. If the file manager is to get extensive data from the serious collector, it will involve work.

THE CRM ARCHAEOLOGIST

The most consistent and predictable site file client should be the journeyman CRM archaeologist. If not, the site file manager has a serious problem; the system is not being used properly! There are some clear parameters that contribute to a stable relationship between site file managers and CRM archaeologists. Firstly, CRM research is a task to complete, a given. It is not generated from within the archaeologist in a burst of anthropological creativity. Secondly, CRM archaeologists must document their work in a manner that meets a level of acceptability established by the preservation process. Thirdly, time is money to the CRM archaeologist, and this necessitates competence in completing site forms and gleaning relevant site file information for a particular project. If this competence does not manifest itself, if the most routine visit to the state site files does not consistently produce the desired results (site numbers for new sites; information on recorded sites), the CRM archaeologist is soon out of work!

In my state, I insist that a site number be granted only when a completed site form is presented. As long as this is well understood, it causes no problems to the CRM archaeologist. What is meant by a completed site form must be very explicit. From the standpoint of site data, business archaeology involves a product; there should be no confusion over what that product involves.

CRM archaeologists can also be willing users of site data, if they can get at it in a form that they can digest within their project's time frame. In Kentucky, an archaeologist working on a project will be presented with a computer listing of the sites in the relevant area, a list of bibliographic resources, and whatever data comes off the databases that are maintained in the Office of State Archaeology. To make it really usable, they are given this information as an ASCII file ready to read and incorporate into their report. Few—perhaps only those who have not gotten their computing skills beyond bare bones word processing—can resist the temptation to streamline report preparation. Recapping, give them data in machine readable form as fast as possible, and they will beat a path to your door. Fail to do so and you eliminate one of the most important file user types—and, as a result, the preservation process suffers.

There remains a running problem in CRM archaeology, which is a fascinating but thorny one. Twenty-five years of CRM archaeology have seen dramatic changes in our conception of a site, and things are not over yet. Literally, what was not considered important ten years ago may now be considered not only a site, but a significant one. The file manager deals with this dynamic situation from the front trenches, before it reaches the State Historic Preservation Officer (SHPO), before the traditional researcher has even thought about it. Faced with a shifting target—the archaeological site—good site file managers, like good bird hunters, must "lead the target" with their site file policies. The best way is to keep abreast of the definition problems as they arise. For example, on an average, how many flakes are being reported per site, or, how many rural farmsteads can actually be documented as fifty years of age or older, or is this a problem? Above all the site file manager should push the site recorder to justify calling something a site, not simply acquiesce to the plea that a site may exist. In the best of all possible worlds, the site file manager should probably host a yearly roundtable discussion, perhaps in connection with the state professional organization meeting. Bring problems of definition into the open, seek a consensus if it can be obtained.

THE AGENCY

Some government agencies manage land, some do not. They tend to view site files differently. For example, the Forest Service directly manages land while the Corps of Engineers, with the exception of some specific responsibilities, does not. State Historic Preservation Offices classically do not manage land, although they may be embedded in historical societies that do. As a rule, agencies that manage land are far more concerned than non-land-managing agencies with recording archaeological sites and keeping relatively precise records of the sites under their purview. Depending upon their mandates, both should be using site file information.

Land managers generally have their own policies concerning archaeological site information. Many maintain their own site files; the sites are their mandated responsibilities. State site file managers must adapt to the needs of land managers and, hopefully, stay on good terms with them so that the aims and policies of both remain the same. I can quote examples of open warfare, which need not have happened. In the worst of all worlds, the agency and the state file manager maintain separate site numbering systems, out of no more than mutual suspicion. The confusion can be incalculable.

Many agencies are concerned with much more than archaeology. Thus they have data management systems that include archaeological data, but also many other things. Archaeological site file managers must keep this in mind, remembering that while archaeological data may be their chief concern, the agency views the same data as one part of a larger and infinitely more complex data world. Patience, combined with a real willingness to assist the agency in managing its archaeological data files, when requested, is clearly called for.

Needless to say, there must be close cooperation between the state site file manager and the agency, any agency, for it is the agencies that have the most power to affect archaeological sites. They need the data for planning purposes. In Kentucky, where the state site files are maintained as an adjunct of an anthropology department in a state university, the updated files are cloned as needed to agencies able to use the information. What agencies do with the site data is up to them. Among archaeologists, there is a lingering fear that agencies will use existing site data to write off controversial projects. They are entitled to do so, just as archaeologists are entitled to use this same data to demand an archaeological survey. Let the review process handle this largely phantom problem, not site file access policy.

The SHPO is one agency official that certainly needs site information. In many states, the SHPO actually manages the state site file, often because the academic world has demonstrated that it cannot manage it by itself. However, because the SHPO generally does not manage sites personally, the SHPO is often not the best person to maintain an archaeological site data file. It goes without saying that the file manager, if not employed by the SHPO, should make sure that the SHPO has unlimited and up-to-date access to the files. My SHPO and I send a portable hard drive back and forth between our offices with the latest version of the site file on it. The system seems to work. One day I will get the file system on-line. This will make the problem of communication much easier. At the same time, it will raise other problems, which I have yet to face.

CLOSING

We have come a long way from the premodern era in state-level archaeology prior to the National Historic Preservation Act. As underfunded and thankless as the task of maintaining site files may seem, the order and accessibility of a well-managed site file is essential to contemporary archaeology of all sorts. But users have different interests, and the site file manager, often with little direction, must deal with these. As a site file manager, keep reminding yourself that the interests of file users vary greatly. This will make your task much easier. When a client walks in the door, ask how can I help you? and not, secretly, what do you want?

A BRIEF HISTORY OF THE ARCHAEOLOGICAL SITE SURVEY IN LOUISIANA

Philip G. Rivet

Ironically, the beginnings of a statewide archaeological site survey in Louisiana can be traced to the neighboring state of Mississippi. In 1927, Moreau B. Chambers and James A. Ford, under the auspices of the Mississippi Department of Archives and History, initiated fieldwork in west-central Mississippi, which consisted of making surface collections and excavating sites that year and the following two years. Chambers carried on the site survey work in Mississippi in the summers of 1930, 1932, 1933, and 1935, during which period he examined a large part of the southern half of that state (Ford 1936:1).

In 1933, a member of the original Mississippi survey team, James A. Ford, received a grant-in-aid from the National Research Council and extended the survey work he had begun earlier with Moreau B. Chambers into the Mississippi River Valley area of northern and central Louisiana (Ford 1936:1). In addition to surface collecting a large number of sites, Ford conducted excavations at the Peck Village site (16CT1) in Catahoula Parish during that first season of fieldwork. This resulted in the publication two years later of *A Ceramic Decoration Sequence at an Old Indian Village Site near Sicily Island, Louisiana* (1935a). Also in 1933, Ford worked with Frank M. Setzler of the Smithsonian Institution at the Marksville site (16AV1)—a Federal Emergency Relief Administration (FERA) project. According to William G. Haag (personal communication 1995), this was the first federal archaeological project in the United States that used relief labor. The year 1933, then, can be viewed as an important milestone in the systematic recordation of archaeological sites in the state of Louisiana on a professional level.

Two years later, sponsored by Louisiana State University (LSU), Ford continued his survey work in Louisiana. He collected additional material and site data from the same part of the state in which he had initially worked. Office space was made available at LSU by Fred B. Kniffen, and two winters of laboratory work and analysis followed (Ford 1936:3). During this same time, Ford wrote two seminal articles on Louisiana archaeology, both of which were published in the *Louisiana Conservation Review* in 1935. One was entitled "An Introduction to Louisiana Archaeology" (1935b), the other "Outline of Louisiana and Mississippi Pottery Horizons" (1935c). In the following year, the results of Ford's fieldwork in Louisiana and Mississippi were published as *Analysis of Indian Village Site Collections from Louisiana and Mississippi* (1936).

From an examination of the archaeological site survey files currently housed at the Museum of Natural Science at LSU, it was evidently around this time that the first archaeological site record cards (in a five-by-eight-inch format) were developed and utilized. One of these is illustrated as Figure 1. These mimeographed forms were initiated by James Ford (William G. Haag, personal communication 1995).

Two sets of the original quadrangle maps used in the site recording process during this early period are presently curated with the state site files in the Louisiana Division of Archaeology, Baton Rouge. Site locations from these early days of site recordation are shown, as are site names and numbers penciled in the margins by James Ford and others. Also dating to this period is a third volume of quadrangle maps for archaeological sites recorded in the Mississippi River Valley in Arkansas and Mississippi.

In addition to seeing the beginnings of systematic site recordation, the 1930s was an important decade in the history of Louisiana archaeology for other reasons. On the state level,

Card # 1 — LOUISIANA ARCHEOLOGICAL SURVEY — 31p

SITE INDEX CARD "A"

State: La — Complex:

Parish: ST. Tammany — Cat. No. 5144 — Photo No.

Site No. ST-L Quad. Covington, SE part. surv. S. 42 T. 8-S R. 12-E

Site Name: Tchefuncte — Type of Site:

Site Loc.

Site Description; Remarks; Prev. Excav.; Hist. Contacts: Excavated in 1939 by Johnson of State Park Service.

PROVENIENCE: — LEVEL: Surface FIND/BURIAL

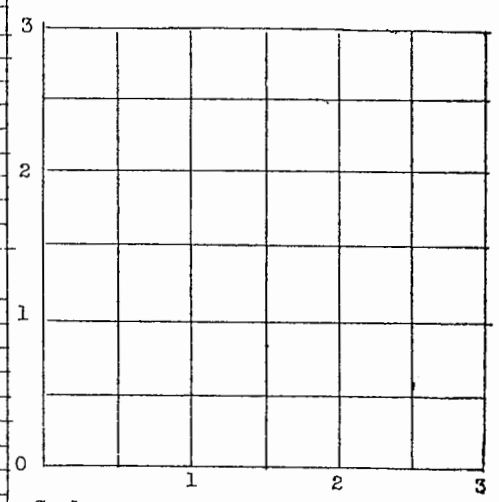
DESCRIPTION OF MATERIAL: (Numerical Count)		SPECIAL ARTIFACTS		POTTERY ANALYSIS	Total	Pct.
STONE						
Chipped Stone		Clay	1			
Ground Stone						
BONE						
Bone Artifact						
Teeth						
SHELL						
Shell Artifact						
COPPER						
Contact Art.						
OTHER MISC.					30	
Total Spec. Art.	1	TOTAL	1	Date Classified: TOTALS	32	
TOTAL SHERDS	32	Date		Collector:		
GRAND TOTAL	33	Checked:		Date: Notes:		

Informant: — Address:

Remarks:

Owner (1)
Owner's repres. (2)
Tenant (3)
Previous Owner (4)
Addresses (5)
Cooperative ? (6)

FURTHER SITE DESCRIPTION; NOTES;



Scale:

Explanation:

Figure 1 (top and bottom) — Original Louisiana Archaeological Survey site card (circa 1935).

the 1930s witnessed the establishment of the School of Geology at LSU, within which was housed the Department of Geography and Anthropology. This was also the decade in which the Louisiana Geological Survey was created. The Survey began publishing the *Geological Bulletin* series; several of the studies incorporated archaeological data, which aided in the interpretation of the geomorphology of the state. The Survey also published *The Louisiana Conservation Review*, which contained reports and illustrations of archaeological excavations and artifact classification (Neuman 1984:47).

On the federal level, this was the decade of FERA (Federal Emergency Relief Administration) and WPA (Works Progress Administration) archaeology in Louisiana. After a hiatus of four years, following the original FERA project at the Marksville site in 1933, James Ford managed a small WPA project in Concordia Parish in 1937, until the project was disrupted by a flood. That same summer, Ford decided to organize a statewide WPA project in Louisiana, the details of which were worked out the following summer. The Louisiana WPA archaeological project, one of the most important archaeological projects of the Great Depression, received final approval from WPA officials in September 1938 (Lyon 1996). It was actually a coordinated LSU-WPA program, established at LSU under the direction of Fred B. Kniffen. The archaeologists Ford selected for his staff included Edwin B. Doran Jr., Preston Holder, Arden R. King, William T. Mulloy, Robert S. Neitzel, George I. Quimby Jr., Carlyle S. Smith, and Gordon R. Willey (Neuman 1984:45).

In Louisiana, during the WPA days, excavations were conducted in Avoyelles Parish (Marksville 16AV1, Greenhouse 16AV2, Philip Nick Place 16AV4, Philip Nick Farm 16AV22, and Baptiste 16AV25); Iberville Parish (Bayou Goula 16IV11); LaSalle Parish (Crooks 16LA3); Orleans Parish (Little Woods 16OR1-5 and Big Oak Island 16OR6); St. Martin Parish (Coulee Rouge 16SM17); St. Tammany Parish (Tchefuncte 16ST1); and West Baton Rouge Parish (Medora 16WBR1). In addition to this work, Neitzel surveyed Avoyelles Parish for archaeological sites, and Doran conducted a brief field reconnaissance for sites in Acadia, Calcasieu, Jefferson Davis, Lafayette, and Vermilion Parishes (Lyon 1996; Neuman 1984:45–46). WPA archaeology in Louisiana ended in 1941.

The next important development in the history of site recordation in Louisiana occurred in the winter of 1939–1940, when Philip Phillips, James A. Ford, and James B. Griffin formulated plans for the Lower Mississippi Survey (LMS). They originally intended to cover the Mississippi Valley from the mouth of the Ohio River south to the area around Vicksburg, Mississippi, where their work was to tie into the earlier survey work done by Ford and his associates in Louisiana and Mississippi. They envisioned a three-prong approach: (1) preliminary site survey and analysis of surface collections, (2) stratigraphic testing of a large number of sites, and (3) small-scale excavation of key sites based on the results of the first two phases. These initial investigations covered the period from 1940 to 1947 (Phillips et al. 1951:5, 40).

While the original LMS work did not make it into Louisiana, follow-up work by the LMS was conducted in Mississippi's Yazoo Basin from 1949 to 1955. As part of these investigations, Phillips did some survey work in the Tensas Basin of Louisiana in 1954. The Tensas survey was eventually completed by Stephen Williams in the two summer seasons of 1963 and 1964. In the preface of the two-volume report written by Phillips on the investigations, he states: "In the spring of 1956, Mrs. Phillips and I, with the generous consent and assistance of Dr. William G. Haag, extended the survey into the files and storage rooms of the School of Geology, Louisiana State University" (Phillips 1970:viii). Over the years, the LMS work in Louisiana has resulted in a substantial number of sites being added to the state site files. Interestingly, however, there are still some LMS sites that have yet to be incorporated into the state site files.

Another important date in the history of the archaeological site survey in Louisiana is 1952, when LSU hired William G. Haag. While his main responsibility at LSU was teaching, he

also managed the Department of Geography and Anthropology's archaeological collections and its associated site data. In the words of Haag, "One of the first things I did was buy a little printing press (one of those Mystics—remember those?)" With the aid of the Mystic, he printed the second version of the Louisiana Archaeological Survey card (William G. Haag, personal communication 1995) (Figure 2). This card, in turn, was superseded by the McBee Keysort site card (Figure 3) in 1960. According to Haag, however, "The computer looming on the horizon made this system obsolete" (William G. Haag, personal communication 1995). The site card system utilized by Ford, Haag, and "others of my vintage," according to Dr. Haag, was taught at the University of Chicago's Field School at the Kincaid site in Illinois (William G. Haag, personal communication 1995).

During Dr. Haag's tenure at LSU (which ended with his retirement in 1978), the need was recognized for a faculty member to conduct archaeological fieldwork in the state and curate the anthropological collections housed in the Department of Geography and Anthropology. In July 1967, LSU hired Robert W. Neuman as Curator of Anthropology for this purpose.

Shortly after assuming his new duties, Neuman instituted a new archaeological survey record form (Figure 4). In addition to a change in format (from a five-by-eight-inch card to an eight-and-a-half-by-eleven-inch sheet of standard paper), the new form provided more space for site recordation data. Neuman also began an extensive color slide and black and white print and photographic collection of sites recorded and investigated during his tenure at LSU, which continued until his retirement in 1994. In 1969, with Lanier Simmons, he also resumed publication of the Louisiana Geological Survey's Anthropological Study Series with Study No. 4, *A Bibliography Relative to Indians of the State of Louisiana*.

The next milestone in the history of the archaeological site survey in Louisiana occurred in 1974 with the passage of the Archaeological Treasures Act (R.S. 41:1601–1613). This act established the Office of the State Archaeologist, under the direction of the Louisiana Archaeological Survey and Antiquities Commission. Subsection 1607(5) established the "central State archaeological survey files" to be maintained in the office of the State Archaeologist. The first State Archaeologist was William G. Haag, who held that position until 1977, when it was assumed by Alan Toth, who had previously been Assistant State Archaeologist.

Section 2 of Chapter IV of the Rules and Regulations of the Louisiana Archaeological Survey and Antiquities Commission, which were adopted on September 2, 1975, specifically detailed the content of the files:

> *The central State archaeological survey files shall include all available information on known historic and prehistoric sites located within the State of Louisiana. Such information may include geographical references, site descriptions, field notes, maps, drawings, photographs, and related documents of every description.*

Pursuant to this, a new "consolidated" site record form was instituted (Figure 5). For the first time, spaces were provided for the UTM coordinates and the name of the 15-minute USGS quadrangle on which the site location was plotted. Space was also provided on the back of the form for the portion of the USGS map that showed the location of the site recorded. These forms were kept in manila folders and filed by parish (county) in file drawers.

This form was eventually superseded by the site record form (Figure 6) currently in use in the Louisiana Division of Archaeology. This was the site recordation system in place when the need to computerize the site files was recognized. Kathleen M. Byrd, who was State Archaeologist from 1979 to 1993, was instrumental in making arrangements for the initial computerization of the state site files in the mid-1980s. This project was begun in 1986 and completed two years later. Its completion was greatly assisted by funding from both the New Orleans and Vicksburg Districts of the U.S. Army Corps of Engineers. The Corps chose to

C14 dates on back

LOUISIANA ARCHAEOLOGICAL SURVEY

Cat. No. 58-566, 5144, 52-27,50,51

Parish ST No. 1 Site Name Tchefuncte Site Coll. Map 31 P

Location: located in the marsh at edge of the dry land, and consequently at the edge of the woods, on the N shore of L. Pontchartrain, about 4 mi E of Mandeville. 1/2 mi of salt separates it from the present shore

Quad. Covington S. 42 T8S R.2E

Geogr. Coord. 30°19'45" N. lt. 90°01'35" W. lg.

Prev. Investigation Doran 1941, Ford 1945 Preservation poor

Type of Site Johnson excavated in 1939 Association beach ridge

Informant Owner State of La., State Parks Commission

Size: H. 5'-6' W. L. Photo: Rl. No. N73-L2, 12 R73-L1, 2-12 Aerial

Date 7/52 Investigator Saucier

Description: Area: 150'x100' & 250' x 100'. Dense vegetation obscures site. Two elongated oval middens, their long axis running NE-SW, nearly parallel to present shoreline. East midden largest. Composed of brackish water clam, Rangia cuneata. Partially excavated Not visited in 52.
oaks and willows

C14 dates:

Chicago Lab	C-150	633±150 B.P.
U. of Chicago Lab	C-151	1233±250 B.P.
Humble Lab	O-30	2200±110 B.P.
Humble Lab	O-42	800±100 B.P.

Cat. Nos
16ST1 - 1 thru 14 4/10/73 Rivet, Weinstein, Dye

Figure 2 (top and bottom) — Second version of the Louisiana Archaeological Survey site card (circa 1952).

CLASSIFICATION INDEX — YEAR — DIRECT INDEX

Site St. Tammany, ST-1 Name Tchefuncte Site Map 31 P

Location located in the marsh at edge of the dry land, and consequently at the edge of the woods, on the N shore of Lake Pontchartrain, abt 4 mi E of Mandeville. ½ mi of salt separates it from the present shore.

Elevation Ecology beach ridge/

Geog. Coord. 30°19'45"N - 90°01'35"W Map Covington Quad. S 42, T 8S, R 12E

Owner State of Louisiana, State Parks Commission

Previous Doran, 1941, excavated, Ford, 1945 1939, Johnson, informant

Area 150'x100' & 250'x100' Depth Height 5' to 6'

Vegetation dense vegetation makes site difficult to find oaks and willow

Water lake brackish Soil Cultivation Erosion

Description Two elongated oval shell middens, their long axes running NE-SW, nearly parallel to present shoreline. East midden largest. Composed of brackish water clam Rangia cuneata. Poor preservation, partially excavated. Not visited in 52. See catalog nos. 58-566, 5144, 52-27, 50, 51.,

Invest. Saucier, 7-52 C14 dates on back

NUMERICAL INDEX — DIRECT INDEX — ALPHABETICAL INDEX — FIRST LETTER — SECOND LETTER — THIRD LETTER

Culture type

Features

Burials

References

Artifact summary 1 clay, 32 sherds Johnson, State Park Service, 1939

C14 dates:			
	Chicago Lab	c-150	633±150 B.P.
	U. of Chicago Lab	C-151	1233±250 B.P.
	Humble Lab	0-30	2200±110 B.P.
	Humble Lab	0-42	800±100 B.P.

Figure 3 (top and bottom) — Third version of the Louisiana Archaeological Survey site card (circa 1960).

LOUISIANA STATE UNIVERSITY
ARCHAEOLOGICAL SURVEY

BROAD LAKE SITE

Reservoir _____ Site No. 16 TE 14 (25-K-)

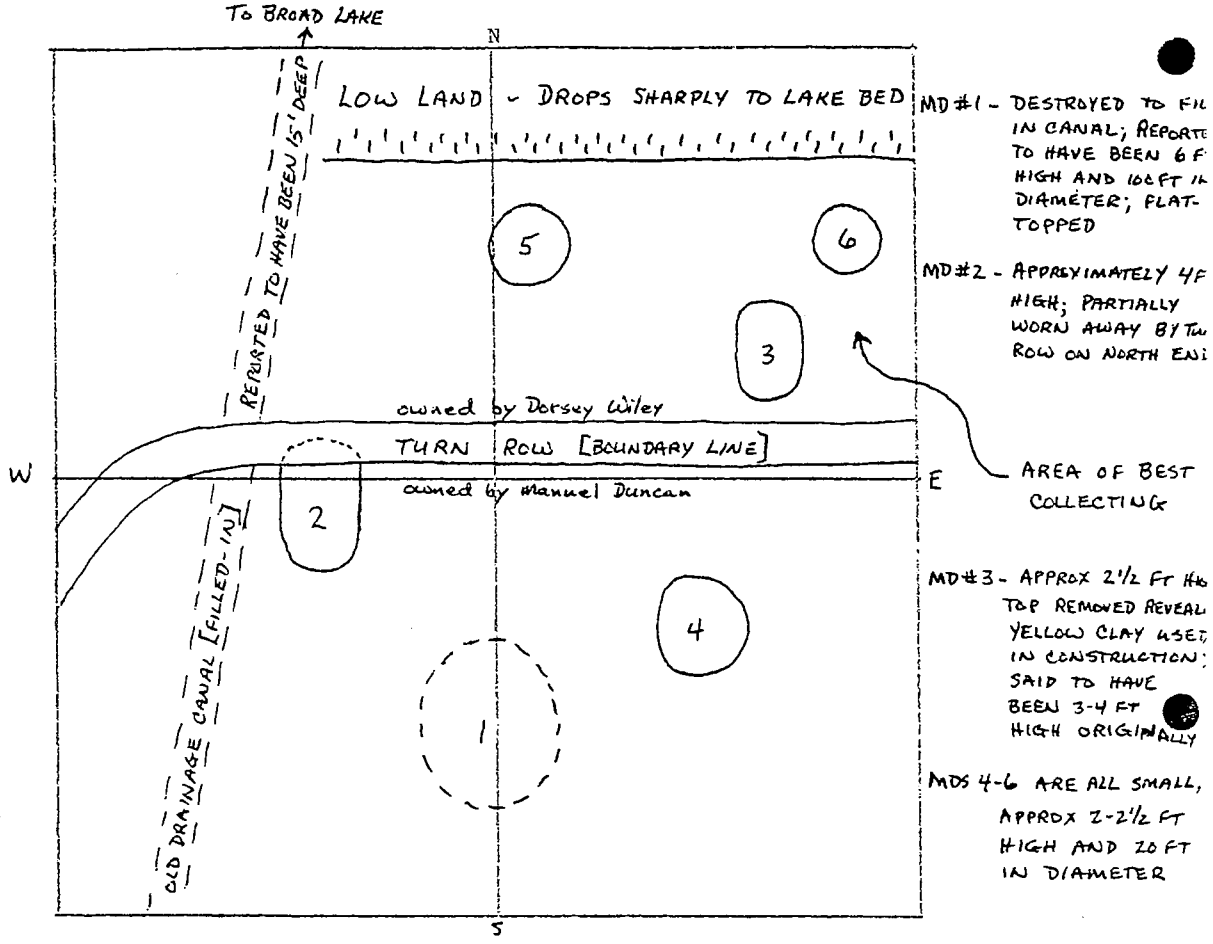
State LOUISIANA Parish TENSAS

1. Map reference 7½' SERIES: GRETNA GREEN / 15' SERIES: LOCUST RIDGE 2. Type of site MOUNDS & VILLAGE
3. Cultural affiliation COLES CREEK / PLAQUEMINE
4. Location 1/3 MILE SOUTH OF SW TIP OF BROAD LAKE; 1/2 MILE EAST OF LITTLE CHOCTAW BAYOU; 4.3 MILES SW OF MAYFLOWER, LA.
Sec. 16 T. 11 R. 10
5. Owner and address NORTH PORTION: DORSEY WILEY; SOUTH PORTION: MANUEL DUNCAN
6. Previous owners
7. Tenant
8. Informants PHILIP B. WATSON, JR., ST. JOSEPH, LA. 71366 TEL 766-3231
9. Previous designations for site NONE
10. Site description 5 SMALL MOUNDS AND ADJACENT VILLAGE AREA; A 6TH MOUND WAS DESTROYED DURING LAND CLEARING OPERATIONS IN THE SPRING OF 1971
11. Position of site and surroundings ON NATURAL RIDGE WHICH DROPS OFF SHARPLY ON THE NORTH TOWARDS DRY BED OF BROAD LAKE; ELEVATION 65 FT; ADJACENT LAND TO SW CALLED OLD ST. MARY FIELD (CULTIVATED PRE-CIVIL WAR)
12. Area of occupation CONCENTRATED AROUND MOUNDS; EXTENDS APPROX 100 YDS ALONG RIDGE
13. Depth and character of fill UNDETERMINED
14. Present condition NEWLY OPENED LAND NOW UNDER CULTIVATION; LARGEST MD DESTROYED SPRING 1971 TO FILL IN OLD DRAINAGE CANAL; ALL MOUNDS REDUCED
15. Previous excavations NONE
16. Material collected SMALL SURFACE COLLECTION (ALL CERAMIC); SITE WAS TOO DRY FOR GOOD COLLECTING
17. Material observed COLES CREEK & PLAQUEMINE CERAMICS
18. Material reported and owner LARGE COLLECTION BY PHILIP WATSON CONTAINS FULL RANGE OF COLES CREEK & PLAQUEMINE CERAMICS PLUS LITHIC MATERIAL
19. Recommendations for further work FURTHER COLLECTION UNDER MORE FAVORABLE CONDITIONS AND MORE DETAILED MAPPING; WATSON'S COLLECTION SHOULD BE PROPERLY ANALYZED
20. Photograph Nos.
21. Maps of site
Recorded by Alan Toth Date Nov. 16, 1971

State
County
Reservoir
Site No.

Figure 4 — The Louisiana State University Archaeological Survey site record form (page 1) (circa 1967).

Site No. 16 TE 14 Mapped by TOTH Date Nov 16, 1971



Scale 1 INCH = 100 FEET (APPROXIMATE)
When entire square represents a section, 1" = 1000'

22. Approach to site: SITE IS DIFFICULT TO FIND AS THE LAND IS NEWLY OPENED AND APPROACH ROADS DO NOT APPEAR ON AVAILABLE MAPS. WE USED A GRAVEL ROAD HEADING WEST OFF OF LA 890 AT MAYFLOWER. ROAD WOUND ALONG LITTLE CHOCTAW BAYOU. WE TOOK THE FIRST GOOD GRAVEL ROAD TO THE RIGHT (JUST PAST SUNDOWN 26-K-9). THE SITE CAN BE SEEN TO THE RIGHT (NORTH) ALMOST IMMEDIATELY AFTER THIS TURN. FINAL APPROACH IS BY NEARLY ½ MILE OF UNMARKED DIRT TURN ROADS.

23. Remarks:

BROAD LAKE IS LABELED "MILLER LAKE" ON THE 1936 EDITION OF THE LOCUST RIDGE 15' QUADRANGLE SHEET. THIS IS CORRECTED ON THE REVISED EDITION AND ON THE 7½' SHEET. THERE WAS NO SIGN OF THE ABANDONED RAILROAD SHOWN ON THE 1936 EDITION IN THE VICINITY OF THE SITE.

Figure 4 (cont.)— The Louisiana State University Archaeological Survey site record form (page 2) (circa 1967).

CONSOLIDATED SITE RECORD
LOUISIANA ARCHAEOLOGICAL SURVEY

Site Name: Cattle Bone House State Survey No: 16 EBR 37
SE 1/4 of the SE 1/4 of Section 46, Township 8 South, Range 1 East
USGS Quads: 15 min: Baton Rouge 7 1/2:
UTM Coordinates: Geog:
Site Location and Approach: Drive south from Baton Rouge on LA 30 until reach Bayou Manchac. Site is approximately 500 meters east of LA 30 and approximately 15 meters north of Bayou Manchac.
Physical Setting: Mississippi River floodplain and backslope of natural levee of Bayou Manchac. Presently area is plowed field. One large hickory tree near site. Originally mixed hardwood forest; soil type Commerce Loam.
Site Description: Scatter of historic artifacts and many bones and bone fragments of cattle. No structural remains visible on the surface; probably is an old house site. Another probable house site (represented by a few artifacts) is located about 150 meters west of this one.
Present Condition: In plowed field, no structural remains visible.
Size and Depth of Midden: Undetermined.
Previous Investigations: None.
Previous Collections and Availability: None.
Owner and Address: See Dave Walker, Commercial Securities - 293-5900.
Tenant and Address: Larry Courville.
Informants None.
Cultural Affiliation: Late historic (early 19th century - Civil Wareand pre-Civil War.
Recorded By: Toth and Woodiel Date: July 1, 1976
Collections: LASAC Catalog Numbers 459-461 (see attached page 66r itemized list)
Remarks: Structural remains and other artifacts may exist below the surface since this area was surely flooded in the past by Bayou Manchac and the Mississippi River.

Site Name: Cattle Bone House State Survey No: 16 EBR 37

Not to scale

Figure 5 — The Louisiana Archaeological Survey consolidated site record (circa 1976). (Condensed from two pages.)

STATE OF LOUISIANA

SITE RECORD FORM

Site Name_____ State Site Number_____

Other Site Designations_____

Instructions for Reaching Site_____

_____

_____Parish_____

USGS Quadrangle: (name, date series)_____

_____1/4 of the_____1/4 of Section_____Township_____Range_____

UTM Coordinates: Zone_____Easting_____Northing_____

Geographical Coordinates: Latitude_____Longitude_____

PHYSICAL SETTING

Land Form_____Geologic Processes_____

_____Elevation_____Slope_____

Site Position with Respect to Terrain_____

_____Nearest Water_____

Flooding_____Soil Characteristics_____

Floral Communities_____

Faunal Communities_____

Other Potential Resources_____

Nearest Known Site_____

SITE DESCRIPTION

Site Size_____Plan_____

Orientation_____Stratigraphy_____

_____

Artifact Density_____Artifact Distribution_____

_____Cultural Features_____

_____

Cultural Affiliation_____

Presumed Function_____

COLLECTIONS

Survey Method_____

Assessment of Collecting Conditions_____

Description of Material_____

_____

_____

_____

CONDITION

Present Use_____Erosion or Disturbance_____

Probable Future Destruction_____

Figure 6 — The Louisiana Division of Archaeology site record form (page 1 of 2) (circa 1979).

SITE EVALUATION

Research Potential_____

State or National Register Eligibility_____

Recommendations_____

USGS 7.5' QUADRANGLE MAP OF SITE AREA

RECORDS

Owner and Address_____

Tenant and Address_____

Informants_____

Previous Investigations_____

Previous Collections and Availability_____

References_____

Photographs and Maps_____

Remarks_____

Recorded by_____Date_____

Figure 6 (cont.) — The Louisiana Division of Archaeology site record form (page 2 of 2) (circa 1979).

provide funding assistance because it is the most frequent user of the Louisiana Comprehensive Archaeological Data Base (LACAD) (Lyon et al. 1992:34). An example of the LACAD coding sheet is illustrated as Figure 7.

Today, the state's archaeological site files represent an accumulation of site data spanning a period of over sixty years. At present, the Division of Archaeology is "cleaning up" the site files as part of a project to archive original record forms. All original site forms will be curated in the Division's archaeological curation facility in Baton Rouge. A working copy of the site files will be housed in the main offices of the Division.

At this time, almost 13,000 archaeological sites have been entered into the Division's computerized database (LACAD). In the ten-year period from 1985 to 1994, a total of 5,424 sites had been recorded, representing 42 percent of the sites on file. Of the 5,424 sites recorded during that period, 3,716, or 68.5 percent were generated as a result of the Section 106 review and compliance process (Figure 8).

In addition to the site records on file at the Division, there are currently 1,900 reports on file, most of which have been written as a result of the Section 106 review and compliance process. Plans are currently underway to archive a copy of each report at the archaeological curation facility and keep one copy in the main offices of the Division for research use.

Within the past year, all site location data has been transferred from the original 15-minute USGS quadrangle maps used by the Division to a complete set of new 7.5-minute USGS quadrangle maps. A copy of the appropriate portion of these maps and accurate UTM coordinates for each site is now required on all site record forms submitted to the Division of Archaeology.

The next step in updating the archaeological database will consist of computer mapping (digitizing) site locations, which will take place in the near future. Automated Mapping and Facilities Management software will be used for this project rather than a Geographic Information System (GIS). This will avoid the high cost of applications, which initially will not be used by the Division, and the expensive hardware required to support the GIS software. However, the Division is ultimately interested in interfacing with GIS programs in operation within other state agencies.

The obvious benefit of digitizing site location data, in addition to more expeditious data retrieval, will be the increased ease of access to this information by qualified researchers and authorized state and federal agencies. The Division of Archaeology will continue to maintain this database and will be responsible for its accuracy and the security of the data. Concerning the latter, it has been aptly stated that "It is exactly the computer records most pronounced benefits, the ease of manipulating and accessing massive quantities of data, which pose the gravest risk of compromise" (Lyon et al. 1992:36).

In summary, the management of Louisiana's archaeological survey files has come a long way since the early days of James Ford and his associates. With the completion of several on-going projects in the Division, the future looks bright for the efficient and successful use of this large database in both protecting and enhancing our knowledge of the valuable resources it represents.

State Site Number _____

LACAD CODING FORM

Landform (1 Entry)

kn	Knoll	**sd**	Saltdome	**bea**	Beach	**nrs**	Nat Relic Scar
rid	Ridge	**swa**	Swamp	**udw**	Underwater	**bat**	Bature
bn	Bench	**bsw**	Backswamp	**nal**	Natural Levee	**ot**	Other, see form
pm	Pimple Mound	**msh**	Marsh	**chr**	Chenier		

Soil Area (1 Entry)

cp	Coastal Plain	**fw**	Flatwoods	**ral**	Recent Alluvium	**cpr**	Coastal Prairies
cmr	Costal Marsh	**mtl**	Miss. Terrace, Loessial Hills				

Soil Series Number _____

Cultural Features (4 Entries)

sar	Single Artifact	**psc**	Prehistoric Scatter	**ls**	Lithic Scatter
md1	Mound/Earthwork	**hsc**	Historic Scatter	**bu**	Burials
md2	Mounds/Earthwork	**hst**	Hist. Sheet Midden	**ss**	Standing Structure
her	Historic Earthwork	**shm**	Shell Midden	**du**	Dump
ote	Other Earthwork	**erm**	Earth Midden	**hr**	Historic Ruins
sw	Shipwrecks				

remarks (C.F.) _____

Cultural Affiliation (7 Entries)

pu	Prehistoric (Unknown)	**tc**	Tchefuncte	**ms**	Mississippian
hu	Historic (Unknown)	**mar**	Marksville	**cad**	Caddo
ph	Prehistoric & Historic (Unk.)	**is**	Issaquena	**hi**	Historic Indian Contact
pal	Paleo-Indian	**ba**	Baytown	**ex**	Historic Exploration 1541-1803
mi	Meso-Indian/Archaic	**tro**	Troyville	**ant**	Antebellum 1803-1860
ni	Neo-Indian (Unknown)	**cc**	Coles Creek	**war**	War & Aftrm 1860-1890
po	Poverty Point	**pq**	Plaquemine	**in**	Industrial & Modern 1890-

Remarks (C.A.) _____

Site Function (3 Entries)

pu	Prehistoric (Unknown)	**fa**	Farmstead	**ci**	Commercial/Service Cen.
hu	Historic (Unknown)	**wt**	Watercraft P&H	**it**	Institution (Rel. & Ed.)
ch	Chipping Station	**pt**	Plantation	**gv**	Governmental
cam	Camp	**hs**	Hist. Town/Vill.	**id**	Industrial
el	Extraction Locale	**ur**	Urban	**du**	Dump
ha	Hamlet/Village	**cr**	Cemetery (Mort.)	**ml**	Military
cer	Ceremonial Center	**ht**	Hist. Transport.		

Remarks (S.F.) _____

Figure 7 — The Louisiana Division of Archaeology Computerized Archaeological Database (LACAD) form (circa 1986).

Description of Material (6 Entries)

cra	Ceramics, Aboriginal	**she**	Shell	**wb**	Worked Bone
hc	Ceramics, Historic	**ppo**	PPO's	**ub**	Unmodified Bone (Fauna)
cs	Chipped Stone	**gl**	Glass	**fl**	Flora
pp	Projectile Points	**me**	Metal	**wo**	Wood
gs	Ground Stone	**cmt**	Construction Material (Brick, Wattle & Daub)		
hb	Human Bone				

Remarks (D.M.) _____

Method of Investigation at Site (3 Entries)

gra	Grab Surface Collection	**au**	Auger Testing	**rs**	Remote Sensing
sy	Systematic Collection	**tu**	Test Units	**dv**	Diver Investigations
sht	Shovel Testing	**exc**	Excavation	**otr**	Other, see site form

Disturbance Agent/Present Use (3 Entries)

unk	Unknown	**ti**	Timber Industry	**cw**	Construction, Water
pd	Potted	**nat**	Natural	**cto**	Construction, Other
nn	None	**di**	Dev. (Urban)	**uw**	Underwater
ag	Agriculture (Plowing)	**otd**	Other, see site form		

Disturbance Degree (1 Entry)

unk	Unknown	**mp**	Minor Impact	**dt**	Destroyed
nn	None	**mj**	Major Impact	**iu**	Inundated

Remarks (D.D.) _____

National Register Status (1 Entry)

unk	Unknown	**ld**	Listed	**ps**	Potential Significant
ne	Not Eligible	**de**	Declared Elig.	**nd**	National Landmark

References (4 Entries)

1)_____ 2)_____ 3)_____ 4)_____

Figure 7 (cont.) — The Louisiana Division of Archaeology Computerized Archaeological Database (LACAD) form (circa 1986).

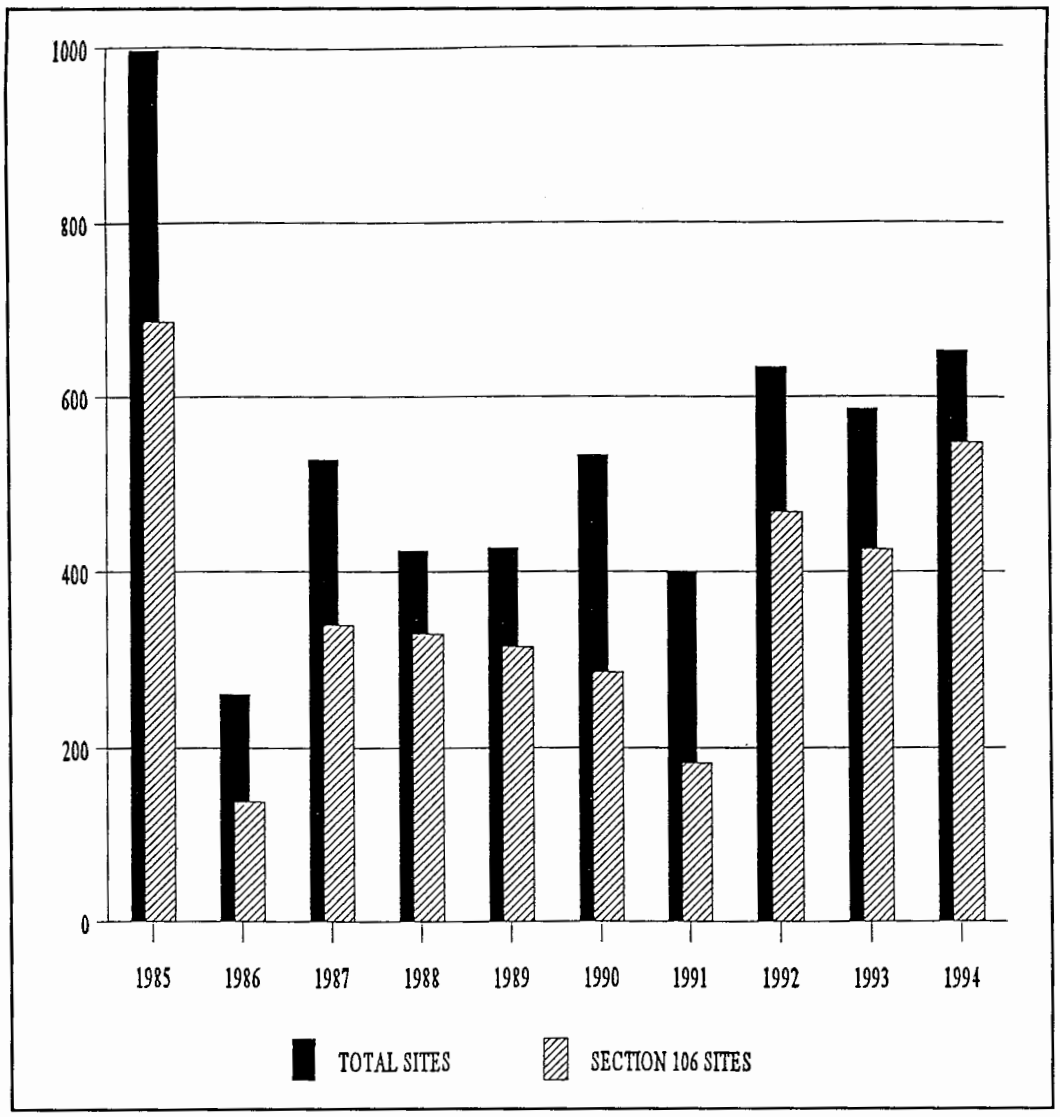


Figure 8 — Archaeological sites recorded with the Louisiana Division of Archaeology, 1985–1994.

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THE UTILITY AND POTENTIAL OF THE MISSISSIPPI ARCHAEOLOGICAL SITE FILE

Keith A. Baca and Joseph A. Giliberti

INTRODUCTION

The information contained in centralized, comprehensive archaeological site files is crucially important for the effective management, preservation, and scientific study of the nation's archaeological resources. Despite a wide range of site file variability among the southeastern states in terms of institutional custody, historical origins, and scope of data emphasis and detail, a certain degree of commonality exists, which has facilitated recent initial attempts at regional synthesis (e.g., Anderson 1993; Anderson et al. 1992). This brief overview of the Mississippi archaeological site file reviews the history, present status, and future prospects of this vital corpus of information, highlighting the utility, limitations, and potential of both the paper document files and the associated computerized database. Many of the problems presented by the Mississippi site file system are similar to those faced by other states, and so the suggested solutions have interstate applicability.

HISTORICAL BACKGROUND

Compilation of the Mississippi archaeological site file was initiated in 1927 by the Mississippi Department of Archives and History (MDAH). An outgrowth of a statewide MDAH-sponsored archaeological survey and excavation program begun by James A. Ford and Moreau B. Chambers, the early state site records were generated following standards promulgated and disseminated during the late 1920s by the National Research Council's Committee on State Archaeological Surveys (Guthe 1930). The systematic organization of the site file was enhanced through the use of standardized site survey record forms based on a format recommended by the Committee. The success of the Committee's attempts to encourage systematic, representative survey coverage on a nationwide basis was uneven (Dunnell 1990:15); but in Mississippi, at least, definite positive influence of this guidance is discernible. This is reflected in the fact that a broader range of sites was recorded than ever before, importantly including village/habitation sites as well as mounds, the latter having overwhelmingly preoccupied earlier investigators. Descriptions of a number of notable sites recorded during these Ford-Chambers field investigations were presented in the pioneering volume *Analysis of Indian Village Site Collections from Louisiana and Mississippi* (Ford 1936). In addition, site survey information available in the few earlier published works on Mississippi archaeology (e.g., Brown 1926; Thomas 1894) was incorporated into the state file.

This initial burst of site recording by MDAH was sustained until the late 1930s, when survey activity slowed drastically following an administrative decision to curtail archaeological investigations. MDAH survey work and site file maintenance were suspended altogether following the United State's entry into World War II due to the resulting wartime staff shortages. By the eve of the war, approximately 500 sites had been recorded in 68 of the state's 82 counties (Works Projects Administration 1940).

Following the war, the state site file laid dormant for over two decades in the absence of an archaeological program and staff at MDAH. However, postwar site recording activity was soon resumed by other organizations, most notably the Lower Mississippi Survey (LMS), a research consortium of the Peabody Museum of Harvard University, the University of Michigan, and the American Museum of Natural History. LMS survey activity in the state was extensive

during the late 1940s and early 1950s, and lasted sporadically as late as the 1980s. Much of the site survey information generated by the LMS between 1940 and 1955 was published in a series of volumes (Phillips 1970; Phillips et al. 1951), but most of the LMS site inventory data was not incorporated into the Mississippi site file until the late 1960s, when the statewide MDAH archaeological program was revived.

The catalyst leading to the resumption of active maintenance of the state site file was the passage of the National Historic Preservation Act of 1966. Under the provisions of Section 106 of the Act, the Mississippi Department of Archives and History was designated the State Historic Preservation Office, with authorization to review and comment upon the potential impact of federally funded or licensed land development projects on cultural resources listed in or eligible for the National Register of Historic Places. As a result, inventory data generated by Section 106 compliance surveys now account for the vast majority of site records incorporated into the state site file, far surpassing noncompliance site information submitted by university-based archaeologists and amateur informants. The drastically increased submission of site data in recent years is largely attributable to intensified Section 106-driven survey work underwritten by the U.S. Forest Service and the U.S. Army Corps of Engineers (Table 1). This sharp recent growth of the state site file is illustrated by the fact that the total number of recorded sites almost doubled between 1982 and 1995. Thus, in the past decade, about as many sites were added to the state inventory as had been registered in the previous fifty years. Currently (May 31, 1995), the Mississippi archaeological site file contains records for 15,699 sites.

STATE INVENTORY SAMPLE, FORMAT, AND CONTROL

In Mississippi, as in all states, survey coverage as represented by the distribution of recorded sites is quite uneven due to multiple artificial circumstances. As summarized by Galloway (1994:48), chief variables influencing recorded site abundance or scarcity include whether or not a given area has a nearby university or government agency with an archaeological program; is the scene of major federal land alteration projects requiring Section 106 site inventory (e.g., The Tennessee-Tombigbee Waterway, National Forest units, etc.); or is subjected to large-scale row-crop agriculture (which greatly increases site visibility). The resulting geographical bias (Figure 1) poses obvious pitfalls in employing site file data in statewide and panregional settlement system analysis; however, such efforts are beginning to be made (Anderson 1993; Galloway 1994).

In 1968, the Mississippi Department of Archives and History became the official agency responsible for assigning each recorded site a unique identification code. At this time, MDAH instituted the use of the Smithsonian trinomial site designation system to bring the Mississippi site file into conformity with the national practice. The initial unit of each trinomial desig-

Table 1 — Archaeological sites reported to the Mississippi Department of Archives and History.

YEAR	NO. OF SITES
1984	507
1985	331
1986	137
1987	627
1988	236
1989	230
1990	398
1991	403
1992	1,239
1993	931
1994	1,885

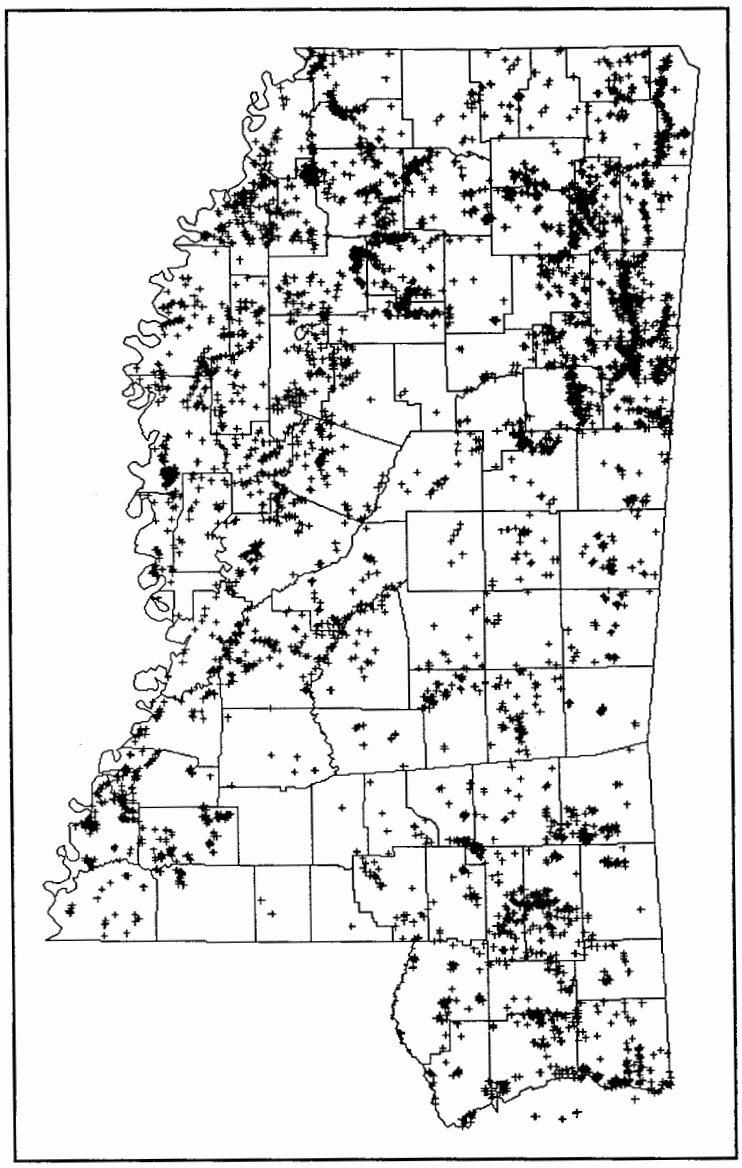

Figure 1 — GIS map of Mississippi archaeological sites with recorded UTM data, May 95 (n=7,732).

nation consists of a number representing the alphabetical-numerical position of Mississippi in the list of the lower forty-eight states (22), followed by a two-letter county abbreviation, then by a sequential accession number. All previously recorded sites were reassigned trinomials to supersede the original numbers. This resolved the management confusion inherent in the former practice of each institution assigning sites numbers according to its own idiosyncratic system. The MDAH trinomial system deviates from the national convention somewhat by beginning each county inventory with the number 500 instead of the usual number 1. As an example, 22Ad500 is the first site in the Adams County inventory, not the five-hundredth. The rationale for this format was to eliminate the possibility of confusion resulting from duplication of any new county sequence numbers with old numbers assigned to different sites (Penman 1977:9).

State trinomial codes are assigned to all archaeological sites predating about 1900. Although post-1900 sites encountered during cultural resource management surveys must be recorded and reported to MDAH for Section 106 significance evaluation, they are not assigned state site numbers. The arbitrary 1900 cutoff date was chosen to avoid inflating the site file with overwhelmingly abundant and ubiquitous twentieth-century sites. The position of MDAH is that tracking the ongoing explosive proliferation of modern sites yields rapidly diminishing returns in useful knowledge when the costs in staff time expended on incorporating such data into the state file are considered, especially in view of an increasingly burdensome records processing backlog. This policy has been criticized by a number of historical archaeologists; however, perennial understaffing of the MDAH archaeology office has imposed practical constraints in records processing capacity. As such, aboriginal and pre-twentieth-century historic-period sites must take priority to maintain site file manageability.

Under MDAH guidelines, the minimal site definition simply consists of any artifact location. This inclusive standard has increased the representation of comparatively ephemeral sites in the state inventory and has served to counteract the former bias resulting from the frequent dismissal of small, but not necessarily insignificant, occupation loci—such as sparse scatters and isolated finds—as not worth re-

cording. However, the practice of assigning trinomial codes to single-artifact finds is restricted to chronologically diagnostic artifacts only (e.g., ceramic sherds and projectile points). This prevents the expenditure of scarce MDAH staff time on the processing of a sizable amount of relatively trivial isolated find data (i.e., one-flake sites).

The preferred (but not yet required) trinomial assignment procedure is for the site recorder to submit completed state archaeological site forms to MDAH prior to issuance of state site numbers, so that the site data may be incorporated into the state inventory without delay. The recorder is then notified of the state number(s), the use of which is required in reports submitted to the State Historic Preservation Officer for review. MDAH is increasingly reluctant to assign site numbers prior to receiving the site forms. This courtesy has been granted for the convenience of site recorders; however, the practice is being curtailed and may soon be eliminated altogether due to the increasingly common failure of site recorders to submit site forms promptly.

The master site file documents consist of eight-by-five-inch file card forms. Currently, only hard copy forms are accepted. Following receipt, the data on the paper forms are entered into an electronic database (see section on *Site File Computerization and GIS*). Data categories include the state site number, location, size, description, physiographic region, chronology/cultural affiliation, diagnostic materials, ownership, landform setting, number and types of mounds (if any), integrity, National Register eligibility, and report references, among others. The Mississippi site form is minimalistic compared to the multipage forms used by other southeastern states. However, the site cards are not intended to comprise a comprehensive record. Instead, they are index forms containing condensed data, which direct users to additional information curated at MDAH or other repositories (Schlundt 1982:58). Associated sources include reports, publications, field records, photographs, maps, and artifact collections. Nevertheless, the site forms themselves, as well as the associated electronic files, do contain most of the same kinds of essential information required by other states. Thus, Mississippi site file data are fairly useful for interstate analysis, especially in the crucial locational and gross chronological categories.

A longstanding data quality problem stems from the unfortunate fact that even the comparatively abbreviated format of the Mississippi archaeological site form is not sufficient to encourage detailed completion of all specified data categories. Even the simple check-off spaces are often ignored by professional archaeologists and amateur recorders alike. Perhaps the most abuse is evident in the carelessness of site form submitters when completing the chronology section. Spaces designating various cultural periods are often checked with no supporting diagnostic artifact information supplied in the corresponding space on the form. One particularly deleterious effect of the frequent misidentification of site chronology was the former erroneous inflation of the number of generic Archaic sites in the state inventory. This flaw, which has been corrected, is symptomatic of a negligent tendency of site recorders to misuse Archaic as a catchall category for poorly identified aceramic sites. Such inattention in chronological classification has been counteracted through the institution of the now-routine procedure of carefully verifying all information on site forms during initial processing rather than accepting them at face value, as was too often the tendency in the past.

For many years, one of the greatest shortcomings of the Mississippi site records involved the lack of precision in site location data. Primary location information was expressed in terms of part-section/township/range, but was only rarely better than the quarter-quarter section level of specificity. MDAH maintains a set of 7.5-minute quadrangle maps covering the entire state upon which all recorded sites are plotted as precisely as possible; however, site location maps were not consistently supplied to MDAH until the 1970s. This causes difficulty in relocating less conspicuous sites recorded many years ago. The addition of the Universal Transverse Mercator (UTM) coordinate data category

to the new site record form, introduced in 1980, resulted in a tremendous improvement in site location database precision and, fortuitously, helped preadapt the site file for the recent implementation of geographic information system (GIS) applications (see next section).

Despite the high degree of precision inherent in the UTM location system, the accuracy of UTM information as recorded on the site forms sometimes leaves much to be desired. Discrepancies of hundreds and even thousands of meters are often noted between the UTM coordinates recorded and the actual location of the site as plotted on the USGS quadrangle section copies attached to the site forms. When these discrepancies are corrected during site form processing, the site locations as mapped on the forms must take priority as the most authoritative source. However, it is quite evident that map reading and orienteering skills are highly variable among archaeologists, not to mention amateur recorders. Even infrequent random field checking of mapped locational data can suggest the significant extent of the problem. Hopefully, this dilemma will abate in the future as global positioning system (GPS) technology comes into more widespread use.

In light of the above-outlined problems, it is apparent that submitters of site forms tend to view them as being of secondary importance and, as a result, all too often treat them as an afterthought. In order to impress the importance of carefully recorded site information, site file managers should strive to communicate to field investigators that when a site form is filled out, a primary scientific and historical document is created that may stand for decades to come as a major, and in some cases the only, source of vital site data.

This discussion has touched upon the role of providers of site information, but what of the needs of site file data consumers? As mentioned previously, the site file has begun to be consulted as a resource for geographically broad-scale research; however, the most frequent requests by archaeologists for state site file data consist of background record inquiries to check for previously recorded sites and surveys in localized project areas. In both cases, site survey information is supplied by the MDAH archaeological staff free of charge, provided that the time involved is not excessive. Otherwise, the investigator must visit the MDAH site file office in Jackson to obtain the data. Unrestricted access to the files is allowed to outside investigators, under the supervision of an MDAH archaeologist. MDAH is currently considering the possibility of providing read-only, remote on-line access to the computerized site database as a means of enhancing the overall utility of the site file. In the event on-line access is made available, it will be restricted to certain authorized users, such as universities and land management agencies, for site security reasons. In this respect, site file information is provided to nonarchaeologists only on a need-to-know basis—for example, landowners or agency planners who must have access to such information in order to prevent or mitigate adverse effects of development projects on known sites. With the exception of those sites open for public visitation, site file data is not provided to the merely curious. This prevents the circulation of site location information to potential looters. This policy has legal backing through an exemption from the state open records law.

SITE FILE COMPUTERIZATION AND GIS

The computerized version of the archaeological site file, established by MDAH in the mid-1980s, was developed in a standard Informix RDBMS, tailored for a Unix operating system. The database is currently about 14 megabytes in size and is maintained on an AT&T 3B2 minicomputer housed off-site from the archaeology office in the main MDAH building. Access to the system is via AT&T 4410 terminals, which are connected to a separate AT&T 3B2/310 minicomputer in the archaeology office, which in turn is hard-lined to the off-site main system.

The database record fields are structured similarly to the categories on the state site cards. New and updated site information is en-

tered in text form. Although standard abbreviations and spellings were established for use in data entry, the former lack of close supervision over the clerical personnel by staff archaeologists has resulted in many inconsistencies and errors in the site file. Specifically, information was sometimes entered into wrong data fields or misspelled, and random typographical errors and eccentric, cryptic abbreviations are abundant. Consequently, the results of data queries are often severely incomplete and, in many cases, not useful. Efforts are under way to clean up the current data and prevent such deficiencies in the future. To this end, the key quality-control measure consists of the designation of a specific staff archaeologist for all data entry, instead of the former use of nonprofessional clerical staff and student interns. This has greatly improved site data consistency and accuracy. Restrictive codes are being written into fields, as well, to help prevent the input of incorrect data.

Recently, the Mississippi Automated Resources Information Service (MARIS) was contracted to develop a GIS menu interface with a customized application capability for use with the computerized site file. The interface between the two files is based on a single point location from the estimated center of each recorded archaeological site. Site locations are recorded as x-y values in accordance with UTM format. As of May 31, 1995, there were 7,732 sites, or 49.25 percent of the inventory total, with UTM coordinates specified, which enables their representation in the GIS (see Figure 1). Efforts will soon be initiated to add UTM data to earlier site records that now lack them. Selected nonspatial attributes of the sites have been linked to the point data, including site number, cultural affiliation, and National Register eligibility. The GIS utilizes ArcInfo software running on a Sun Sparc20 workstation housed at the MARIS facility in Jackson, with linkage between MDAH and MARIS via modem. The MDAH archaeology office utilizes an IBM-compatible 486-66 MHz PC with a 19-inch monitor and 16 MB RAM. The MDAH PC uses the Tektronix Emulation Package EM4105 to enable integration with the MARIS workstation. Future developments will include the addition of linear features and polygons to the application capability, as well as adding new sites and site information updates.

There has been some internal disagreement and debate at MDAH concerning the future of the state's computerized site file. The MDAH staff archaeologists have been of the opinion that the present system should be exchanged for a PC-driven database, such as those employed by the states of Alabama, Tennessee, Louisiana, and Georgia. This would allow for independent, in-house operation of the system by archaeologists. The off-site housing and control of the system have greatly complicated data queries by the archaeological staff and have caused difficulties and long delays during the aforementioned GIS project. In effect, the computerized site file has been little more than a backup repository of information already available in paper form. Its effectiveness as a management and research tool has been severely restricted by computer maintenance problems, access limitations, and the complexity of the Informix database itself. Converting the site file to a PC-based system would give those who utilize and generate the data direct access to its management and operation. Further, it would relieve the technical support staff of the burden of maintaining the site file in the problem-prone and antiquated minicomputer. The technical support staff, however, has shown resistance to this idea and has suggested that a PC-based system could not perform as many tasks as effectively as the current system.

Recently, work on the National Park Service's Ancient Indian Architecture/Earthwork study—currently being conducted as part of the federal Lower Mississippi Delta Region Initiatives project—has helped prove that PC-based systems are the most desirable format for maintaining an automated site database. Requests from both the Southeast Archeological Center (SEAC) of the National Park Service and the University of Mississippi for comprehensive archaeological site file information specified the need for PC-compatible data. Since these were

not available, Guy Prentice of SEAC and Jay Johnson of the University of Mississippi have kindly converted ASCII-formatted data sets of the MDAH site file into PC databases. SEAC utilized Microsoft Access, while the University of Mississippi used the program Paradox. By adapting these converted files, the MDAH archaeological staff has successfully created a PC-based version of the site file in dBase for Windows 5.0. This PC database has already proved easier to use. Further customization and refinement are now underway, and the resulting improved accessibility of the computerized site data will make large-scale regional studies far more practical.

CONCLUSIONS

Although the Mississippi archaeological site file is on the whole a reasonably efficient system, it is apparent that many of the problems involved in its management have arisen from the past lack of sufficient scrutiny of site data for reliability at the front end of the records processing stream, as well as the failure to regularly update site information as more knowledge accumulates. Such problems are by no means unique to Mississippi: it has been pointed out that among southeastern states in general "site forms all too typically appear to be filled out (and then forgotten) early in the research process..." (Anderson 1993:15). In Mississippi, this situation is now being rectified through systematic site data proofing and updating by the site file management staff. A decade of site file computerization and the more recent implementation of GIS have forcefully demonstrated the importance of "clean" site files now that automated data manipulation and retrieval have become an indispensable part of archaeological management and research.

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THE MANAGEMENT OF ARCHAEOLOGICAL SITE FILES IN NORTH CAROLINA

Almeta Rowland and Dolores A. Hall

BACKGROUND

As the official custodian of the North Carolina archaeological site files, the Office of State Archaeology (OSA) has certain legal obligations regarding their maintenance and disposition. This paper offers a brief overview of the North Carolina system for site file management as well as some of the issues affecting the system. Working within the confines of limited staff, funding, and technology, our primary goal has been to provide accurate data to a variety of users.

The North Carolina OSA is a branch of the State Historic Preservation Office (SHPO). Our main office is in Raleigh. We have one archaeologist in the Western Office of Archives and History in Asheville and three archaeologists in our Underwater Archaeology Unit (UAU) at Kure Beach. In 1981, we accepted responsibility from the Research Laboratories of Anthropology at the University of North Carolina at Chapel Hill for maintaining the state's centralized site numbering system. Our site files contain records of both prehistoric- and historic-period archaeological sites. As of May 31, 1995, there were 27,045 archaeological sites recorded in the state of North Carolina. Information on standing structures is maintained by our sister branch, the Survey and Planning Branch in Raleigh, and shipwreck files are maintained by the UAU at Kure Beach. Since 1989 it has been our policy to record noncommercial cemeteries as archaeological sites if they appear abandoned or neglected or if the last interment was more than fifteen years ago. This information is also forwarded to the North Carolina Abandoned Cemetery Project staff for inclusion in their files.

We use an eleven-page computerized site form for recording both prehistoric and historic archaeological sites, including cemeteries; a computerized one-page form for recording isolated finds; and a one-page, two-sided form for site recording by amateurs—which we later transfer to a computerized form. While the eleven-page form may be daunting, it contains many multiple-choice fields and includes environmental, cultural, management, and bibliographic information categories. Although our site files have been computerized since 1979 in a Prime Information 4150 mainframe computer, only about half of the 27,000 recorded sites are currently in the computer system.

The majority of site forms are submitted by professional archaeologists as a result of compliance investigations. Permanent site numbers are assigned and sites are mapped on USGS topographic quadrangle maps in our office before the forms and reports are submitted to us. In this way, duplicate numbers for the same site and the confusion of temporary instead of permanent site numbers in reports are avoided. Site forms with permanent numbers are submitted at the same time as the compliance reports. The bibliographic number assigned each report as it is data entered is noted on the site form. Tracking numbers keyed to any compliance project related to the report are also added to the site forms for cross-reference.

Quality control of archaeological site data is a primary concern. Since we obtain site data from a number of sources, it varies in accuracy and level of detail. Several steps are taken to ensure consistency and completeness whenever possible. An accurate location for each site is paramount. We maintain all site locations and surveyed areas on standard 7.5-minute USGS topographic maps. All plotted locations, UTM coordinates, and environmental information are checked against the information on the site form before being entered into the computer system. Each site location is assigned an accuracy rating

based on the consistency of the information.

If the site was recorded for compliance purposes, the cultural and management information on the form is checked by the staff archaeologist during report review to maintain consistency. After the site information is entered into the computer system, a printout is made and proofed for errors by a different individual. The original form, along with the printout and other supporting data, such as sketch maps or artifact inventories, are prepared for microfilming.

Site forms are among the many records converted to microfilm on a regular basis as part of the OSA's official Records Retention and Disposition Schedule, mandated by law. This practice allows us to store large quantities of data in small spaces and, more importantly, a copy of the microfiche is placed in the fireproof vault of the North Carolina State Archives. Most of the archaeological data concerning North Carolina are unpublished and scattered across the state. As the central repository for much of this information, we have an obligation to protect and preserve the records as well as the artifacts. In addition to site forms, we microfilm archaeological reports, field notes, artifact inventories, compliance project documentation, and other site information, as well as an assortment of administrative records. We do have the on-site capability to convert the microfiche back to paper. The microfiche is always checked for legibility prior to destruction of the original paper records.

ACCESSIBILITY

The policies of the OSA regarding accessibility of archaeological information are prescribed in part by the North Carolina public records law. Archaeological site files are included in the definition of "public records" found in North Carolina General Statute (NCGS) 132-1 and must therefore be collected and maintained to certain standards. Public access to information concerning archaeological site locations is restricted by the provisions of NCGS 70-18 to protect the sites from a risk of harm. It is incumbent upon the OSA to protect both the archaeological resource and its associated records and to maintain the distinction between public ownership of records and public access to those records. Striking the appropriate balance is not always a simple task.

The OSA site files are utilized daily by staff archaeologists, federal and other state agency archaeologists, archaeological consultants, and, less frequently, university archaeologists and their students. Requests for computer queries for archaeological data concerning specific counties, time periods, environmental situations, and soil types are common. The professional archaeological community is only one of our constituencies, however. While we do not open our files to the general public and have refused access to site information to those individuals looking for "a good place to dig," we do recognize a number of situations where non-archaeologists have a legitimate "need to know."

Site information is routinely sent to state and federal agencies and their applicants during the compliance process as part of our official SHPO comments. Environmental firms conducting background assessments for their clients are given access to certain information. Increasingly, city and county planning departments are attempting to incorporate consideration of archaeological resources into their environmental studies and ordinances. Local historic preservation commissions, certified local government boards, and tribal organizations are also legitimate users of archaeological information. Decisions regarding how much and what type of information to make available are made on a case-by-case basis. Once approved, a recipient of this data must in turn agree to share the information only with colleagues who "need to know."

While we are aware of the dangers of increasing accessibility to site data, archaeological resources cannot be protected or preserved unless those groups or individuals responsible for decisions that will affect these resources have access to the appropriate information. In an age of dwindling resources and

regulations, it is difficult, if not impossible, to convince people to consider the effects of their actions upon archaeological resources without telling them where these resources are located and why they are important.

NEW AND CURRENT SYSTEMS

Electronic access to site data is also becoming an issue. The North Carolina Department of Transportation (NCDOT) has contracted with the North Carolina Center for Geographic Information and Analysis (NCCGIA) to develop a geographic information system (GIS) for use in the highway planning process. This system is to include a number of data sets, such as wetlands, soil types, endangered species, hydrology, topography, prime farmland, historic structures, and archaeological sites. These data layers, once compiled, will be held by NCCGIA and used in the development of a North Carolina on-line geographic data source directory. This project could engender both problems and opportunities.

The problems involve the control of access to site information and information updates. Any agency or group requesting maps or data layers of archaeological site information must have written approval from the State Archaeologist. Once data layers are released by NCCGIA, however, our control of access is, for all practical purposes, lost. In addition, the data can become outdated quickly, both in terms of specific site status and recommendations and in the number of recorded sites in any specific study area.

On the other hand, the NCCGIA project offers us an opportunity to organize and update our archaeological site files and take a closer look at how we organize our data. At the initiation of the project we were faced with supplying NCCGIA with the site information without benefit of additional staff or funding and without specific guidance on how to organize the data. We decided that the USGS 7.5-minute quadrangle map was the most practical format on which to provide the data. Although we started plotting surveyed areas on USGS maps in the mid-1980s, approximately twenty years of surveys had not been plotted. There was a massive backlog of site forms to be map checked and entered into the computer system. We also had mapped site locations for which we had no site forms or other information.

Beginning with the Abbottsburg quadrangle and proceeding in an alphabetical sequence, we began checking reports and files to ensure that sites and surveyed areas are plotted accurately and completely and that all site forms are complete, consistent, and entered into the computer system. We also make sure that the bibliographic and management information for each archaeological report is included in the bibliographic program. In the process, we are compiling an inventory by quadrangle map of counties depicted on the map; sites recorded on the map; archaeological reports that include data on these sites and/or areas; and sites listed or determined eligible for listing in the National Register of Historic Places, or placed on the state study list for possible future listing. This inventory is available—on diskette when requested—for staff and consultant use.

Once complete, the maps are digitized by an NCCGIA technician, and we are provided with a mylar overlay of archaeological sites and surveyed areas. Nonspatial data will be downloaded to the NCCGIA system in the near future. After about a year, we were able to obtain a full-time NCCGIA employee to work in our office updating maps, plotting surveyed areas, and doing data entry for the project. When the new staff person joined our team, we shifted our focus for six months to provide NCCGIA with information on a statewide basis of National Register listed, determined eligible, and study list properties. With the completion of that data layer, we have returned to a map-by-map progress, although it is likely that we may have to shift focus again based on NCDOT or NCCGIA priorities. The result of this project will be the elimination of backlogs and incomplete data and the creation of a well-organized and inventoried set of reliable site files.

Much has been accomplished since September 1994, when we reorganized our staff and instituted a team approach to records management. Our team consists of (1) a records retention and disposition manager, (2) a GIS technician, (3) two compliance review coordinators (each of whom also have other records responsibilities), and (4) the site registrar/office Cultural Resources Evaluation Program (CREP) data coordinator. While each team member has many other responsibilities not associated with the records project, specific periods of time are reserved for teamwork. So far the team has proofed for legibility about 12,000 microfiche and paper site records, updated bibliographic entries for five counties, transferred site data to about twenty revised USGS maps, and prepared three years of compliance project documentation for microfilming.

The team works jointly once a month on projects, such as expanding and updating the site database, correcting map problems, adding bibliographic entries in our computerized database, and plotting surveyed areas. The records manager and the site registrar meet weekly to develop solutions to specific problems and to guide the team's progress. All team members are encouraged to keep abreast of any backlogs and to explore new ways of maintaining a viable system of site file management. Creative approaches to problems and the team concept have allowed us to complete a number of tasks well in advance of the target dates set for completion by single individuals. We have a better appreciation and understanding of the responsibilities of each team member and offer both the archaeological community and the public a higher standard of service.

SITE FILE MANAGEMENT IN PUERTO RICO

Miguel A. Bonini

Site file management is of fundamental importance to any successful archaeology program. The Puerto Rico State Historic Preservation Office, though lacking in personnel, has strived to maintain its files as up-to-date as its resources will permit. This situation, we are sure, is consistent with that of the states on the mainland, which are also faced with a volume of information that greatly outweighs the resources available to adequately manage them.

Though included administratively in the Southeast Region of the National Park Service, Puerto Rico is quite distinct culturally, both historically and prehistorically speaking, from the other states in this region. Interest in the island's archaeology dates back to the late nineteenth century (Carbone 1980). Among the early scholars were Agustin Stahl (1889), Alfonse Pinart (1893), and Cayetano Coll y Toste (1907). Their early investigations, roughly contemporary to the pioneering investigations in the continental United States, reflect the insurgent worldwide interest in prehistory in the last century.

After the island's change of sovereignty in 1898, American archaeologists and anthropologists began to conduct investigations in Puerto Rico. Among them were Jesse Walter Fewkes (1907), Samuel K. Lothrop (n.d.), Franz Boas, J. Alden Mason (1941), Robert T. Aitken (1917, 1918), Froelich Rainey (1940), and Irving Rouse. One of the most extensive surveys was Rouse's in the late 1930s (1952, 1992).

Puerto Rico has never been subjected to a systematic islandwide survey (WPA archaeology also missed Puerto Rico). As a result, the number of recorded sites is relatively low, totaling only about 1,000. Of these sites, only a small percentage have information describing the areal extent or even cultural affiliation (beyond prehistoric or historic). This severely limits the utility of the file. After all, a site file is only as good as the information contained in it. Files can be up-to-date and easily accessible, but if the information is limited to just the name of the site, its general location, and whether it is historic or prehistoric, a researcher does not have much to go on. The goal in site file management is not just to have readily retrievable site files, but to insure that those files contain information beyond general location and cultural affiliation.

One advantage Puerto Rico has compared to most of the states of the Union is that its database is relatively small, so it takes less resources to manage it. The amount of archival space or computer space to store this information is probably a fraction of that which is needed for any of the other states in the Union. Unfortunately, we are painfully aware that our files greatly underrepresent the number of sites exiting in the island. When the funding to adequately manage and expand this database is nonexistent, an unsatisfactory situation exists.

The Puerto Rico State Historic Preservation Office (PRSHPO), which is part of the Office of the Governor, maintains their site files with the Filemaker Pro database program on a Macintosh LC III computer. Most of this computer file was originally taken from the old, paper site forms and processed by the Consejo para la Protección del Patrimonio Arqueológico Terrestre de Puerto Rico (Council for the Protection of the Archaeological Land Patrimony of Puerto Rico, or Consejo).

The PRSHPO and Consejo site file forms are divided into five broad parts (see Figure 1 at the end of this article):

Part I: ***Identification.*** Basically the name, site number, location in UTM or latitude and longitude, municipality, USGS quadrangle, owner and use of terrain.

Part II: ***Environment.*** The type of terrain, vegetation, soil erosion, and soil classification.

Part III: ***Archaeology.*** The type of site (prehistoric, historic, or multicomponent), cultural association area, depth, type of material (ceramic, lithic, shell, petroglyph, ballcourt, etc.), and previous excavations.

Part IV: ***Architecture.*** Basically, visible architectural elements, material used, and function of structures.

Part V: ***General Information.*** A catch all. Bibliographic references, graphic information, and commentaries.

A brief overview of the agencies that regulate archaeology on the island is in order. Puerto Rico has enacted two state archaeology laws: the Protection, Conservation and Study of Underwater Archaeological Sites and Resources Act of 1987 and the Protection of the Archaeological Land Patrimony of Puerto Rico Act of 1988. These laws created the Consejos (Councils) of Underwater and Terrestrial Archaeology. Though impressive on paper, the implementation of these laws, particularly the one concerning land archaeology, has been problematic.

Among other things, these two laws fail to consider the legal requirements imposed on federal agencies by the National Historic Preservation Act (NHPA) of 1966, as amended—particularly Section 106 compliance. This sometimes causes jurisdictional conflicts for cultural resources compliance in construction projects that are determined to be federal undertakings.

The net effect of these various agencies or offices having legal responsibilities for ensuring compliance with archaeology laws, both state and federal, is an overlapping of responsibilities and (you guessed it) multiple site files. In an effort to create a uniform site file database and, at the same time, be computer compatible, the PRSHPO, in 1993, purchased a Macintosh LC III computer and adopted the Consejo of Terrestrial Archaeology's computer site file format, incorporating into this the additional information available in our records. This commonality allows for easier sharing of information, albeit not through computer link (we still can't surf the net) but through sharing floppy disks.

None of the agencies in Puerto Rico have any personnel dedicated exclusively to the task of site file management. It is, in fact, a collateral duty dealt with on the rare occasions when time permits. Nevertheless, in terms of the information available to our office for processing, we are practically up-to-date. We do not have a backlog of files to process.

Currently, our Office maintains two sets of USGS 7.5-minute series topographic maps covering the entire island, as well as the islands of Vieques, Culebra, and Mona, which comprise the Commonwealth of Puerto Rico. Archaeological sites are marked on the maps with a hollow red triangle with the designation written next to it. Areas that have been surveyed are highlighted in orange. These invariably are areas surveyed under Section 106 compliance of the NHPA. Over the years, however, several spurious marks, drawn in pencil, have been added to the maps. Local archaeologists call or stop by the PRSHPO and mark the general area where they found a site or were told a site was located. We lack the personnel to field verify these. The net result is that we have more sites marked on our maps than site forms.

RECOMMENDATIONS

The way the government of Puerto Rico manages its archaeological resources needs to be streamlined and consolidated. The precious few resources that are available are spread too thin, and we must avoid duplicating each other's efforts. The number of sites recorded on the Island is certainly at a manageable level in terms of maintaining a site file. The question is, do these files represent an accurate picture of the resources that are out there? This is the major weakness here. The paucity of informa-

tion known about the vast majority of these sites severely limits the file's utility. This can only be rectified through field verification and limited testing.

INVENTARIO DE RECURSOS ARQUEOLOGICOS

OFICINA ESTATAL DE PRESERVACION HISTORICA, OFICINA DEL GOBERNADOR

Parte I - IDENTIFICACION

1) Nombre(s) del Yacimiento:
2) Código de Identificación:
3) Coordenadas (UTM ó GCS):
4) Descripción de acceso al lugar:
5) Cuadrángulo USGS:
6) Uso de Terreno:
7) Municipio:
8) Barrio/Sector:
9) Dueño (dirección):

Parte II - ECOAMBIENTE

10) Rasgos Morfológicos:
___ llano ___ montaña
___ valle ___ mogote
___ islote ___ colina
___ costa ___ cueva/refugio
___ vega ___ sumidero

11) Erosión:
___ severa
___ moderada
___ mínima
___ ninguna

12) Tipo de Vegetación:

13) Agua: ___ río ___ laguna ___ quebrada
___ mar ___ mangle ___ manantial
___ lago ___ pozo ___ otro

Distancia (mts.):

14) Suelos: Munsell:
Clasificación:
15) Elevación (mts.):
16) Declive (0-90°):
17) Comentarios:

Parte III - ARQUEOLOGIA

18) Tipo de Recurso:
___ arqueológico/prehistórico
___ arqueológico/histórico
___ arquitectónico
___ multicomponente
___ otro (explique)

19) Area (mts.):
20) Profundidad (mts.):
21) Relación de material arqueológico superficial:
22) Período y/o asociación cultural:
23) Indicios de saqueo/vandalismo: ___ sí ___ no
Explique:
24) Muestreo: Recolección de superficie: ___ sí ___ no Pozos de prueba: ___ sí ___ no
Material recolectado:

Figure 1 — The Puerto Rico State Historic Preservation Office and Consejo site file form.

INVENTARIO DE RECURSOS ARQUEOLOGICOS

OFICINA ESTATAL DE PRESERVACION HISTORICA, OFICINA DEL GOBERNADOR

25) Composición del yacimiento:

___ restos alimenticios	___ cerámica(P)	___ residuario	___ metal	___ campamento
___ estructura(s) histórica(s)	___ cerámica(H)	___ conchero	___ cristal	___ pictografía
___ mat's./zona de cultivo	___ plaza/batey	___ petroglífo	___ lítica	___ enterramiento
___ maquinaria agrícola	___ cantera/taller	___ montículo	___ hueso	___ caracol

26) Excavaciones previas:

27) Relación de Yacimientos Adyacentes y/o Cercanos:

28) Comentarios:

Parte IV - ARQUITECTURA

29) Material estructural:

___ cal y canto
___ ladrillo
___ madera
___ acero/hierro
___ hormigón
___ bloque
___ mampostería
___ argamasa

30) Materiales de elaboración:

___ zinc ___ azulejos
___ mármol ___ maderas
___ terrazo ___ losa criolla
___ tejas ___ losa canaria
___ yeso ___ hormigón(1)
___ otros(explique):

31) Elementos de valor arquitectónico:

___ puertas ___ relieves/murales
___ escalera ___ cisterna/bodega
___ cornisas ___ contrafuertes
___ bóvedas ___ columnas
___ rejas ___ chimenea
___ arcos ___ cimientos
___ vigas ___ ventanas
___ pisos ___ otro(s):
___ paredes

32) Estructura(s):

___ central azucarera	___ tren jamaiquino	___ maquinaria	___ portuario	___ puente	___ faro
___ casa de hacienda	___ ingenio/trapiche	___ alcantarilla	___ vivienda	___ fuerte	___ poza
___ iglesia/convento	___ sistema irrigación	___ ferroviario	___ almacén	___ molino	___ otra

33) Tipología:

Figure 1 (cont.) — The Puerto Rico State Historic Preservation Office and Consejo site file form.

INVENTARIO DE RECURSOS ARQUEOLOGICOS

OFICINA ESTATAL DE PRESERVACION HISTORICA, OFICINA DEL GOBERNADOR

34) Comentarios:

Parte V - INFORMACION GENERAL

35) Referencias Bibliográficas:

36) Información Gráfica:

a) ___ fotografías	b) ___ planos	c) ___ dibujos
núm.(f): _____	núm.(p): _____	núm.(d): _____
tamaño(f): _____ x _____	tamaño(p): _____ x _____	tamaño(d): _____ x _____
medio(f): _____	medio(p): _____	medio(d): _____
archivado(f): _____	archivado(p): _____	archivado(d): _____

37) Comentarios:

38) Fecha de Inspección de Campo: **39) Realizado por:**

Figure 1 (cont.) — The Puerto Rico State Historic Preservation Office and Consejo site file form.

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INFORMATION MANAGEMENT WITHIN SCIAA: A SOUTH CAROLINA PERSPECTIVE

Keith Derting and Jonathan Leader

INTRODUCTION

The South Carolina Institute of Archaeology and Anthropology (SCIAA) was founded by state law in 1963. This enabling act made the housing and management of South Carolina's site inventory files and collections a primary duty of SCIAA. Over the past thirty-two years, several different individuals have overseen the site files and left their marks. Between 1963 and 1984, five different individuals with widely varying levels of competency oversaw the running of the site files. Only two of the five were full-time employees. Since 1984, the site files have been organized and run by a single full-time manager. This brief article provides a foundation for understanding the present circumstances of the South Carolina Site File and where we expect to go from here.

It should be noted that SCIAA is not the State Historic Preservation Office (SHPO). This latter agency, which is housed separately, oversees compliance-related activities, maintains the National Register of Historic Places, and is advised through memorandum of agreement by SCIAA. For obvious reasons, we act as sister agencies with mutual support whenever possible. Nonetheless, the site files and subsidiary documentation are the sole responsibility of SCIAA.

SCIAA is composed of six divisions: the Administrative Division, the Office of the State Archaeologist, the Research Division, the Underwater Archaeology Division, the Cultural Resources Consulting Division, and the Savannah River Archaeological Research Project. These divisions are, in part, tied to the 1963 enabling act and, in part, the result of additional legislation—such as the 1982 (revised 1991) South Carolina Underwater Antiquities Act—and a unique contract with the Department of Energy.

INFORMATION MANAGEMENT

For the purposes of this discussion, we will focus on the site files as they function as a part of the Office of the State Archaeologist (OSA). The head of OSA is the Deputy State Archaeologist. Besides the advisory role of the office in terms of federal and state laws and public outreach, the deputy coordinates and oversees the activities and policies of the Information Management Division (IMD), as well as the Curation, Conservation, and Publications Divisions. The site files are located in the IMD. Regulations and policies for each of the divisions of OSA derive from the applicable standards of the profession and their specific needs and constraints. IMD is no exception, and a policy and procedures manual has been in place since 1988 (with revisions). Several topics will be briefly discussed herein. They are the general management of the site files, including a brief history; present conditions of the site files; computerization and GIS; and related concerns. As previously mentioned, prior to 1984 the site files were inadequately supported. Major changes occurred when a new SCIAA director was hired in 1984. By 1985, the precursor position to the Information Manager, called the Laboratory Manager, was made permanent. In 1987, the Laboratory Manager became known as the Information Manager and the position of Curator was made permanent. Curation, which had also been under the direction of the Laboratory Manager, became a separate division in 1988.

These changes were a direct result of the professional commitment by SCIAA to the coordination and management of the site files and archaeological collections, and the related increase in a recognized outside client base (Appendix 1). Initially, SCIAA site files and collections were seen as simple supporting ad-

juncts to in-house research. The heavy reliance on site file and curation services by non-SCIAA clients caused a reappraisal of the connections between the site files, curation, and the other divisions of SCIAA (Appendix 2) (Figure 1).

The realization that the majority of people producing and using site data were from outside SCIAA required a rethinking of access, security, and procedural issues to meet perceived user needs (Appendix 3). This culminated in a revision of the site file form; the production of a site file form handbook; the revision of informal and formal procedures; the introduction of a six-step quality-assurance and quality-control program, starting in the field and following the project to its culmination; and the production of an exhaustive policy and procedures manual.

Concurrent with this process, the site file manager rapidly identified serious problems with the data. During the site files' early days, insufficient funding and staffing had taken a serious toll. The lack of quality control, the use of rudimentary forms improperly filled out, the nonstandardized field survey and site report maps, the sloppy and inaccurate location data, and the all but nonexistent supporting field notes, documents, and publications resulted in a serious mess. It is an understatement to say that at least 60 percent of the files have problems.

While the procedures and processes detailed in the appendices met and corrected a number of current and anticipated future problems, they did not address the already corrupted files. To that end, the site file manager sought and received assistance from the National Park Service and the South Carolina Department of Archives and History. The Site Files Upgrade Project of 1988–1989, funded by two successive Survey and Planning Grants, allowed the site files to be verified and corrected following a six-step process. While this brought many of the site files to a minimal level of accuracy, it soon became clear that some files were intractable to correction.

An unforeseen benefit of this corrective work was the production of basal data that as-

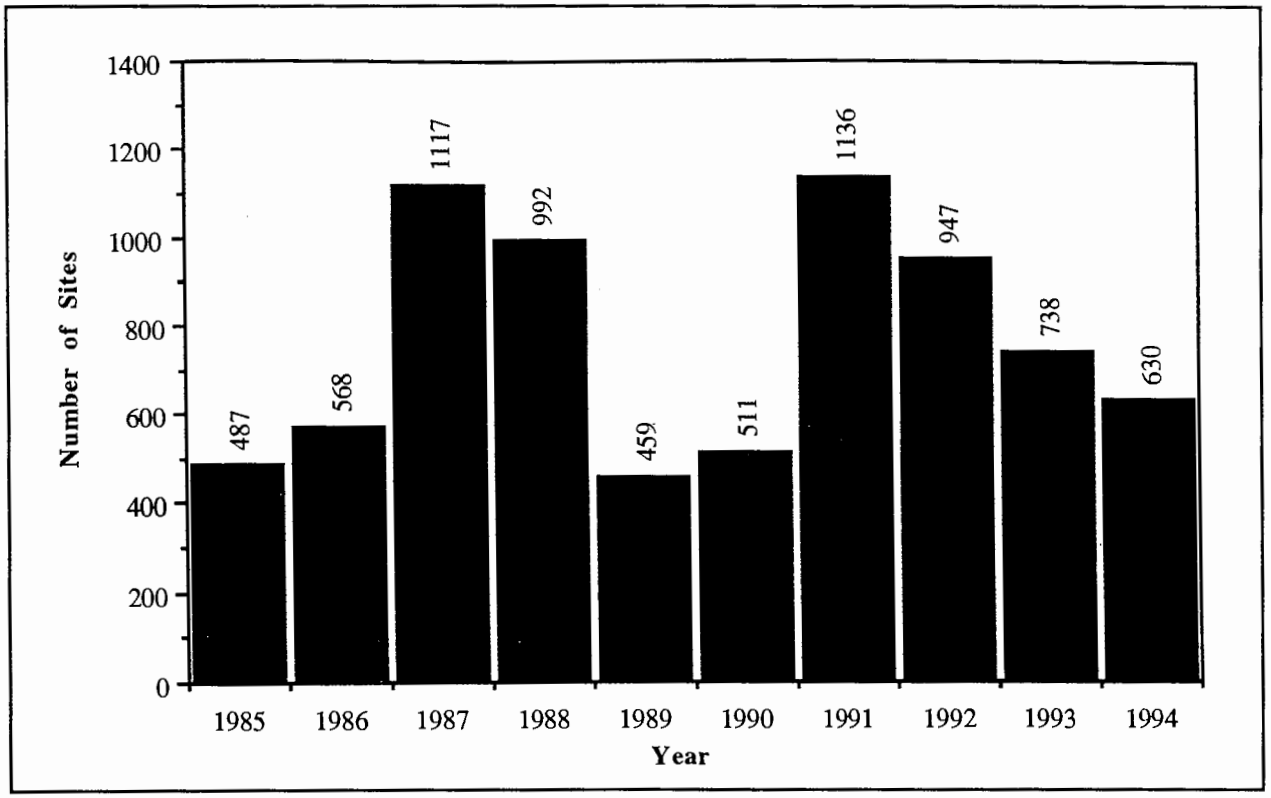

Figure 1 — Total sites submitted between 1985 and 1994.

sisted in the successful completion of the South Carolina Bibliography Project of 1989–1990. This project, funded by a Survey and Planning Grant, was undertaken by the site file manager as a means to support both the National Park Service National Archaeological Database and to clear up residual problems of identifying primary sources for the site files. This interplay resulted in the recapture of significant documents and the creation of site file forms for previously unreported sites. The resulting reference book, entitled *A Comprehensive Bibliography of South Carolina Archaeology,* received a coveted Notable State Document Award from the State Library in 1992.

All of these activities have increased the accuracy, usefulness, and worth of the site files and, by extension, the collections and other documents under the control of the curator. As one would expect, useful resources get used (see Figure 1). Both the site file manager and the curator have had a geometric rise in demand for their services. Unfortunately, there has not been a related rise in the level of support or staffing. As is often the case where fiscal constraints impinge upon dedicated services, the staff attempts to make up for the lack of support and buffer the end user from the harsh realities.

Computerization and GIS have been touted by many researchers and managers as a panacea for low staffing and other problems. While this is clearly not the case, the benefits of GIS and computerization at whatever level are real. Unfortunately, many states made the serious error of leaping on the automation bandwagon before their databases were sufficiently accurate and coherent to support their envisioned usages. The Latin phrase, *purgumentum init, purgumentum exeunt,* is apt. IMD insisted on getting its paper, manual system in order first. Now that this has been done to an appropriate minimal standard, GIS and computerization are proceeding apace. At the time of the March 1995 workshop, two-thirds of the site files had been digitized for GIS with the invaluable help of James D. Scurry of the Department of Natural Resources (Scurry and Carlson, this volume). In addition to the Cooperative Agreement between the two agencies, legally binding user's licenses for both private and public entities have been produced, standardized, and used at the federal, state, and local levels. Other computerization formats and protocols are currently being explored, and SCIAA has an interactive Homepage on the World Wide Web.

Present and future concerns revolve around security issues, public outreach, minority empowerment, ethical stewardship, and relevance to the users. This is no different from what other disciplines are experiencing. Nonetheless, in terms of site files and information management, we cannot lose sight of where our responsibilities lie.

SUMMARY

The IMD of SCIAA has met the needs of its changing client base through the wise application of professional standards, a clear understanding of its mission, and a willingness to incorporate changes and suggestions from a variety of sources. No change occurs without risk. Accepting risk as necessary for growth, and keeping it within appropriate levels, is a serious challenge to site file managers. Incredible pressure is placed on the professionals who undertake this task for "quick fixes." It is hoped that this article demonstrates the ultimate benefits of a more temperate and considered approach.

APPENDIX 1 — IMD AREAS OF RESPONSIBILITY, 1995

Pursuant to South Carolina Code of Laws 60-13-210, the Information Management Division (IMD) of the South Carolina Institute of Archaeology and Anthropology (SCIAA) provides archaeological site information and support to professional archaeologists, cultural resource managers, environmental scientists, academic researchers, and other local, state, and federal agencies conducting archaeological investigations and cultural resource management in the state of South Carolina.

STATE SITE FILES

- Process documentation (site forms, maps, field notes, etc.) for newly reported sites.
- Process updated/revisited site records, making corrections to files and master maps as needed.
- Solve "inherent" and newly discovered problems concerning site files, site maps, site locations, etc.
- Support in-office use of and/or access to resources (retrieve and replace site files, maps, publications, etc.).
- Provide site file information via telephone and letter requests to professional archaeologists, local, state, and federal agencies, and other entities.
- Conduct Environmental Site Assessments for environmental consulting firms.
- Work in cooperation with agencies, organizations, and individual researchers on "special projects" involving the archaeological site files, cartographic files, publication files, etc.
- Compile various summaries and reports describing the "state" of the IMD, the archaeological site files, special assignments, etc.

PUBLICATION FILES

- Process newly received publications, compile bibliographic inventory, and maintain all South Carolina archaeological publications.
- Maintain the computerized bibliography both in conjunction with the site files and, per agreement, with the National Park Service's National Archeological Database (NPS/NADB).
- Support research requests and bibliographic searches concerning archaeological publications via office visits, telephone, and letter correspondence.

APPENDIX 1 (cont.)

POLICIES, PROCEDURES, AND GUIDELINES

- Maintain the IMD's Policies and Procedures Manual, compiling updates as needed based on developing responsibilities, newly emerging or assigned tasks, etc.
- Develop, distribute, and enforce policies and procedures related to all aspects of IMD areas of responsibility, to include site files, cartographic files, publication files, computer files, records management, user access and restriction policies, etc.
- Enforce and abide by all internally established procedures for operation of the IMD, to include the processing of archaeological site documentation, maintenance of master maps, etc.
- Develop and establish policies and procedures, and memoranda of agreement or understanding regarding site file access, use, and restriction, in cooperation with other state and federal agencies, as the need arises.

GENERAL INFORMATION AND PUBLIC EDUCATION

- Provide general information via letter, telephone, and office lectures/tours concerning South Carolina archaeology, archaeological record keeping, IMD functions, SCIAA functions in general, etc.
- Work in cooperation with internship programs, mentorship programs, talented and gifted student programs, and volunteer programs in teaching archaeological record keeping, site file management, etc.
- Prepare and maintain displays on record keeping and/or recording archaeological sites for presentation to the general public and special interest groups.
- Work with SCIAA Curator on joint projects involving resources, primarily archaeological project records, for which responsibility is shared by both Curation and IMD.
- Assist Curator on an as needed basis with operation of the SCIAA Curation Facility and other collections-related tasks.

RELATED PROFESSIONAL POSITIONS AND/OR DUTIES

- Serve as an affiliate member of the South Carolina State Mapping Advisory Committee (SMAC).
- Serve as the designated Records Manager for SCIAA, per the South Carolina Public Records Act.

APPENDIX 2 — TYPICAL SITE FILE USERS (IN OFFICE), 1990–1994*

AGENCY/ORGANIZATION NAME	NO. OF VISITS
SCIAA	
Research and Contracting Divisions	115
Savannah River Archaeological Project (DOE)	72
Underwater Division	70
University of South Carolina Departments	
Anthropology	33
Geography	1
Geology	2
History	3
Other	20
South Carolina State Agencies	
Department of Archives and History (General)	32
Department of Transportation	155
State Historic Preservation Office (of SCDAH)	56
Wildlife and Marine (Division)/Heritage Trust Program	83
Water Resources Commission/NRDSS	31
Parks, Recreation and Tourism	1
Department of Health and Environmental Control	1
Other state agencies	1
Federal Agencies	
National Park Service	4
Army Corps of Engineers	6
Soil Conservation Service	2
Forest Service	2
Utility Companies	
Duke Power Company	8
South Carolina Electric & Gas	10
Environmental Consulting Firms (Private Sector)	
Atlanta Testing & Engineering	2
LPA Group	1
Lockwood Green	1
S & ME, Inc.	1
Wilbur Smith Associates	4

APPENDIX 2 (cont.)

Archaeological Consulting Firms (Private Sector)

AF Consultants	20
Brockington & Associates, Atlanta	20
Brockington & Associates, Charleston	45
Chicora Foundation, Inc.	41
Diachronic Research Foundation, Inc.	55
EBASCO, Inc.	1
Engineering Sciences, Inc.	3
Goodwin & Associates, Inc.	1
Garrow & Associates, Inc.	9
Law Environmental, Inc.	5
Louis Berger & Associates, Inc.	12
New South Associates, Irmo	57
Panamerican Consultants, Inc.	7
Southeastern Archaeological Services	7
Tidewater Archaeological Research, Inc.	2
Robert S. Webb & Associates, Inc.	2

Museums

Museum of Hilton Head Island	1
Museum of York County	1

Other Research (Academic, Personal, Grant)

Archaeological Society of South Carolina, Inc.	1
Clemson University	1
Columbia University	1
East Carolina University	1
University of Georgia	1
Heritage Preservation Association	1
Lamar Institution	1
Palmetto Trust	10
Smithsonian Institute	1
Wofford College	1
Other	5

TOTAL OFFICE VISITS	1,030

* Numbers are based on tallies taken from sign-in sheets maintained in the Information Management Division (IMD). It should be noted that these figures are low due, in part, to failure of users to consistently sign in properly.

APPENDIX 3 – IMD SITE FILES PROCEDURES, OCTOBER 1993

To maintain the South Carolina Statewide Archaeological Site Inventory and to insure the adequacy and consistency of archaeological site documentation in South Carolina (pursuant to S.C. Code of Laws 60-13-210), the South Carolina Institute of Archaeology and Anthropology (SCIAA) ***requires*** the proper use and timely submission of the Site Inventory Record Form (68-1 Rev. 85) and site locational maps for each archaeological site discovered in South Carolina.

The procedures for submission of Site Inventory Record Forms, and also for utilization of the State Archaeological Site Files and related resources are as follows:

1) Site Inventory Record Forms and locational maps must be completed and submitted to the Information Management Division (IMD) at SCIAA as quickly as possible after site discovery. Forms must not be withheld pending results of additional investigations (testing, data recovery, etc.). It is also recommended that each site be given a temporary field name or number to serve as an identifier until it can be assigned a state number.

2) State site numbers will be assigned ***only*** when complete correct site forms and locational maps are submitted to and accepted by IMD. Site numbers ***will not*** be assigned by telephone ***prior*** to receipt of completed site forms. Furthermore, IMD will not assign numbers to site forms and maps transmitted by FAX machine. Computer generated forms are acceptable provided they are formatted to match the official site form (68-1 Rev. 85) with no additions or deletions.

3) Locational maps submitted with each Site Inventory Record Form must include an 8½-by-11-inch photocopy of a USGS topography map (7.5-minute series preferred) and an 8½-by-11-inch photocopy of the South Carolina Department of Highways and Public Transportation General Highway Map (county road map). Archaeological site location and temporary field name or number must be clearly marked on each map. In addition, site sketch maps noting major features, placement of test units, artifact concentrations, etc., are highly recommended. Site boundaries must be clearly marked on all submitted maps, and map scales must be included, especially on topography or county road map copies that have been enlarged or reduced.

4) Documentation for underwater archaeological sites must include, in addition to Site Inventory Record Forms and appropriate maps, a completed SCIAA Division of Underwater Archaeology Supplementary Data Sheet (Form 87-49).

5) Any additional information that is submitted with the Site Inventory Record Form, such as field notes, drawings, photographs, etc., must be clearly marked and appropriately labeled (e.g., project name, temporary field name or number, contractor). If these categories of documentation are submitted ***after*** a state site number has been assigned, their labeling must include the state number.

APPENDIX 3 (cont.)

6) State site numbers ***must*** be used in reports submitted to the State Historic Preservation Office (SHPO) per their *Guidelines and Standards for Archaeological Investigations.** It is therefore necessary to file site forms and receive state numbers from SCIAA ***prior*** to submission of draft and final reports to the SHPO for review. All compliance-related projects must adhere to the SHPO guidelines, and it is strongly suggested that non-compliance, privately funded, academic, and/or research-oriented projects adhere to them as well to insure a minimum standard for archaeological fieldwork and reporting in South Carolina.

7) Copies of final reports must be submitted to IMD as soon as possible after project/report completion. The reports supplement the information recorded in the State Archaeological Site Files and are used extensively for background research.

8) Site form updates ***must be submitted*** whenever archaeological sites are revisited, recollected, or when additional fieldwork of any kind is conducted. Updates must be recorded on the Site Inventory Record Form with ***all*** categories of information completed, and they must include revised site maps (topography, county road, and sketch). SCIAA no longer accepts artifact collections for curation that are recovered during site revisits and/or multiple-phase field investigations ***without*** submission of update documentation to IMD. Further, the SHPO will no longer review project reports concerning sites for which update information has not been submitted.

9) Artifact inventory lists must be included with site forms and site form updates. A summary statement of cultural and functional types may be submitted if artifact analysis is still ongoing, but ***must*** be followed by complete inventories as soon as they are available. IMD now tracks every project for which state site numbers have been assigned in order to follow through on the status of outstanding site forms, site form updates, artifact inventories, and final reports.

10) Site forms and all accompanying documentation must be reviewed for completeness, accuracy, and clarity before submission to IMD. Principal Investigators must make certain that crew persons filling out site forms are thoroughly schooled in form completion, and that they have access to and have read the *Handbook to the Site Inventory Form.*** IMD reserves the right to return all incomplete, incorrect site forms to their originators for corrections ***prior*** to assigning a state site number. If the site forms were sent via express mail, they will be returned via express mail at the expense of the originator. Furthermore, IMD now requires ***two*** full work days to review submitted site forms and to assign state site numbers. All submissions must be planned accordingly.

11) SCIAA's Curator must be contacted regarding curation standards and fees as early as possible in the project planning stages and no later than the time of site form submission to IMD if ultimate disposition of the recovered materials will be at SCIAA. The current charge is $68 per cubic foot of materials to be curated.

APPENDIX 3 (cont.)

12) It is expected that ***all*** fieldwork be preceded by background research at the State Archaeological Site Files (IMD/SCIAA) and at the SHPO, South Carolina Department of Archives and History. If for any reason site forms are submitted ***prior*** to conducting this background research, they must be accompanied by a letter so stating.

13) IMD ***requires*** appointments to be set up at least 24 hours in advance of in-house visits, and reserves the right to deny use of the site files to individuals arriving without an appointment. Office hours are 8:30 to 11:30 A.M. and 1:00 to 4:30 P.M., Monday through Friday.

14) ***All*** site files, maps, reports, and other informational resources requested for research must be pulled and refiled by IMD staff only. These resources ***must*** be used in an assigned work space in the IMD office. They may only be removed for purposes of duplication at the SCIAA photocopy machine, and only when permission is granted by IMD staff. The photocopy fee is 5 cents per page for the first 50 copies, and 15 cents per page for all copies thereafter. Master archaeological site location maps (USGS topography and county road) may ***not*** be photocopied. Site locations, if needed, must be transferred to clean maps by hand.

* State Historic Preservation Office
n.d. *Guidelines and Standards for Archaeological Investigations.* State Historic Preservation Office, Review and Compliance Branch, South Carolina Department of Archives and History, Columbia.

** South Carolina Institute of Archaeology and Anthropology
1985 *Handbook to the Site Inventory Form (68-1 Rev. 85).* South Carolina Institute of Archaeology and Anthropology, University of South Carolina, Columbia.

IMPROVING SITE RECORDING ACCURACY IN A GIS: A SOUTH CAROLINA EXAMPLE

James D. Scurry and Ruth E. Carlson

INTRODUCTION

Establishing accurate site location is critical for both cultural resource management and archaeological research. The procedures for site recording and its subsequent spatial representation can have a tremendous impact on the validity and integrity of data relationships and associations inferred by correlating site location with environmental or other variables. Traditionally, on-site recording of variables or extraction of critical information by visual inspection of site files and maps have been the primary spatial analysis techniques. This often is followed by statistical data analysis using one of several commercially available software systems.

The development of geographic information systems (GIS) over the past two decades—and especially their proliferation over the past decade—have provided the capability to capture, store, analyze, and display large volumes of site information to identify distributional patterns. Combined with advanced multivariate analytical and spatial statistical analysis techniques, these systems also have facilitated complex data analyses, including the development of predictive site location models and hypothesis formulation and testing (Allen et al. 1990; Scurry 1989).

This article will outline current efforts in South Carolina to incorporate archaeological site data into a statewide GIS. It will identify some problems and issues that affect site location and plotting accuracy and will recommend procedures for improving accuracy and avoiding future problems. Finally, it will also present an overview of a planned GIS infrastructure and delineate the opportunities such a system presents for long-term archaeological research and data management in South Carolina.

PROJECT STATUS

The South Carolina Department of Natural Resources (DNR), Water Resources Division (WRD), has been developing a GIS to support watershed-based natural and cultural resource evaluations by providing critical spatial and tabular data and through implementation of standardized evaluation criterion and analytical procedures (Hale et al. 1991). The GIS database contains more than thirty layers—including wetlands, soils, land use, hydrography (stream networks), hypsography (contours), transportation networks, and significant natural areas for South Carolina—at 1:24,000 scale, georeferenced to the 7.5-minute U.S. Geological Survey (USGS) topographic map (Figure 1). Currently, approximately 500 of the 570, 7.5-minute quadrangles are either completed or being digitized for these primary layers. Other data, such as threatened and endangered species locations, National Register sites and districts, fisheries, and various environmental permits, have been obtained statewide from numerous state and federal regulatory and resource management agencies as hardcopy or digital tabular files. These files have been converted to spatial coverages and encoded into the database.

In 1991, the WRD entered into a cooperative agreement with the South Carolina Institute of Archaeology and Anthropology (SCIAA) at the University of South Carolina to develop a digital database of archaeological site locations for inclusion into the system. Initially, digitization of site locations was limited to specific basins and watersheds scheduled for resource evaluation projects. This phase of the database development was completed in 1993. In mid-1995, the digitization project was expanded to

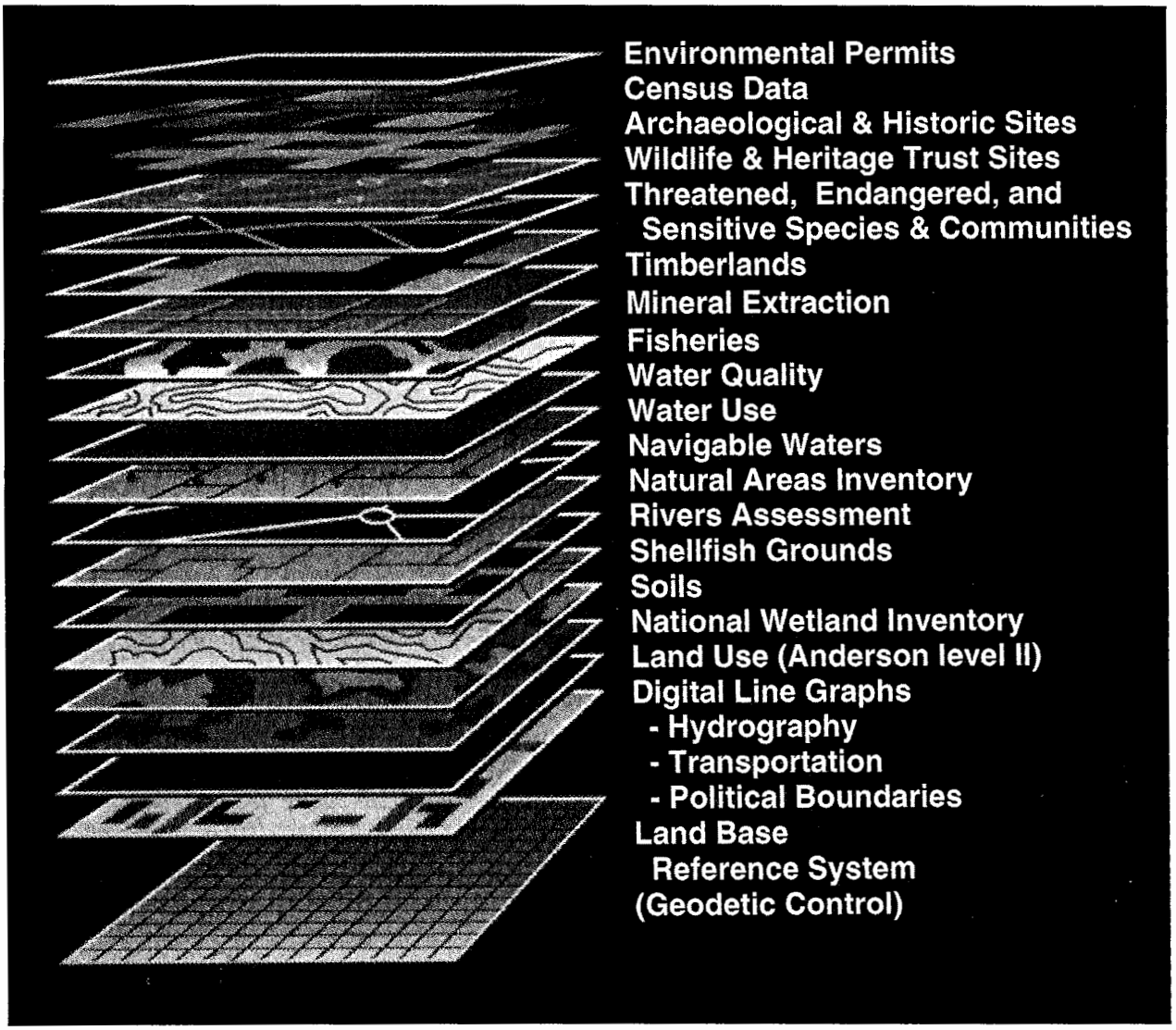

Figure 1 — Natural resources decision support system data layers, available on a 7.5-minute quadrangle at a scale of 1:24,000.

incorporate the rest of the state and to update previously digitized quadrangles with new sites.

About two-thirds of the state's more than 18,000 sites have been digitized, with completion of the project anticipated by June 1996. In addition to the site locations, SCIAA staff are compiling site numbers, National Register status, and specific cultural affiliation information (indicated as presence/absence or unknown) into tables. These data are being encoded into the INFO relational database management system software by the WRD. Eventually, all will be linked to the spatial data file.

DATABASE ISSUES AND POTENTIAL SOLUTIONS

In designing the digital database, issues of site definition and spatial representation, data type, scale, resolution, and accuracy had to be resolved prior to digitization. Failure to resolve these issues generally results in a database that contains incompatible information, which could adversely impact management or research results. Because many of the sites were recorded over three previous decades, some issues, such as map scale and data resolution, were accepted

without consideration. Similarly, many site definition problems could not be resolved absolutely. Solutions were devised using the best information available from the site files, and variances from mapped site delineation were in accordance with current SCIAA procedures. The DNR/WRD submitted all questions and modifications to the SCIAA site file manager for final resolution and approval.

Site Definition and Spatial Representation

Questions of site definition have plagued archaeologists for decades, and there is no clear-cut definition of what comprises a site or how to delineate its boundaries without total exposure or excavation. Although such a definition is beyond the purpose of this article, the method of spatial representation should be considered when recording a site. Field archaeologists should be trained in database procedures and recording standards before submitting a site to the inventory, and site forms and delineation should be compliant with current site definition requirements and accuracy standards.

In South Carolina, archaeological sites are stored in hardcopy site files containing locational and site characteristic information. Sites are plotted on 7.5-minute topographic quadrangles and maintained in a map library. During the 1960s and early 1970s, the standard procedure for representing sites on the maps was to plot triangles, presumably at site centroids. Subsequent site locations were identified by a series of symbols ranging from various sized dots, circles, ellipses, diamonds, squares, and free-form polygons or other geometric designs (Figure 2a). In addition, some symbols were solid filled or hatched while others were left unfilled. While many different symbol sizes and configurations are evident on any given map, there is no procedural manual and, often, no indication in the site files as to the significance (if any) of the various shapes and sizes.

In several instances entire coastal islands, incorporating hundreds to thousands of acres, have been considered a single site, although the cultural components and spatial disaggregation

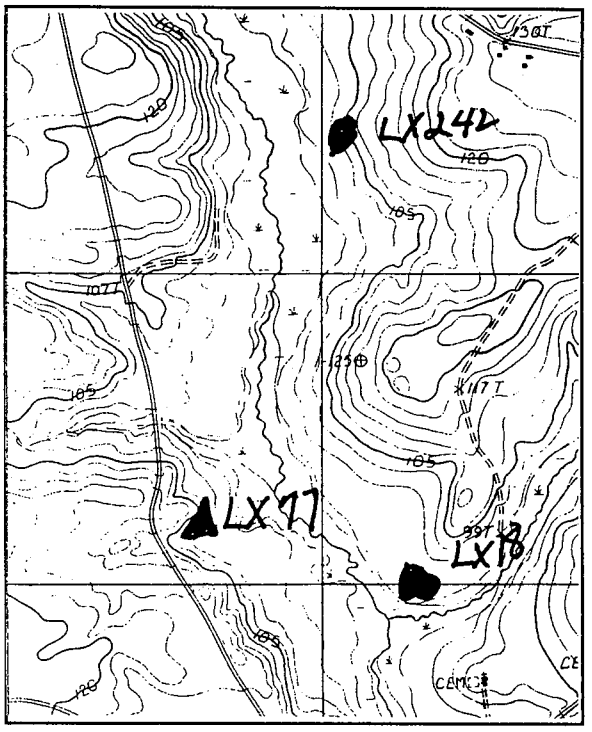

Figure 2a — Sites on the Pelion West quadrangle.

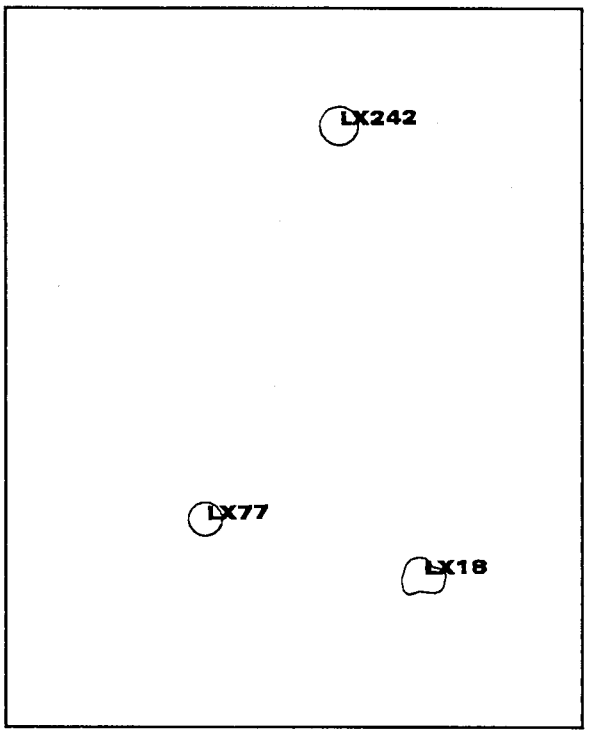

Figure 2b — Digitized site configurations on the Pelion West quadrangle.

of individual loci indicate separate and unrelated activities. Similarly, a survey of one county recorded numerous multiple loci as single sites even though the loci were separated by one-half to one mile of discontinuous occupation. In most cases, no documentation was presented to support a relationship between the loci and their classification as a single site.

Current SCIAA site file manager, Keith Derting, has dedicated considerable staff resources to correct many of these problems. Following the current SCIAA mapping practices and the GIS data structure and digitizing options, specific rules and procedures were developed to convert the site data from hardcopy to digital formats. The decision was made to capture all features as polygons since the ArcInfo GIS does not support multiple data types within a single map file. This resulted in the digitizing of dots, triangles, and other point features as small polygons. If necessary, centroids or label points can be extracted from each site polygon for point pattern analyses.

The circle became the primary polygonal-feature geometry for sites that approximate circles or dots or where there was no clear indication that actual site boundaries were delineated on the maps. This included the triangles and diamonds and many of the squares and ellipses (Figure 2b). Use of the circular polygon has greatly facilitated digitization because the ArcInfo software allows circle generation by cursor input of a centroid and a single radius definition point. The software automatically builds the circle using a user-defined grain size for vertex placement (ESRI 1989). For noncircular polygons, shapes as close as possible to those on the maps have been duplicated. A standard architectural drafting template was used to evaluate uncertain site shapes, and, occasionally as a quality-control measure, sites were digitized as both circles and polygons to determine which geometry best suited the site definition.

Edgematching

Often sites extended across quadrangle boundaries. In many cases, these sites were plotted on the maps without resolving common edge node mismatches. In order to preserve the site delineation and topological integrity, the site boundaries had to be physically edgematched. While most common edge nodes were within 30 meters, several were misregistered by more than 200 meters. Relatively close edge nodes were adjusted manually during digitizing using site form/situation, majority allocation, and digitizing sequence criteria to determine which node required adjustment. Sites with edge nodes separated by more than 30 meters were corrected and replotted by the SCIAA site file manager using the site files to determine the appropriate adjustment. Potential edgematching errors can be avoided by using a light table to co-register or an engineering scale for accurate measurement when plotting sites across map boundaries.

Map Scale, Resolution, and Accuracy

Map scale is the ratio between the on-ground and on-map units of measurement (Antenucci et al. 1991:104). A 1:24,000-scale map indicates that one inch on the map represents 24,000 inches on the ground. A 1:100,000-scale map represents 100,000 inches of ground measurement on the same one inch of map space. As such, a 1:24,000-scale map is a larger scale map than the 1:100,000-scale map. The larger the map scale, the higher the resolution and accuracy that can be achieved.

Most sites at SCIAA have been plotted on 1:24,000-scale topographic maps. In areas where these maps have only recently become available, sites were plotted on 15-minute, 1:62,500-scale maps. All sites were transferred from 15-minute to 7.5-minute maps prior to digitization.

Associated with map scale is the concept of map resolution. Resolution is the smallest feature that can be mapped or sampled (Burrough 1986:182). More detail can be shown on a 1:24,000-scale map than on a 1:100,000-scale map, therefore the map resolution is higher. For example, a standard USGS 1:100,000-scale, 1-degree by 30-minute map (measuring 36 by 21.75 inches) displays the same geographic area as 32 individual 1:24,000-scale, 7.5-minute

topographic maps (each measuring 19.5 by 22.75 inches). Generally, an area (polygon) of ten acres is the minimum that can be represented on a 1:100,000-scale map, whereas polygons of less than one acre can be shown effectively on a 1:24,000-scale map.

With the precision of modern computers, polygons of infinitely small dimensions can be stored and maintained in the GIS database. For the South Carolina data, no minimum resolution was necessary. Data were digitized as they were represented on the maps and in accordance with the rules and procedures discussed above.

Accuracy refers to the variation between the observed and actual position of a feature or set of features. It may be relative or absolute. Relative accuracy refers to the relationship of a single map feature to other features on the map. Absolute accuracy is a measure of a map feature location to its actual position on the earth (Antenucci et al. 1991:102).

The U.S. Bureau of Standards has established acceptable standards of accuracy referred to as National Map Accuracy Standards. For large-scale maps of 1:20,000 or larger, not more than 10 percent of the planimetric or well-defined points can exceed 1/30 of an inch; for maps smaller than 1:20,000, the limit is 1/50 of an inch each measured on the publication scale (Antenucci et al. 1991:103). For a 1:24,000-scale map, this equates to +/- 40 feet; for 1:100,000-scale maps, +/- 166 feet. As a result, it is best not to mix data of different map scales. Although each layer may comply with National Map Accuracy Standards, relative accuracy errors may occur from their combination.

Because of the nature of archaeological site data, most site delineations do not comply with National Map Accuracy Standards. Many of the site boundaries are not well defined but are approximations based on surface collection or limited subsurface testing. However, additional error may be introduced during the digitization process because of improper map registration. The primary source of potential map registration error is the use of nonstable base source maps, such as paper topographic maps. Paper maps are susceptible to shrinking and warping from humidity and repeated use.

The ArcInfo GIS software provides a Root Mean Square (RMS) error statistic during set-up of the map for digitization, which estimates the accuracy of the map to earth transformation (ESRI 1989). Generally, a RMS of 0.009, the maximum acceptable error before reregistration, is required. In digitizing the sites for South Carolina, 0.003 was the target RMS, with ranges from 0.003 to 0.006 most common.

Potential Solutions and Recommendations

There are numerous ways in which archaeological site data can be improved.

- First, archaeologists should work through professional organizations to develop a data dictionary and standards that establish procedures for site definition and recording. The data dictionary should identify critical elements that must be recorded for each site with definitions of acceptable attributes for those elements. This is critical for establishing a standardized database that can be maintained long term.
- Second, regional archaeologists should be trained—through workshops and other mechanisms—in established site recording and database procedures, including site delineation and reporting requirements. As part of the database quality-assurance/control programs, site file managers should reject data that is not compliant with these standards.
- Third, global positioning systems (GPS) technologies should be required for site delineation. These systems use a constellation of orbiting satellites to fix accurate positions on the earth's surface, and, with differential and post-processing capabilities, they can locate sites to within two to five meters (Puterski et al. 1992:12–14). GPS units, like all computer technology, are increasing in sophistication while decreasing in price. Standard, hand-held units can be obtained for $300 to $1,000 depending on optional features and enhancements.

FUTURE PLANS AND PROSPECTS

The DNR/WRD GIS configuration is composed of an IBM RS/6000, Model 970 file server and ten RS/6000 workstations. ArcInfo is the primary GIS software, including the Triangulated Irregular Network (TIN), NETWORK, Coordinate Geometry (COGO), and GRID subsystems. In addition, the ERDAS image-processing system and the SAS statistical analysis software provide satellite data processing and statistical support. A Calcomp digitizing tablet and numerous pen, thermal wax, and electrostatic plot devices provide data input and graphic production capabilities.

Currently, data access is limited to DNR staff, however, a public access server will be installed in early 1996, providing access to soils, wetlands, land use, digital line graph, and other data. Archaeological site locations and other sensitive information not managed by the DNR will not be placed on this system unless requested by the source agency. It is anticipated that SCIAA will work through the university to install ArcInfo or ArcView on resident computers and maintain the archaeological site data in-house when initial digitization is completed. This configuration will allow archaeologists to maintain the site data and to access and download available natural resource information through the Internet for cultural resource management and research.

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SITE FILE MANAGEMENT IN THE ELECTRONIC AGE: FUTURE DIRECTIONS IN TENNESSEE

Suzanne D. Hoyal and Kevin E. Smith

INTRODUCTION

In Tennessee, the Division of Archaeology manages information on more than fifteen thousand archaeological sites on public and private lands. The Tennessee Site Information Files encompass an incredible diversity of materials, including maps; published and unpublished manuscripts, articles, reports, correspondence, and books; photographs and negatives; artifacts; and numerous miscellaneous types of documents.

The most frequently accessed subset of the Site Information Files is the Tennessee Site Survey Record—the individual record forms and USGS topographic survey maps containing basic information on known archaeological sites. Both public and private sector archaeologists access the Site Survey Record daily in the review of more than three thousand proposed construction projects annually. The most frequent users of these files focus on project-specific regulatory obligations under state and federal statutes. Clients of consulting archaeologists primarily seek answers to questions about factors that might affect proposed project costs, such as site location, size, and cultural characteristics. Prior to computerization of the Site Survey Record, initiated in 1992, these basic questions were becoming difficult to answer due to an overwhelming mass of paper forms.

EVOLUTION OF THE TENNESSEE SITE SURVEY RECORDS

The Site Survey Record represents a consolidation of over sixty years of archaeological survey efforts by several agencies and institutions. As a result, site records show tremendous variability in the quality and quantity of specific information depending on the age and purpose of the initial recording project. A brief history of site recording in Tennessee illustrates the scope of the problem prior to 1992.

The first direct ancestors of the contemporary Site Survey Record emerged as a result of the federal relief programs in the 1930s. Large-scale reservoir impoundment surveys sponsored by the Tennessee Valley Authority and the University of Tennessee (UT) produced the first sets of site records in a simplistic card format. Between 1933 and 1941, archaeologists recorded the locations and basic descriptive information on hundreds of archaeological sites along the Tennessee River and its major tributaries. With the termination of this program in 1942, responsibility for site recording fell to UT Knoxville.

Archaeologists at UT Knoxville maintained the primary site file repository until the establishment of an archaeology program at Memphis State University. With the tremendous increase in archaeological research in the 1960s, the Chucalissa Museum at Memphis State University assumed responsibility for archaeological site information in West Tennessee. The McClung Museum at UT Knoxville remained the repository for site information in Middle and East Tennessee. While a shared responsibility eased the burden of site recording, the lack of a centralized repository resulted in the occasional assignment of duplicate numbers, the presence of large blocks of unassigned numbers, and similar management difficulties.

As a result of the lobbying efforts of avocational and professional archaeologists, the Tennessee General Assembly created the Division of Archaeology in 1971. The first legislated responsibility of the Division was "to survey the state to identify and record archaeological sites" (Tennessee Code Annotated 11-6-101). As a result, one initial objective of the

Division was to develop and administer a centralized statewide site survey file. In 1975, archaeologists at Memphis State University and UT Knoxville agreed to help create a centralized statewide site survey file (Tennessee Anthropological Association 1976a). Effective in 1977, the Site File Curator assumed formal responsibility to "maintain the statewide archaeological site survey files and assign permanent site numbers upon receipt of a completed site form" (Tennessee Anthropological Association 1976b:2). The responsibilities of this position included the creation, maintenance, and revision of the Site Information Files.

The Site Survey Records of the late 1970s incorporated photocopies of forms from both Chucalissa and the McClung Museum. Assignment of new site numbers required the submittal of a relatively simple two-page form (Tennessee Anthropological Association 1979). Between 1979 and 1990, efforts to standardize information and meet growing regulatory demands resulted in several substantial revisions to the reporting format. The form increased from the initial two-page format to a seven-page format requiring a complex manual to complete. The complexity of the format resulted from attempts to address the diverse needs of clientele. Regulatory users want information on site location and the potential significance of sites within project areas. Scholars want information on regional patterns of settlement for specific time periods or for specific regions over long periods of time. While these goals are by no means mutually exclusive, governmental mandates increasingly focus on regulatory needs at the expense of research needs.

Since the late 1970s, the Site Survey Record increased by over five hundred sites annually (Figure 1). The constant growth in

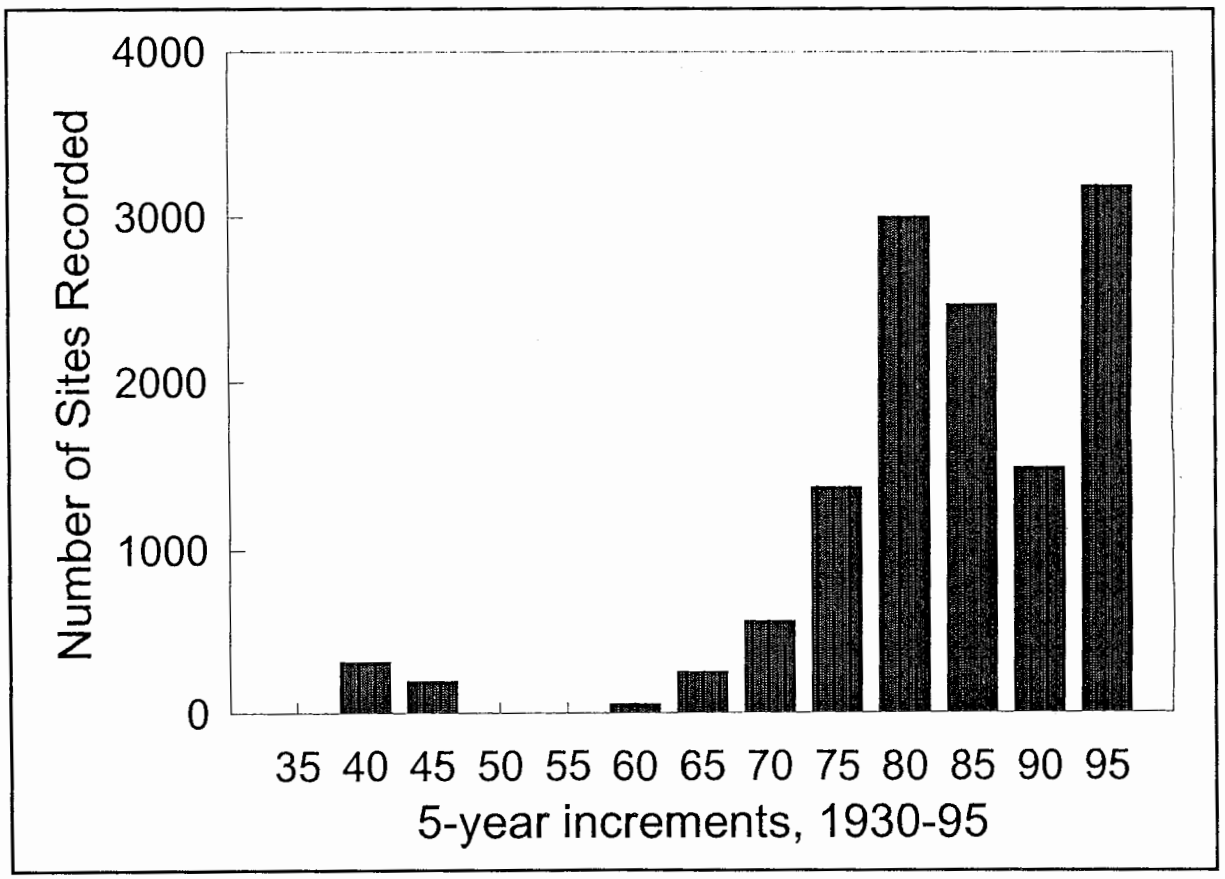

Figure 1 — Number of sites recorded in Tennessee between 1930 and 1995.

regulatory demands stymies systematic efforts to revise and check antiquated records for errors, although resurveys of some sites provide updated information in an unsystematic fashion. By the year 2000, the authors estimate that the Site Survey Record will contain well over twenty thousand entries.

THE ARCHAEOLOGICAL INFORMATION MANAGEMENT SYSTEM

In order to cope with the growing demand for site numbers, Kevin Smith (Federal Programs Archaeologist and Interim Site File Curator) proposed a comprehensive Information Management Computerization Initiative in 1992 (Tennessee Division of Archaeology 1992a). Phase I of this initiative proceeded using federal Historic Preservation Funds, administered by the Tennessee Historical Commission, between 1991 and 1993. The grant resulted in the creation of a Site Survey Record database in dBase III+ format currently containing basic information on over fifteen thousand sites (1995). The long-term plan for the system will incorporate all of the various forms and formats of archaeological information held by the Division of Archaeology.

Phase I computerization of the Site Survey Record accomplished the following immediate goals: (1) revision of various sections of the State Historic Preservation Comprehensive Plan; (2) identification of gaps in survey coverage throughout the state; (3) provision of quantified information on site distributions by various criteria to the National Park Service, U.S. Army Corps of Engineers, and other requesting agencies; and (4) simplification of the review and compliance process under both state and federal statutes. Subsequent phases of the Information Management System address the curation crisis experienced by virtually every facility in the United States (Childs 1995) through the provision of linked databases.

The central Site Survey Record database links by state site number to an Artifact Collections database (primarily for the purpose of tracking the storage location of artifact collections). Another partially implemented component of this system is an electronic bibliographic database containing information on archaeological reports and other primary research material through 1989. Creation of the database was a cooperative effort between the Division and the National Park Service's National Archeological Database project. In addition, the system also contains links by state site number to databases of maps and photographic media. Current staffing and funding levels do not permit full implementation of the system, but the search for additional funding sources continues.

Simplistic error-checking routines permitted the identification and correction of some significant problems in the more antiquated Site Survey Record information. Other problems and errors were beyond the scope of the allocated funds and the abilities of interns with limited archaeological background. In our opinion, the decision to "computerize first and ask questions later" proved correct. High-speed manipulation of the electronic data readily exposed errors and problems hidden within the mass of fifteen thousand hard-copy paper forms. Certainly, the inadequacies of the existing electronic Site Survey Record are no greater than those contained within the existing paper version. While implementation proceeds and many aspects of the initiative remain incomplete, the existing database files have already proven useful for both regulatory and research purposes.

Regulatory Uses

From a regulatory perspective, computerization simplifies the use of the Site Survey Record. The immediate production of a list of sites within a specific drainage basin, county, physiographic region, or other area allows the consultant to spend more time on the synthesis of regional data, analysis, and writing. The once onerous task of examining hundreds or thousands of forms prompted many regulators to view consultation of the Site Survey Record as unproductive. The rapid results generated by

initial computerization have encouraged some municipal and county planning commissions to view consultation as an asset in their consideration of zoning changes and construction projects. Computerization also makes it possible for the Division of Archaeology to participate more readily in statewide planning efforts. For example, Division personnel provided detailed archaeological information (by topographic quadrangle map) for inclusion in the Tennessee Scenic Rivers Assessment—a planning project that prioritizes land acquisition and other projects along Tennessee's scenic rivers. As a result of computerization, archaeological sites are now a part of this prioritization process.

Research Uses

From a research perspective, the primary advantage of the electronic Site Survey Record is the production of site lists by various criteria. For example, an independent study project on Early Archaic settlement patterns conducted by a student from Middle Tennessee State University required identification of all Early Archaic sites in approximately twenty counties along the Cumberland River. Prior to computerization, generating the list of sites with an Early Archaic component required two months of perusing several thousand site forms. After computerization, the system generates the same list in less than five minutes. Recent research also demonstrates the potential of electronic site information for modeling larger-scale regional settlement patterns (Anderson 1990, 1993; Smith and Moore 1993).

Cooperative Computerization Projects

Cooperative projects can help meet the goals of both regulators and researchers. The United States Forest Service, the Division of Archaeology, and the State Historic Preservation Office conducted a jointly funded project to computerize and synthesize information on about fifteen hundred sites in Cherokee National Forest (Tennessee Division of Archaeology 1992b). Prior to completion of the project in 1994, the Site Survey Record included only a small percentage of known sites in Cherokee National Forest. Furthermore, the Division of Archaeology, State Historic Preservation Office, and the Southeast Archeological Center of the National Park Service are working cooperatively to record sites within the Big South Fork National River and Recreation Area. When completed, this project will record approximately two thousand additional archaeological sites.

These same types of cooperative efforts are also possible within the context of academic research. For example, the Middle Cumberland Mississippian Survey is systematically relocating approximately one thousand sites identified by an early statewide survey (Myer 1923a, 1923b; Smith 1995). Conducted around 1915 by William Edward Myer, a self-trained archaeologist employed by the Smithsonian Institution, this survey was the first systematic statewide survey of archaeological sites. With the support of Governor Thomas C. Rye, Myer sent questionnaires to:

> *leading Tennessee educators, local antiquarians, judges and other court officials, ...civil engineers employed by the State Highway Department and by the leading railroads...and to the county superintendent of public instruction in each of the ninety-six counties in Tennessee...using the school children and teachers in their respective counties as aids in securing as much information as possible. (1923a)*

Unfortunately, Myer's untimely death in 1923 left around fifteen hundred manuscript pages of site information in relative anonymity. The current project, in addition to meeting very specific research goals, also incorporates the filing of new or revised site forms in cooperation with the Division of Archaeology.

FUTURE GOALS AND CONSIDERATIONS

The future nature and functions of the Tennessee Site Survey Record and Site Information

Files depend largely upon two factors: (1) the already demonstrated needs of regulatory users; and (2) the efforts and interests of researchers and scholars to assist the Division of Archaeology in providing services they desire in the future. Law mandates ready access to site locational information. Future access to other types of information requires that scholars and researchers share the burden of responsibility to demonstrate that useful and productive research can be conducted using Site Survey Records and Site Information Files.

In the electronic age, many researchers desire gratification by the instantaneous production of site lists, appropriate reports, and locations of field notes, photographs, and artifact collections. The current state of computerization of the Site Survey Records cannot meet these idealized goals. However, these goals can probably be realized within a decade with appropriate support and assistance from the professional archaeological community, the interested public, and regulatory users. Initial stages of computerization created an opportunity for researchers to manipulate data in ways that were impossible less than half a decade ago. However, funding for further progress requires more substantive and directed efforts on the part of the academic and consulting archaeologists who are the primary users of the Site Information Files.

Regulatory concerns and the provision of site locational information will remain the focus of staffing and funding for the Division of Archaeology computerization initiative for some years to come. This primary mandate will guide future goals for computerization of the Site Survey Records. At the time of this writing, the Division of Archaeology Information Management System is in a state of rapid flux. A revised proposal for computerization goals includes: (1) creation of an electronic site form for submittal of newly recorded data; (b) translation of the existing database for use with a geographic information system (GIS); and (c) simplification of the Site Survey Record form to remove information available in GIS data layers.

Slow progress towards system implementation in Tennessee mirror a larger national crisis in long-term preservation of collections, records, and reports. As noted by Francis P. McManamon (1995:2), "too few archeologists spend enough time and effort considering the long-term preservation and use of collections, records, and reports—which is all that remains of the archeological record after a site has been excavated." Management of the archaeological site information held by the Division of Archaeology faces a critical point in its evolution. For the first two decades of its existence, the Division of Archaeology has accumulated and maintained records, but removing the backlog of over a century of archaeological investigations in Tennessee necessitates substantial long-term planning, allocation of staff and funds, and cooperative efforts by the larger archaeological community.

ACKNOWLEDGEMENTS

The first Site File Curator for the state of Tennessee was Ms. Patricia Coats, who served as an employee from 1972 until her untimely death in 1991. Her dedication and devotion to the Site Survey Records provided a solid foundation for the initiatives described herein.

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An appreciable part of the workshop time was given over to open and somewhat free-wheeling discussion among the participants on a wide range of topics. Some of this commentary made its way into the various articles presented in this volume; other subjects were left unaddressed, although they might be considered for future papers and meetings. Lightly edited excerpts from some of the discussion sessions are presented to give the reader an appreciation for the complexity of some of the topics discussed, and for the spirit of the meeting.

MINIMAL SITE DEFINITION AND SITE FILE MANAGEMENT POLICIES

➢ ***Clay:***
Site file managers probably set a lot of the existing policies having to do with site files, or are in a position to set such policy, and should exercise it. The whole question of minimum sites, how little, how minimum material one must have to have a site bothers me, because I sense we are going through a lot of data/site file inflation in the CRM period, the addition of a lot of low information archaeological sites to our database. Many people, and certainly some of our research colleagues, view some of our data files as so corrupted by this minimum site data that our files are not worth funding. So this problem of minimum sites impinges upon the support we get down the road to maintain the site files. I'd like to know what the minimum site definition is that the various states accept, or do you have a minimum? I've had this continual tug of war. In Kentucky, I've tried to come down for two different artifacts, and I've had to fight to get that.

➢ ***Williams:***
In Georgia, we take what they give us without trying to force anything on them. This means that there is a range. What I see is that the contractors self-rule themselves. If they find an isolated find, many don't want to fill the whole form out. We don't try to enforce "thou shalt have two or four or six artifacts." We have always felt it was the archaeologists prerogative rather than our prerogative to make this call.

➢ ***Clay:***
In Kentucky, the SHPO has a big influence on what is a site or not. My experience is that defining sites is not self-correcting; contractors do not automatically limit themselves. Perhaps in our state, because of a highly active review and compliance program, the contractor is tempted to over-record to reduce any possible criticism of their fieldwork. There is a whole subcurrent of bickering among archaeologists: "Oh somebody doesn't find archaeological sites." The way you protect yourself from this criticism is to report everything.

➢ ***Futato:***
We don't have a minimum number of artifacts. We try to balance minimum numbers of artifacts versus ground cover, terrain, and so on. So three flakes scattered over 20 hectares of cultivated field would probably not get a site number. We do not report isolated finds, but then we have this sort of vague concept that we occasionally use of multiple isolated finds, which sounds like an oxymoron. On the other hand, if you have three flakes from two shovel tests in the pine woods, we would take that.

➢ ***Clay:***
How many times do you second guess archaeologists and not give them site numbers?

➢ ***Futato:***
Not very often, simply because most of the people who work in Alabama have worked there a long time and know what we do, and sometimes they call us and ask for advice. One of the main things we have noticed from CRM firms whose main offices are in other states is that they tend to go by that state's general

practice. We don't have a consistent definition, but we try to take whatever people provide.

➢ ***Hoyal:***
Tennessee's policy is basically the same as Alabama's.

➢ ***Futato:***
We are willing to negotiate this with people. If someone calls us up and says, "I really think you ought to give this a site number, and here's why," and they've got a reasonable argument...

➢ ***Clay:***
I'm in pretty much the same situation.

➢ ***Baca:***
For many years, we did not give site numbers to most single-find sites. Well, what happened is that we were assigning site numbers to isolated Clovis points. What do you do with that data? Do you shove it in the back of the file as a separate category? How do you track it? Recently we adopted a policy of assigning site numbers to isolated finds to avoid bias that occurs when numbers are assigned to Clovis points but not to single flakes, which is hard to justify. The word has gone out that site forms will be filled out for single finds made while shovel testing; chances are there are going to be more artifacts that you don't see. Unfortunately some investigators have been sending in finds of artifacts found on logging trails where the material could have rolled in on a tire.

➢ ***Giliberti:***
You've got to trust the archaeologist to have good sense and judgment about what a site is and whether isolated finds are in good context. We have to be on the realistic side of data management, though, and don't want to record every beer can or every flake that has been washed down the stream.

➢ ***Clay:***
In a CRM context, in some cases, the person defining the site may be the least qualified to determine whether the materials are in good context or whether the materials are culturally or naturally modified. We don't have Ph.D. archaeologists defining sites, we have people that are paid by the hour.

➢ ***Williams:***
Some of those guys can find more sites than any Ph.D.!

➢ ***Futato:***
Let's turn the whole question around and ask what is a maximum site definition? Urban archaeology...what do you do about that? What about plantations? What about sections of the Tennessee River Valley, where (as the old saw goes) there may in effect only be two sites, the north and south banks? What do you do in these situations? In an urban situation, if it is a house lot or a complex, such as the University of Alabama main campus, that gets one site number. At the university, for example, we use abbreviations after the site number that indicate subareas or buildings, like JH for Jefferson Hall. These are negotiated with the archaeologist. On plantations we try to give the central nucleated zone, however that is defined, a single site number with different tags for the various separate structures and areas, and then if there is something a half mile away, we give that a separate number. In terms of continuous prehistoric scatters, those tend to be more of a problem. They tend to be long linear scatters, and a lot of times we use what we recognize as absolutely arbitrary breaks by little drainages and topographic features, and places where the scatter thins out to what we consider, at least for that region, background noise.

➢ ***Derting:***
In South Carolina, we more or less leave the site definition up to the discretion of the archaeologist. We weren't in the field with them and didn't see what they found. We assume they know what a site is. We have, however, been burned a number of times when we have found out later that site numbers probably shouldn't have been assigned.

➢ ***Clay:***
The numbers of isolated or low information scatters are getting to be a very high frequency in my files. As a regional data crusher, David, does this vast difference in information from one site to another bother you?

➢ ***Anderson:***
No, because I try to standardize the data using values such as the percentage of all sites recorded by county or state. There are differences in equivalency from state to state, and, accordingly, you always have to have caveats about the quality and limitations of the data you are working with. One of the things I do when I go out and do survey is to collect and report on every nonmodern artifact found in undisturbed context. Some states want an isolated find form, others a site form, still others to note their location and content in the report. As an aside, in many areas where CRM survey is done, most of us are happy to find anything at all. I feel it is important to encourage people to record undisturbed nonmodern artifacts of the prehistoric and historic periods, so that we don't get in the habit of walking over stuff and saying "Oh, I only see one thing here so I'll just keep on walking" instead of taking the time to deal with it, to learn what is really there. Any Clovis point in undisturbed context, as far as I am concerned, should be recorded as a site, and probably any diagnostic or isolated point or tool as well, because they are some aspect of the settlement/resource procurement system we are trying to understand. Now whether you as the site file curator call them an isolated find or an archaeological site, or whatever, is your business. It's up to you to set the standards in your state. What I would encourage you to do is set the standards so that the archaeological record does not get ripped off by people who might otherwise simply walk over possible sites. Remember, 25 years ago sites were defined in some states by whether or not they contained double handfuls of artifacts...read the Cache River report by Schiffer and House if you wonder about this. Remember, standards change.

➢ ***Clay:***
In Kentucky, if you find isolated finds, they go in your report—what they are and where they are. They don't necessarily get a site number.

➢ ***Williams:***
The problem with this is that you've got to read the report to get that information. From a research point of view, that information is lost if it is not part of the files. What do we lose by reporting a few hundred isolated artifacts as sites each year? I claim we don't lose anything.

➢ ***Anderson:***
Some isolated finds, when you revisit them, turn out to be worthless and in disturbed context; others turn out to be the tip of the iceberg. In Louisiana, we know that some San Patrice sites are buried 60 to 80 centimeters down, at least in the sandhills of west-central Louisiana. You can walk across the surface and not see anything or maybe see a flake or two. If your shovel tests go down deep enough, though, its like opening a blackberry pie. If you write off your isolated finds, you are writing off potential site locations. You folks have to make this call, but I would urge you to consider making people record them in their reports. Remember, if they are in the report, they are not really lost as long as there are copies of that report in existence. Through programs like NADB, somebody in the future will be able to make use of this data.

➢ ***Clay:***
That single flake is still a problem...

CURATION AND DE-ACCESSIONING COLLECTIONS

➢ ***Donat:***
We need to develop procedures about how to deal with de-accessioning collections, both for NAGPRA and in general.

➢ ***Childs:***
Curation training is critical. All of you have

been talking about some of your problems with site file and records management—you're getting so much material, your buildings are full or in danger of collapsing! I think we are beginning to see that we have a terrible crisis in terms of space, or lack of space. I know we have all grown up with a philosophy of keeping everything, but if we keep two tons of fire-cracked rock, our buildings may break. Down the line, we've got to start thinking about sampling and really careful consideration of what we're collecting as we do our fieldwork, and the various stages at which culling can occur. What do we do with existing collections? I think the most important thing is that you track your de-accessioning. Always consider that down the line you've got to know what you had and where it went, whether it went to a garbage dump or has been reburied, or was sent to another repository. It is really critical that you document where your material has gone.

➢ ***Futato:***
This idea of sampling existing collections scares me...this idea that at some point we are going to have to sample our existing collections and cull out a bunch of stuff. To put on my PI's hat for a minute, on a big project we are working on now, we are counting, size grading, weighing, and tossing the fire-cracked rock, except from controlled column samples, features, and contexts like that. I agree there is no reason to put ten tons of fire-cracked rock and mussel shell in the repository. But, putting on my curator's hat, by the time that material gets to the repository, it's already been sampled six, eight, nine, or ten times. You've got a sample of the reservoir area, you've got a sample of the sites in the reservoir, you select a sample of those sites, you've excavated a sample of the area within each one of those sites, and you've recovered only a sample of the material within that area, and you retain only a sample of that. So, by the time the collection gets to me as a curator, it is already a sample of a sample of a sample of a sample of a sample of a sample. And if I have to sample it again, I'm going to go "Oh my lord!" Now, that aside, I know we have to deal with the issue. Until we are forced by a lack of space, which I hope never happens, we will keep the material...

➢ ***Childs:***
We have several states here that have said they have no space.

➢ ***Williams:***
You have to put in compression shelving like we are doing here at the University of Georgia.

➢ ***Derting:***
This still brings up the problem at the other end, though, with the archaeologist in the field. If you've got an early nineteenth-century brick kiln, how many bricks do you need to bring in? Two truck loads? There's got to be a way to figure out how to control what's brought in if you've got a real redundant artifact category.

➢ ***Futato:***
To a degree, cost itself will have a breaking effect. If a project is done for an agency, they commonly ask us what they should do about curation. For example, they ask us if they should send us 100 boxes of shell. I'd ask them "Do you really want to pay us to keep all of this stuff?" At the same time, I think that in the grand scheme of things, curation space, good curation space, is really not all that expensive if you look at it as additional cost per box of materials added to this whole process. Mark, you said you were fixing up your facility here. What is it going to cost?

➢ ***Williams:***
One hundred twenty thousand dollars. We've got a 2,500 square foot area. Right now we can get 4,000 boxes in there. When the work is done, we'll be able to get 8,000 boxes in there. That $125,000 is also going to include a bar code system and software to track everything and create inventories. That should certainly keep us for a few years into the next century, if not more than that.

➢ ***Futato:***
So that's 8,000 boxes for $120,000. Your

looking at $15 a box, and by the time you go through the cost of the whole mitigation process that produced those boxes, $15 more per box at the end is not that great a cost.

➢ ***Childs:***
36CFR79 is requiring archaeologists on federal projects to identify a curatorial repository before the project starts and also budget for curation. I think that another critical key at the state level, or any level, is that you start mandating that curation is put in as part of your projects. For years and years, archaeologists never put curation costs into their research budget.

➢ ***Clay:***
In some cases, the basic facilities for curation don't even exist or are being closed down. Curation facilities require a lot of capital investment, and universities hate to build storage space.

➢ ***Childs:***
No, they don't like to do that. And, again, that is the importance of showing the use of our collections and our site files, and demonstrating that it is valuable information. You can use collections and the information in the site files for a variety of purposes that make it valuable. This is the only way I can see that we are going to get the resources to build these facilities. At another meeting, I heard about a state getting an ISTEA grant to renovate a historic building as a curation facility.

➢ ***Williams:***
Another way, one that we have used successfully, is to play the card that if a better facility is not built, our heritage is going to go to Alabama. If you yell loud enough to the right places, perhaps they'll change their tune.

➢ ***Futato:***
We in Alabama might have something to say about that! Seriously, our curation facility has many selling points. Our university's mission is specifically teaching, research, and service. Our facility brings in excellent valuable, documented research collections; it attracts excellent high-quality researchers to work on those collections; it produces lots of publications on those collections. We are providing a service by having this facility available and these collections available for people who need it. It provides thesis projects, dissertation projects, undergraduate student projects; it provides funding for graduate assistantships. It does all of these things. ***It is not a storage building, it is an integral part of the university teaching and research mission,*** and the university sees it this way.

➢ ***Baca:***
In Mississippi, all of our collections are in a temporary building that is a fire hazard. We don't ask where collections are going, because we can't accept them.

➢ ***Futato:***
The thing about it is that 36CFR79 puts the burden on the agency. The responsibility is not on the university, the SHPO, or the state archaeologist....it is on the agency, and if the agency is not providing appropriate curation, they are out of compliance. It is not your problem, it is their problem.

➢ ***Baca:***
What about work done by a private contractor for a COE permit?

➢ ***Childs:***
Arrangements for curation should be in their contract with the COE.

➢ ***Futato:***
The SHPO needs to be kicking the agencies' butts about this.

➢ ***Baca:***
You're saying the SHPO needs to be telling the agency, but we are saying that the agencies should be aware of this themselves.

➢ ***Childs:***
We are trying to get as many federal agencies as possible to understand the requirements of 36CFR79. We do the best we can. If you

understand and they come to you, you can offer the proper advice. The enforcement of these regulations is a problem; we don't have a police force that can go out and nab them!

➢ ***Baca:***
SHPOs are typically under a great deal of political pressure, so it should be the federal agency's responsibility to deal with this, and not push it off on the SHPO.

➢ ***Anderson:***
These problems are slowly being resolved. The St. Louis Corps of Engineers, for example, contracts itself out to various agencies, such as the Fish and Wildlife Service, to handle curation. They find where collections are, and if they are not in suitable repositories, they recommend sending them elsewhere. That's what we are going to see happen more and more; it has already started, and its going to continue.

➢ ***Childs:***
They have done several major reports, with photographs, showing the deplorable conditions and stating exactly where these things are happening. You don't want those kinds of things going out to your superiors. One of the things that has happened is that the St. Louis COE District is now the Center of Expertise for the Curation and Management of Archaeological Collections. They are responsible for all Corps curation for the entire country. So if you are having any problems with the COE locally about collections, call the St. Louis District.

➢ ***Anderson:***
To reiterate, if there are any COE-generated collections anywhere in the country that you are familiar with, that you feel are being abused by the way they are curated, let the St. Louis COE know, and they may be able to get them pulled and put into a decent repository. And if that happens enough, once the governors of these states start hearing about their heritage going off, you may get some action.

➢ ***Childs:***
There are a variety of strategies, and we are willing to help you as best we can. Accessibility means the material gets used, which means it is more important. The more data we collect that shows that the collections are used, the more likely we are to get support from our institutions, colleagues, and federal agencies.

HOW DO WE GET BETTER DATA FROM OUR DATA PROVIDERS?

➢ ***Derting:***
We are finding that primary information on site locations and dimensions submitted on site forms may differ appreciably from what appears in the final report. We believe some of this is due to people turning in site forms quickly to get numbers, without fully evaluating the data they have collected. Often times, the most junior people are assigned to preparing the site forms, something reflected in their quality. We are finding sites misplotted or mislabeled, as well. That is, site numbers are not where they were plotted when the form was submitted.

➢ ***Anderson:***
I have a similar problem with some of the reports that I review. When I add up the artifact numbers in the text, in the report tables, and on the site forms, I sometimes note serious discrepancies. This review strategy comes from something Dr. James B. Griffin told me a long time ago...if someone's numbers don't add up, there are probably a number of other things about their report that won't add up. So it's not just locations that may be a problem, but also basic assemblage data.

➢ ***Hall:***
The way we deal with this is to review the report and the site forms at the same time as part of the formal review process. The appropriate time to conduct the review is when the collections, report, and site form data are all in hand. Until we get a resolution of problems, we do not sign off on the reports.

➢ ***Anderson:***
Many sites are reexamined down the line, and the collections are reanalyzed. The component identifications, however, often bear little resemblance to what is in the site files. When professionals reexamine collections, it would be nice if they let the site file curators know what they found, so the site records themselves can be updated. That rarely happens at the present.

➢ ***Rowland:***
People must have an appreciation for what is done with the site form data, and how it is used.

➢ ***Derting:***
We have learned the hard way that we need to require site forms before giving out numbers.

➢ ***K. Smith:***
In Tennessee, if we do not get the site forms, we do not sign off on the report.

➢ ***Futato:***
Most people submitting forms are not data managers, and don't understand the implications of and problems created by sloppy work. We obviously have widely differing philosophies about what our site files are and what they should contain. All our basic data is indexed by the site number, but whether all kinds of data should be maintained in the site files is a question.

➢ ***Anderson:***
What some of us would like to see is everything linked together in some way.

➢ ***Rowland:***
We used to keep our data in separate categories, now we tie all this information together.

HISTORIC STRUCTURES, CEMETERIES, AND SITE FILE MANAGEMENT

➢ ***Clay:***
When do standing structures over 50 years old get state archaeological site numbers?

➢ ***Anderson:***
When they burn down! Just joking, just joking!

➢ ***Clay:***
How do other states deal with standing structures?

➢ ***Donat:***
In Arkansas, the SHPO's office maintains a separate database, which we hope will be tied together.

➢ ***M. Smith:***
In Florida, if there is an archaeological site in the yard, we use the 50-year rule of thumb, and they should fill out a site form. If there is a standing structure—and I've gone as far as to allow that to be defined on the basis of a single wall—then they are supposed to fill out a standing structure form. I guess I am in a different position from anyone else in the room since I am responsible for both of these files, and that's an advantage. In our case, we apply a unitary Smithsonian trinomial number to each. It really is one-stop shopping. There are technical problems integrating the two; obviously, the information is very different, but that's what we do.

➢ ***Clay:***
I am moving, in Kentucky, possibly toward merging these data.

➢ ***Hall:***
We do the same thing on a case-by-case basis. If an archaeologist has been there and there is an archaeological component, it gets an archaeological site number, but otherwise...no.

➢ ***Williams:***
That's what we do too, except we are starting to get some pressure from historic archaeologists within the state to give numbers to all buildings. It's scary.

➢ ***Clay:***
At least 50 percent of the sites now being recorded in Kentucky are historic sites as opposed to prehistoric sites. Fifteen years ago, 5 percent

of the sites were historic. Historic sites have suddenly become visible in the whole preservation system. Also, what do we do with historic cemeteries? What we do is, if there are a small number of tombstones with names, it gets a number, or if there is a cemetery with unmarked graves, it gets a site number. I balk at giving site numbers to every city cemetery.

➢ ***Hall:***
In North Carolina, we have an abandoned cemetery survey that's part of Archives and History but not part of our office. Their legal definition of an abandoned cemetery is one in which there has not been an interment for the past 15 years, and we've adopted that. We will record marked and unmarked cemeteries that have not had an interment for at least 15 years, but not municipal cemeteries or commercial cemeteries.

➢ ***Futato:***
We do it the same way we do houses. There is a cemetery register in the Department of Archives and History in Alabama, and, like a standing structure, we assume that the cemetery has an archaeological component. But unless it is subject to archaeological investigation, we don't give it a site number.

➢ ***Clay:***
More and more cemeteries are being examined and moved by archaeologists, so we are facing this issue of approaching modern cemeteries as archaeological sites.

➢ ***M. Smith:***
Does anyone here routinely record historical cemeteries, say those 50 years or older, as archaeological sites? We've been trying to record them because we regard them as cultural resources. A problem is just how we record them. We are concerned about having to deal with another massive database. Cemeteries do suffer from benign neglect. I've recently worked with historical geographers interested in cemeteries to develop a form for historic cemeteries, but we haven't developed a new database for them. Instead they are recorded as archaeological sites.

➢ ***Baca:***
In Mississippi, it must have a dated tombstone before 1900 before it is typically recorded as an archaeological site.

➢ ***Clay:***
Do we record the whole cemetery or just the part that dates back to the nineteenth century?

➢ ***Derting:***
It hasn't become a serious problem yet. We haven't had anyone systematically recording cemeteries in South Carolina.

➢ ***Anderson:***
I record cemeteries as part of my projects, but then I'm extremely compulsive.

➢ ***Futato:***
Well, they should be reported as part of the background, but that doesn't necessarily mean they should receive archaeological site numbers.

➢ ***Williams:***
They should be recorded because this is important information local people should know about.

➢ ***Hoyal:***
Cemeteries are listed as historic sites in Tennessee.

➢➢➢

SITE FILE INFORMATION MANAGEMENT: MYTHS, ILLUSIONS, AND REALITIES

Lee Tippett

Electronic access to information rich databases is rapidly becoming as American as credit card debt, MTV, and roller blades. Significant competitive advantages accrue to those who have access to value laden information. Individuals, institutions, and nations recognize that information resources are vital to their interests. It should come as no surprise that serious conflict over the control of information resources looms on the horizon.

The national debate over information control and distribution provides a context for evaluating some of the issues surrounding public access to site file information. Fortunately, conflict between archaeologists with opposing viewpoints on this subject will not trigger the fall of nation-states or disrupt international economic systems. Nevertheless, the outcome of this debate is important because it touches on the politically sensitive nature of our relationship with the general public (Pokotylo and Mason 1991).

In this article, I take the position that archaeology pays dearly for policies that restrict public access to site file information. Policies that restrict the free flow of information about the location and content of archaeological sites are not only unwise but also unnecessary. These policies are unwise because they send a negative message to the public. The message is one of exclusion based on mistrust and intellectual arrogance. This message is highly counterproductive at a time when archaeology desperately needs to increase its base of political support.

It does not take a rocket scientist to know that current lobbying efforts by the Society for American Archaeology, the Society of Professional Archaeologists, and others will be to no avail if we are regarded by Congress as just another special interest group out for ourselves. Increased public access to site inventories would produce a cascading effect of public support for programs important to archaeology. Grassroots support for archaeology in the countryside translates into voter constituencies with real political clout.

Archaeologists have become skilled at reporting the effects of pothunting on the resource base (e.g., Hutt et al. 1992; King 1991; McAllister 1991). But, we have failed to adequately explore the folk culture that structures how archaeological sites are perceived and used by the general public. For example, we do not understand the channels along which archaeological site information flows at the local community.

Because we do not know how this sensitive information travels, it is impossible to assess to what degree pothunters would use site file information for personal gain. And, while looting is a concern, is it our only concern? What about empowering the public to educate themselves about archaeological resources through on-line access to site file information? Should we ignore the obvious educational and political benefits of such access because of a fear that may be unfounded?

Arguments about the nonrenewable character of archaeological resources are suspect. As we all know, but are afraid to admit, archaeological deposits are created and reorganized by human beings on a global scale as part of their everyday activities. I am confident that there will be plenty of resources available for study by future generations of archaeologists as long as our species maintains a presence on this planet.

Archaeological site file information is a valuable commodity that should not be monopolized by a privileged few. It is a form of public property, and, as such, archaeologists have no inherent right to restrict its distribution or

use. I find many of the arguments against the free flow of site file information to be little more than self-serving myths.

The patronizing "father knows best" attitude, which typifies much of the discourse surrounding site file management, erodes public support by sending a message that is composed of two parts. Unfortunately, both parts are as negative as they are unnecessary.

The first part clearly implies that the public cannot be trusted with information about the location and contents of archaeological sites. Legitimate concerns about looting are used as an excuse to exclude the public from information that is gathered, assembled, and housed at their expense. For the sake of argument, I would contend that there is no evidence of a relationship between open site files and increased looting of archaeological sites. It is likely that a serious study of professional pothunters would reveal an information network that is local, oral and often familial. In other words, looters do not need to go to the site files to find the commercially productive sites.

The second part of the message expresses contempt for the general public by suggesting that site file information is of no use to them intellectually. It supports the argument that it is beyond the capacity of the average citizen to comprehend the complexities of our "science."

It is probably true that few people are interested in the opaque jargon that passes for archaeological information by way of processualism. However, many of our citizens may still believe that archaeology can instruct about the historical evolution of ideas, social organization, and technology.

I would argue that, at this point in the development of North American archaeology, some of the best ideas about the past may come from the fertile imaginations of school children, bus drivers, waitresses, and others who have not had the "benefit" of formal training by the academic elite. Also, the descendents of those we study may have insights into the past that are not based on western scientific tradition. These people are ill-served by current site file management policy.

The "archaeologists only" club mentality of many site file managers has led to absurd inconsistencies in information management policy. For example, anthropology students may use the site files for research papers. At the same time, public officials with vast regulatory and planning responsibilities are given limited access or no access at all.

The position that only archaeologists should make management decisions that affect archaeological sites is untenable. As a practical matter, there are not enough competent archaeologists available to review even a tiny fraction of the municipal, county, state, and federal undertakings that have the potential to affect the resource base.

Across the country, State Historic Preservation Offices are flooded with requests for information as part of the federal Section 106 process. Because most federal undertakings receive some level of review, many assume that the same process occurs at the local level. This false assumption produces what I call the illusion of cultural resource management. Everyday local government officials make thousands of decisions, each one of which has the potential to adversely affect historic properties. These decisions are usually made with no information about the archaeological sites located within their jurisdictions. We are kidding ourselves if we think these people are going to take the time to call us on a case-by-case basis.

The solution to this problem is empowerment. Site file information provided to local officials for use in a geographic information system (GIS) will not only save sites but also provide an impetus for local archaeological ordinances (Carr 1990). Grassroots empowerment to manage archaeological resources important to the community will protect sites and build constituencies for archaeological site management and research programs (Judge 1993; Williamson and Blackburn 1990).

I would like to conclude by restating the main points of this paper.

- First, there are hidden costs embedded in policies that limit public access to state

maintained site files. These can be summed up in terms of lost political support for our programs.

- Second, arguments stating that open site files are an invitation to looters have not been substantiated. Looters have their own sources of information. They do not need the site files.

- Third, archaeologists are attracted to the highly successful environmental movement with its aura of scientific correctness. Assertions about the nonrenewable character of archaeological resources reflect a desire for acceptance and scientific legitimacy.

- Fourth, restrictive site file policies send a negative message to the general public. These policies exclude the public from participation in the exchange of ideas about the past. Intellectual arrogance is repaid with political indifference when programs important to archaeologists are threatened.

- Finally, many are willing to pretend that archaeological resources are being taken into account by local government planners. They are not. Decisions are being made in an information vacuum of our own devising. Local communities should be empowered to manage resources by accessing site file information through GIS technology.

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MANAGING AND EXCHANGING INFORMATION ABOUT ARCHEOLOGICAL SITES IN THE ELECTRONIC AGE

S. Terry Childs

INTRODUCTION

Archeological sites are often complex entities that, individually, can yield a tremendous amount of information and collectively, by region or theme, can be overwhelming. Individual archeologists, recognizing the potential range of their data sources—geographic, cultural, topographic, vegetational, temporal, administrative—have become increasingly dependent on electronic databases to record, store, and manage bits of data. Automation has made the collection and storage of data faster and more efficient. It also promotes greater accuracy since data entry errors can be more easily tracked. Automation has the other advantage of providing a vehicle to transform those bits of data into new information through queries or statistical manipulation of the data to answer particular questions (Limp 1992). This allows goals of interpretation, education, and long-term site management and preservation to be attained.

Whereas many individual archeologists understand the potential of electronic applications to archeological data and information, larger institutions and organizations have not been as quick to take advantage of emerging technologies. State archeological site file data, for example, is a logical candidate for management by electronic media. Many states have successfully taken the step to "go electronic" with their site file data, but others have not. Why is this? What factors and decisions are involved in deciding whether or not to "go electronic?" What site data should be collected in this medium? What are the future trajectories of these efforts for archeological site databases? The Site File Management Workshop of the southeastern states and nearby territories offered some interesting perspectives on such questions.

Perhaps a fundamental inhibitor to the Pan-American development of electronic databases of state archeological sites, besides the ever-present problem of limited and varied resources, is conceptual—understanding that data on each site do not have to be individualized and made static by being stored in paper files or on cards hidden in file folders. They can be components of dynamic, queriable, automated systems that are capable of massaging much more data into useful information than the human brain can alone. Perhaps there needs to be a name change away from state site "files."

There are several other key factors that state site data managers must always consider if they want to try electronic media or change their electronic capabilities in the future. It became apparent during the Site File Management Workshop that audience, needs and goals of the audience, accessibility, and available resources were important to any decision-making process about electronic databases. This essay examines these factors and how they might influence possible future goals of communication between states for site management and preservation, as well as research. It also considers a national-level electronic database system, the National Archeological Database (NADB). This system provides a useful model for states on the benefits and problems associated with data collection from many different providers for various uses, as well as data dispersal and use.

AUDIENCE/USERS AND THEIR NEEDS

Critical influences on the design and long-term maintenance of a database, whether electronic or in paper files, include a careful examination and understanding of who the users are, the nature of their needs, and how their changing needs

affect a database over time.

There are three discrete groups of archeological site data users. One group consists of researchers whose needs relate to their research questions. Given the potential breadth and variation of information they seek, they might demand, as well as offer to collect, the greatest range of data. A second group includes federal, state, and local cultural resource managers, employees of private archeological and engineering contracting firms, and business people, such as land developers, who have specific planning or research questions to ask, usually in association with compliance to federal and/or state law. Their data needs are generally limited to fulfilling legal requirements. These two groups must be seen as both data users and data providers. Their participation and coordination as data providers is essential to the long-term viability of any archeological site database.

The final group of users are the state employees, such as the state site data managers and state historic preservation officers and staff, who manage and protect the states' archeological sites. Not only do they have to make sure that the members of the first two groups provide the data required by law, but they need to administer, validate, and monitor pertinent administrative information. Success at their jobs requires that accurate data is received and entered into a data system in a timely fashion.

The audience or users of a database can and will change. Some flexibility, therefore, should be built into a system to accommodate any new data fields that arise due to changing user needs or requirements. For example, many of the first compilers and users of site-oriented data were university researchers with regional interests in settlement and land-use patterns. With the enactment of various federal and state laws on historic preservation, beginning in the 1970s, the majority of site data users are now associated with cultural resource management. Pieces of data never recorded by university researchers are now important for cultural resource management. Today's generations of researchers often do not even know that databases of state sites exist, since they are primarily located in state government buildings, often have restricted access, and their research potential is poorly presented in archeology graduate school programs.

Given the various needs of the archeological site data users, there are several advantages to collecting such data in an electronic system.

- First, the forms can be made available on diskettes to facilitate data entry, to increase accuracy, and to minimize the amount of data verification that must be done by the data managers.

- Second, once a database is operational, it can be set up for more than one user at a time, either in an office or through remote connections.

- Finally, electronic databases can be linked to and interact with other databases. Thus, databases on associated archeological collections or associated documentation, such as site and laboratory reports—both extremely important for site management and protection—can be related directly to the primary site data.

These databases do not have to be created at the same time as the main site database, but can be developed as related modules, over time, as resources permit (Canouts 1992). Arkansas, Tennessee, and Massachusetts provide excellent examples of such integrated systems. Long-term planning for such relationships, however, is critical.

AVAILABLE RESOURCES

In choosing what archeological site data to collect, an attempt should be made to accommodate all the potential users' needs. However, this is dependent on the resources available for the collection and management of the data. It is clear that state commitment to staffing and funding for archeological site information management fluctuates. Sometimes, in good times,

increased resources may encourage the overhaul of the site inventory form or the addition of new data fields to a database; or it may provide support to "go electronic." In bad times, a reduction of data fields or the accumulation of a terrible backlog of site data may ensue.

In general, states have not been able to secure adequate staffing or financial backing for effective management of archeological site data. As a result, large backlogs in data collection, entry, and verification do exist. There seems to be only a couple of solutions to these problems. In the most dire situations, perhaps only a bare minimum of data can and should be collected and managed in order to minimize backlogs and other stresses on the staff. Another solution would be to closely coordinate with the data providers to furnish accurate and timely data in an electronic format. Perhaps the combined forces of federal archeologists and land managers, state site data managers, private cultural resource management firms, business people, and researchers can work together to obtain funding for the construction or enhancement of workable and accessible electronic databases for everyone's needs.

ACCESSIBILITY

The other important factor in designing and managing a database is the degree to which it is made accessible. Some of the most important information compiled on sites, such as locational data (i.e., UTM coordinates), is highly sensitive and, in order to protect sites, should not be made public. It is becoming increasingly apparent that dedicated collectors and pothunters already know where the sites are, but such information also needs to be restricted from the casual public.

What about the rest of the data that is highly useful for research and management decision-making? A study of the information needs for the social sciences identified that archeologists and anthropologists would benefit from new ways to share field data (Gould and Handler 1989), such as through an accessible site database. It is becoming increasingly difficult to justify the collection and storage of information that can benefit a sizeable portion of the public, yet is relatively inaccessible to that public.

Paper files typically must be handled on an individual basis at their storage location. This significantly limits their accessibility and use. For those who do gain access, the sensitive information remains visible in those files. Electronic databases, on the other hand, have the potential to sharply increase accessibility to the data while simultaneously restricting some users to sensitive data. This can be done by assigning user accessibility levels so that some data fields do not appear to some users. Furthermore, electronic databases can be accessed remotely so that potential users do not have to travel to the office in which the information is stored. A database can be made available by a modem hook-up between a person's personal computer and telephone, or over the Internet.

When data are compiled and stored electronically, another accessibility factor is facilitated. This is the degree to which the data can be standardized and shared among a wider public across arbitrary boundaries, such as state lines. Each state presently requires somewhat different data from their providers due to differences in state laws and priorities or funding and staffing limitations. With automation of databases and agreement on some of the same data fields by at least some states, these data can be more widely shared and used to tackle regionally-oriented and, perhaps in the future, national-level management and research problems. It will always be critical to keep sight of individual states' database goals, which emphasize locally-relevant information needs, during attempts to standardize data categories (Canouts 1992). The ability to share some data, however, will be of great benefit in some instances.

NATIONAL ARCHEOLOGICAL DATABASE AS AN EXAMPLE

Many of the issues associated with developing an electronic database on the archeological sites

within a state—coordinating data providers, having a broad audience with a range of needs, careful management of resources, accessibility, the advantages of a modular and relational database structure, and long-term planning—have been dealt with during the development and implementation of the National Archeological Database (NADB), and continue to be addressed. NADB provides a potential model of electronic data acquisition and distribution for those considering the development of or upgrading to a similar system for site and related data management. Ironically, NADB was first envisioned as a modular system of databases, including one on archeological projects. The implementation of the latter module for the entire country, however, proved to be very difficult in the mid-1980s.

NADB presently consists of two modules *Reports* and *Native American Graves Protection and Repatriation Act (NAGPRA)* and a Map Library. Another module, *Permits,* will soon be accessible to the public and will be related or linked to the *Reports* module. Each of these modules have been made available for public use in stages after considerable planning and coordination to gather the necessary data. They are now accessible through a telnet session on the Internet or by modem. As recently as October 1994, NADB was also placed on the World Wide Web, a graphics-based interface on the Internet that is very user-friendly. (Appendix I, at the end of this article, provides access information.)

The effectiveness of *Reports*—a bibliographical database that presently contains approximately 120,000 records, largely from the U.S. archeological gray literature—depends on a well-organized system for data collection, as well as data distribution. Bibliographic data are most commonly collected from the State Historic Preservation Offices around the country, who submit their data in electronic form. These offices receive and review copies of the archeological site reports from projects conducted in their states and, therefore, are natural partners in this national endeavor (Canouts and McManamon 1991).

Until very recently, five National Park Service (NPS) regional coordinators collected and compiled the *Reports* electronic records from the states in their jurisdiction for an annual update of the database. They then sent these regional records to the national coordinator in the Archeological Assistance Division (AAD) of the NPS in Washington. This individual assembled the data in a master database and checked for duplication of records. The NPS is currently undergoing significant reorganization. The AAD is now called the Archeology and Ethnography Program and the ten former regions are now seven field directorates. This will affect the future assembly of *Reports* data and offer a good example of how changes in the infrastructure of a data collection system can affect the overall viability of a database unless some flexibility is built into it.

The distribution of the *Reports* data has been and will continue to be handled by another partner, the Center for Advanced Spatial Technologies (CAST) at the University of Arkansas. CAST makes the database available on the Internet and via modem for querying and downloading the results to a personal computer. (The Department of Defense has also cooperated in facilitating data dissemination.) This requires special expertise and electronic hardware, although the latter is rapidly decreasing in cost. Many states have made similar kinds of queriable databases accessible to their public and, therefore, have at least some of the appropriate resources. Now all they might have to contend with are the traffic jams on the Information Super Highway and telephone lines.

A second module, *NAGPRA,* allows Native Americans, museum professionals, government agency personnel, archeologists, and others to access documents pertinent to the Native American Graves Protection and Repatriation Act. These are often difficult to find elsewhere. The module provides the full text of the act, a contact list for Indian tribes and federal agencies, guidance on the regulations, notices of inventory and repatriation activities, and information about the NAGPRA review committee meetings. All of these documents can be downloaded to a

personal computer. In the near future, the Indian and federal agency contact list will be queriable. The *NAGPRA* documents and database are compiled and continually updated by the NPS's recently reorganized Archeology and Ethnography Program, in cooperation with CAST.

The Map Library of NADB, constructed by CAST using the ArcInfo and GRASS GIS systems, is only available on the World Wide Web interface of the Internet because of its graphics capabilities. Presently, a number of national-level maps are available for viewing and downloading into a personal computer: SHPO archeological site counts and densities, National Register of Historic Places (NRHP) property and site densities, NADB citation counts and densities, fluted point density, and a series of map layers relating to the effects of agriculture on U.S. cultural resources. These maps display data compiled only to the level of the state and county for security reasons—to prevent public access to individual site location information. In the near future, a new module—*MAPS* (Multiple Attribute Presentation System)—will allow the user to query the data and download the frequency information by county, which can be used to generate maps around particular research or management questions. Such graphics capabilities will be useful for statewide and regional planning, as well as general research.

Permits is a database that now contains about 3,500 electronic records of permits issued for archeological and paleontological work conducted on federal lands between 1906 and 1984. The *Permits* module will be added to the NADB on-line system in early 1996, and will allow users to query such topics as the issuing agency, the permittee, locational information (UTM coordinates will not be available to the public), location and types of collections, NAGPRA-related objects, and resulting reports. Data entry has been conducted by the recently reorganized Archeology and Ethnography Program using the archival records housed by the program and at the National Anthropological Archives, Smithsonian Institution. Public access to this data will be provided by CAST.

CONCLUSIONS

The Electronic Age is here to stay; more and more people and organizations are taking advantage of the increased efficiency afforded by electronic databases and the ability to access almost unlimited information through the Internet and other information systems. Since archeological projects generate a tremendous amount of data that is well served by such media, many states, which use and manage site data, have taken advantage of the new technologies. The rest are preparing to do so. It is hoped that as those latter states "go electronic," they will consider some of the issues outlined herein.

Probably the most pressing matters for the future management and use of state site data is the degree to which the data will be made accessible to the public and made compatible with neighboring states for regional and, perhaps, national uses. Key to the latter, as already mentioned, is coordination among the interested states in the standardization of at least a minimum of useful data categories. Most states with electronic databases do not use the same hardware or software, and there is considerable disparity in the breadth of their electronic capabilities (Wood 1990). These realities were a serious liability to data sharing in the recent past. It is becoming increasingly easy, however, to convert standardized data from one system to another. It is also becoming increasingly easy to access data on different servers for gathering comparable data. Perhaps once states get their site data entered into electronic databases, fully validate it, and clear their backlogs, these matters will become priorities.

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APPENDIX I — HOW TO ACCESS NADB

The on-line NADB network is available twenty-four hours a day, seven days a week. NADB runs on a SunOS UNIX system at the University of Arkansas, where it is maintained and operated through a cooperative agreement between the NPS and the Center for Advanced Spatial Technologies (CAST, UArk).

NADB—a full-screen application—is user-friendly, highly suitable for PC users with low-cost terminal emulation software. Menus, on-line help, and informative query screens assist in finding information.

The CAST server, which houses the NADB network, can be reached by the following routes.

» *Via Modem*

If your computer has a communications package and the ability to download files, dial this commercial number on your modem:

(501)-575-2021

Suggested modem set-ups are: Parity-None; Data bits-8; Stop bits-1; Duplex-Full

At the login prompt, type **nadb** in lowercase letters and follow the prompts.

» *Via Internet, Telnet*

If you have an Internet account, simply key in this address:

telnet cast.uark.edu
or
telnet 130.184.75.44

At the login prompt, type **nadb** in lowercase letters and follow the prompts.

Note: NADB requires full-screen display for input and response. Accessing NADB via a telnet session on the Internet has been difficult for users at terminal-based systems linked to mainframe computers with single-line protocols. This problem will not affect most Internet users of NADB.

» *Via Internet, World Wide Web*

If you have a Mosaic or Netscape browser on your PC, you can access NADB on the World Wide Web (WWW). Simply key in this URL address:

http://www.cast.uark/d.cast/nadb.html

SITE RECORDS IN THE SOUTHEAST: AN OVERVIEW OF PRESERVATION EFFORTS AND CHALLENGES

Michael Trinkley

Five years ago Chicora Foundation sent a detailed, six-page questionnaire regarding the preservation of site forms, field records, and photographic materials to seventeen institutions in ten southeastern states. Sixteen institutions, representing all ten states, responded, including nine of the "official" repositories for site data. This survey formed the basis of the first (and, as far I know, only) evaluation of preservation efforts in the southeastern archaeological community (Trinkley 1990). Based on the findings of this 1990 study, a simplified four-page questionnaire was designed to follow-up on previously identified issues. It was distributed to the eleven states and territories participating in the National Park Service's Site Files Management Workshop in Athens, Georgia. Seven of the eleven states (64 percent) responded to the questionnaire. Before continuing, I want to thank those who took the time and effort to participate in both studies and bare their collective souls for scrutiny.

THE 1990 FINDINGS IN BRIEF

The 1990 study found, for example, that only about a third of the repositories maintained duplicate records either on- or off-site. The remaining institutions had no procedures to back-up these irreplaceable records. Only one of the institutions was using acid-free enclosures. None required the use of exclusively "archival" writing media. Only 22 percent reported any consistent environmental controls, with some institutions reporting relative humidity readings in their paper and photographic storage areas as high as 75 percent RH (well within the range associated with mold and insect infestation). None of the institutions had developed any disaster plans to insure the protection of their records from either natural or man-made disasters. Only two states were using acid-free, or permanent, papers. Most of the site forms were evaluated as having a life expectancy of fifty years *or less.*

Photographic collections, including both color transparencies and black and white negatives, were exposed to equally hazardous conditions—improper enclosures, fluctuating temperature and relative humidity, lack of duplicates, and unstable processing. Non-site form records were perhaps even less well preserved, with many collections inadequately filed, located in unsuitable facilities, and consisting of unstable materials. Only a quarter of the institutions had any policy regarding regular inspection of their paper holdings, so most couldn't evaluate how bad conditions might be.

I remarked at the time that it was clear the archaeological record in the Southeast was in jeopardy. Simply put, very few of the site records—which contain the basic information of each state's cultural heritage and on which our science is based—were likely to survive to the year 2030. Some items would likely not survive even another twenty years of benign neglect.

I suspect that this hardly came as news to site records managers, who are typically understaffed and underfunded by agency heads who see little glamour in "archival" or "library" work. Regardless, there was an ethical imperative for professionals and institutions to adequately fund, and implement, preservation programs. I suggested that if archaeologists would devote as little as 1 percent of their budgets—a very modest sum—to the preservation of their records and documents for future researchers, some of the current crisis could be resolved. Coupled with this, however, I suggested that repositories must begin lobbying for more satisfactory physical plants, and that, from the

top down, those responsible for these records must begin to better understand basic preservation issues.

Certainly the issue was being clearly formulated by others in the profession at the same time. Following what might be described as the groundbreaking work of Mary Anne Kenworthy and her colleagues at the University of Pennsylvania (Kenworthy et al. 1985), every archaeologist had access to simple, concise, and accurate information on preservation issues. The same year as our study, colleagues in the United Kingdom Institute for Conservation, Archaeology Section, published the equally concise *Guidelines for the Preparation of Excavation Archives for Long-Term Storage* (Walker 1990).

THE CURRENT STUDY

Certainly the issue of preservation continues to be at least occasionally discussed in archaeological circles. Just this year, the Wenner-Gren Foundation for Anthropological Research published an overview on preservation issues (Silverman and Parezo 1995), offering it free to those interested. Chicora Foundation publishes a free preservation newsletter. And preservation literature has significantly increased over the last five years. There are, for example, exciting new techniques for calculating to what extent a collection's lifespan will be shortened by improper storage and environmental controls (Reilly 1993; Sebera 1994).

With this in mind, how has the condition of the Southeast's field records and site forms changed in the last five years? Has there even been a change? Is there a greater awareness of preservation needs?

To discover the answer to these and other questions, I developed a simplified four-page questionnaire, which was distributed to the eleven states and territories participating in the Site Files Management Workshop (sponsored by the National Park Service in March 1995). Seven of the eleven states (64 percent) responded to the questionnaire.

The study found that all of those responding still use paper site forms as their primary site identification record. Of these, three institutions (43 percent) are ***not*** using permanent (pH neutral, alkaline buffered) paper, and one (14 percent) isn't sure what kind of paper is being used. Two institutions using permanent paper actually test the product and can confirm that it meets minimal preservation standards. Only three of the seven responding institutions (43 percent) have any backup of the paper copies. While in all three cases the backups are stored off-site, duplicate copies are usually made less often than monthly, suggesting that losses could still be significant. As earlier stated, there is still no real effort to require that forms be completed using an archival media, and a broad range of writing instruments are allowed. Four institutions still use highly acidic commercial office folders for site form storage, one uses binders, one didn't specify how forms were stored, and a third reported a novel preservation approach using tyvek envelopes.

Four of the seven states or territories reported some degree of site form computerization, which provides very mixed blessings. The percent of forms computerized varies from 100 percent to something in the range of 50 to 74 percent. Two use personal computers as their platform, while one uses UNIX (the fourth did not provide this information). The records themselves are on floppies, tape, and hard drives, and the records use both proprietary and in-house programs. Backups of the files range from daily to monthly. The three institutions responding reveal that these backups are maintained off-site. Two of the three specify that there is at least one person on staff specifically responsible for system security (including authorization of use, protection from viruses, and debugging). One institution, however, had no one assigned to system continuity and disaster recovery, certainly one of the weakest chains in computer use.

Five of the seven institutions report that they have no constant (24-hour, year-round) environmental control in their site form storage area. One, which reports consistent environmental controls, actually monitors the conditions

using a recording hygrothermograph, while the other relies only on a thermostat. Other environmental controls, such as restrictions on eating, drinking, and smoking, seem to be consistently specified and enforced.

In the last five years, two of the seven institutions have apparently developed programs to periodically examine their paper records. Yet only one of the seven has a disaster plan that incorporates the site files. The remaining collections are at risk of everything ranging from hurricanes to earthquakes to fires. The one disaster plan reported was written more than a year ago, and there is no known provision for either updating the plan or testing it.

Four of the seven institutions have no fire detection system at all, two have smoke detectors, and one has only heat detectors (which are hardly better than nothing at all). Two, or 29 percent, report having sprinkler systems—clearly the most appropriate fire suppression device available—while two others report only portable fire extinguishers. These, of course, are only of use if the fire occurs during the building's occupancy and if the staff is trained to use them successfully. Although none of those responding had used an extinguisher in the past year, two did report some form of training. However, one individual scoffed at training, comparing it to the use of a pencil. I can only point out that however true this may be in principal, in practice the National Fire Protection Association has found that a trained individual can extinguish two and a half times more fire with an extinguisher than an untrained person. This may be the difference between containing a fire or having it destroy the site files. Institutions are little better secured with only two reporting any form of intrusion detection.

Photographic collections are stored in very much the same conditions as the paper records. Typically, the storage enclosures for black and white negatives are good, with four of the seven institutions using inert materials, such as mylar or polyester. Three, however, are still using paper envelopes, which may or may not be appropriate (depending on design and the paper used). None of the responding institutions checks black and white negatives for proper "archival" processing, and only one reports that prints are processed to permanent standards (although even that institution couldn't specify what sort of test was being used to confirm the archival processing). In only three cases are negatives and prints stored separately, and in only one case are duplicates stored off-site. Storage enclosures for color transparencies are also generally satisfactory, although one institution is using vinyl pages, well known for their damage to slides. No institution has established requirements on the type of film to be used to maximize preservation, and six institutions have no policy on the use (i.e., light exposure) of slides in their collection. In all cases the environmental controls, fire safety, and security for photographic materials was identical to those of the paper collection.

This survey also requested information on the amount of funds used on the preservation of site forms and associated records. Only three of the seven reported any direct expenditures (although clearly all funds either serve to foster, or hinder, preservation efforts). One institution reports spending less than $1000 a year, while two others report spending less than $500. Clearly preservation is not a big ticket item for most site file managers. One institution candidly remarked that "processing and maintaining originals is only a primary issue due to [our] lack of manpower."

This study reveals that there are positive changes: the number of institutions using permanent paper has increased; the number maintaining backup copies has increased; and several institutions are beginning to periodically examine their files for inventory and preservation purposes. Computerization, when appropriately backed up, is also another significant step to ensure that records will be not simply more accessible, but safer.

In other areas, however, there is virtually no change. For example, still less than a third of the repositories have appropriate environmental controls, and only one is actively monitoring its conditions. There has been virtually no change

in disaster planning—in spite of Hurricanes Hugo and Andrew. There has been no substantive improvement in protection against fire—the single greatest threat to these collections. Security—an increasing concern focusing on the entire spectrum from terrorism to disgruntled staff to random vandalism—is still largely ignored.

THE NEAR FUTURE

There is compelling evidence that preservation, while gradually improving, is still underfunded, understaffed, and, to some degree, misunderstood.

Considering the funds that have flowed into archaeology, it is difficult to understand why site records have not received a much more significant allocation of available resources. It is absolutely essential that in archaeology—as in museums, archives, and libraries—support for preservation begins at the top. There must be institutional support manifested in the allocation of reasonable resources. There can be no excuse for the failure to provide appropriate care and preservation of primary archaeological site data.

This survey has identified several broad areas of concern, which both the local agency and the National Park Service can help address:

- There is a need for additional preservation training opportunities. Site file managers, most typically archaeologists, must also become preservationists. They need to have the opportunity to understand environmental controls and monitoring, the principles of integrated pest management, fire safety techniques, disaster planning and recovery methods, photographic preservation, and archival accessioning. Funds for such training must be either provided by the institutions or made available by the National Park Service.

- Institutions must aggressively pursue the acquisition of appropriate physical plants—buildings with adequate HVAC systems, security, and fire detection and suppression systems. Coupled with this, site file managers must be provided with the resources to operate their sections in a manner that is consistent with good preservation skills. While the claim will always be made that funds are in short supply, those available must be better allocated, even if this means "doing" less archaeology in order to take care of that which has already "been done."

- Institutions must also allocate reasonable budgets to the maintenance of site files. Reliance on improper paper, commercial folder stock, and cheap housing only creates an even worse "preservation time bomb." It will be less expensive to maintain a reasonable level of preservation procedures initially than it will be to take corrective action later. This is another area where the National Park Service might wisely devote planning and seed money.

It should come as no surprise that all three of these recommendations revolve around the central issue of funding. In 1993 *A Report of the Task Forces on Archival Selection to the Commission on Preservation and Access* offered very similar recommendations and noted that:

> *The intent of these recommendations is not to request increased funding...rather, their purpose is to suggest a better use of scarce resources through a more balanced allocation of existing funds. Funding would therefore reflect the value of all information and result in more consistent policies and stronger and clearer requirements on repositories. (1993:5)*

THE LONG TERM

There are many new preservation possibilities on the horizon, but not all that is new is good or even worthy of being considered.

Both the Canadian Conservation Institute and the Commission on Preservation and Access

are exploring mass deacidification processes that can potentially buy additional life for acidic papers using commonly available systems, such as Akzo-DEZ, Wei T'o, and FMC-MG3. Early results are promising, yet it is also clear that not all materials are equally suitable. In addition, the deacidified collection must still be protected from insects, fire, and other preservation threats.

New forms of microfiche, including color fiche, are being explored, and there is some indication that they will have a role in preservation efforts. In general, however, fiche remains a second choice to microfilm for long-term preservation and reliability.

Most commonly discussed are various forms of digital technology—such as optical WORM and CD-ROM. This is an area where suppliers gush the virtues of their specific technology—low cost, ease of use, wonderful access, and so on. What is rarely discussed, however, is the archival stability of the media or the technology. It is essential to understand that when we are speaking of an archival media, we are talking about long-term retention of information, typically for several hundred years.

Digital technology is new. Its long-term stability is unknown and will vary by materials used and by manufacturer. There is no industry standard, and there has been no adequate testing. There are no commonly accepted standards for archival storage. Digital formats are not human readable, but rather require a hardware system. This hardware system may have a significantly shorter lifespan as either an individual piece of equipment or as a technology than the disk itself. Virtually all of the digital market is consumer driven—new equipment or replacement parts will only be available if a market exists. It is unlikely that the archival community alone will be capable of providing manufacturers or retailers with a viable market. More significant than wearing out equipment will be format obsolescence. The technology is rapidly changing, and new formats are constantly being developed. They may, or may not, last.

While the most common approach to many of these problems is to periodically convert old data to new formats prior to problems, this is more wishful than realistic. For institutions with chronic budget problems and limited political clout, it seems overly simplistic to suggest that new hardware be purchased and old digital materials be periodically converted to the new technology. In addition, while the copying process is not necessarily difficult and can frequently be accomplished flawlessly, there remain lingering concerns over intentional tampering with data during the conversion process.

Many agencies, such as the National Endowment for the Humanities' Division of Preservation and Access, do not accept digital formatting as archival. They point out that the various disks are known to deteriorate over time; that they are subject to pollution (especially dust) and storage environments (especially temperature and relative humidity); and that if they are damaged the entire corpus of information is lost and cannot be retrieved with the currently available technology.

Even those who are more generous to digital imagining, such as the Cornell and Xerox study, admit that this technique will replace traditional approaches, such as microfilming, but only *"in the future"* (italics added) (Kenney and Personius 1992:35). The studies acknowledge that there are still concerns.

In general, we should realize that the future relies not nearly as much on new technologies as it does on a fuller understanding of preservation goals and techniques. When preservation quality microfilming with a known track record costs around ten cents a page, and digital scanning with no assurance of long-term preservation costs upwards of thirty cents a page, there is ample reason to wonder whether new technology is truly the future. With limited funds and even more limited staffs, there is greater need for simple preservation initiatives than there is for major technological tests.

It is essential, however, for directors of agencies responsible for site file management to understand the importance of these records and take the steps necessary for their preservation. If we are cavalier in our efforts to preserve these data, how can we expect the public to be sympathetic to our pleas for site preservation?

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SITE FILE MANAGEMENT IN THE SOUTHEAST

David G. Anderson

INTRODUCTION

The articles in this volume offer a good introduction to site file management in the Southeast. As we have seen, archaeologists in the Southeast, as in other parts of the country, are working to improve the quality of their site file data in order to facilitate research and resource management goals. The March 1995 workshop highlighted the importance of and need for regular interaction between the region's site file managers. The interaction that took place at the meeting led to a better awareness of each state's approaches, problems, and solutions, and has already resulted in minor changes in several of the programs. In this article, which complements the very fine summaries produced by Childs and Trinkley, I examine a number of the general themes explored at the workshop and in the articles derived from it.

Site file management has a long and distinguished history in the Southeast, dating back to the 1920s and 1930s when National Research Council directives on state archaeological surveys influenced the initiation of site files in several states. James A. Ford, an inspiration to four generations of southeastern archaeologists for his extensive field and reporting efforts, helped get site file systems started in Louisiana and Mississippi. The site files that exist in most of the other states in the region are likewise a testament to the activities of now near legendary early archaeologists, such as Joffre Coe in North Carolina, William S. Webb in Kentucky, and David DeJarnette in Alabama. Their modern-day direct descendants deserve no less praise, since they work to bring order and accuracy to vast amounts of information, often with little more support than existed when the files were started fifty or more years ago. Site file managers in the Southeast and beyond are, I believe, truly unsung heroes of the archaeological profession, compiling and safeguarding the primary evidence about the archaeological record that will be passed on to future generations.

The Southeast has witnessed a tremendous amount of archaeological field research in recent years, much of it the result of federal environmental legislation and the ongoing phenomenal growth and development of the region. Information management in the region has grown and improved apace, and the site files in each state are increasingly perceived as valuable resources by land managers and scholars alike. Unlike the situation ten to fifteen years ago, when site file data were often spread among a number of repositories, this information is now maintained in centralized files in every state. Site file data exist or are being placed in electronic format across the region and, in several states, are being incorporated into geographic information system (GIS) formats. Southeastern archaeology's increasing maturity and sophistication in information management can be seen in the changing data collection forms used through the years, as illustrated in Rivet's article describing the Louisiana situation. From card files to computerized coding forms, the development of site recording in Louisiana, and across the Southeast in general, parallels developments in American archaeology. Already starting to work together as a regional community, southeastern information managers are striving to bring some measure of compatibility to their data; an effort that should facilitate improved research and resource management at ever larger and more inclusive scales in the future.

THE IMPORTANCE OF SITE FILE DATA

The importance of archaeological site file data to both research and resource management cannot be overstated. As Baca and Giliberti elo-

quently stated in their article, in an observation that bears repeating, "when a site form is filled out, a primary scientific and historical document is created that may stand for decades to come as a major, and in some cases the only, source of vital site data." This sentiment should be held close to the heart of every archaeologist because it underscores the need to take care and pride in the completion and curation of our records, not the least of which are site forms. Site records and their associated collections are our profession's primary data, the only information that remains after fieldwork is completed (McManamon 1995:2). As several of the participants in the workshop observed, working with site file data should be encouraged early in an archaeologist's career because it teaches the importance of primary data and the complete and accurate recording of information.

As Futato noted in his article, we manage archaeological data for its research value, for what it can tell us about the past. As is evident from all of our contributors, site file data in the Southeast are overwhelmingly generated and used by cultural resource management (CRM) personnel as part of environmental protection actions. State site files are, at present, most commonly used to provide information about the kinds of cultural resources and the level of archaeological survey that has occurred in a given area. The data are typically used to provide summaries of the past occupation of a project area and generate expectations about the kinds of resources likely to be encountered. Research considerations, accordingly, are an intrinsic part of the environmental protection process (Butler 1987). This is evident in the National Register of Historic Places (NRHP) for which the most typically used criteria to determine significant archaeological sites is whether or not the sites "have yielded, or may be likely to yield, information important in prehistory or history."

Besides playing a major role in resource management, site file data are also increasingly being used to explore important research questions, such as where peoples were distributed on the landscape, how rapidly population levels rose or fell, and how environmental or technological change affected settlement over large areas (e.g., Galloway 1994; Sassaman and Anderson 1994; Williams 1994). For the last several years, for example, using data provided by the other contributors to this volume, I have been exploring prehistoric settlement in the ten states comprising the lower Southeast (Anderson 1990, 1991, 1996; Sassaman and Anderson 1994). The map in Figure 1 exemplifies this research. Illustrating the distribution of Early Archaic (10,000 to 8000 B.P.) sites over the region, the map is based on the incidence of just over 7,000 sites with Early Archaic components within a total regional sample of approximately 180,000 sites.

From this map, it is evident that Early Archaic sites are widely but unevenly distributed over the regional landscape, with concentrations along and near the Fall Line across the Atlantic and Gulf Coastal Plains and along or near major river systems. A number of these concentrations correspond to the locations of major lithic raw material source areas, indicating that quarries were important foci for these populations. These distributions also offer some support to riverine-oriented settlement models advanced for the period, with at least some of the observed concentrations likely reflecting areas where aggregation loci, seasonal camps, or quarries could have been located (e.g., Anderson and Hanson 1988; Kimball 1992; Morse and Morse 1983). Appreciable population concentrations appear to have been present in some areas that may represent the centers of macroband systems. This kind of analysis illustrates that to more fully understand past occupation in any one area, we must have an appreciation for the much larger regional picture. Site file data can be extremely useful toward this end.

Finally, besides assisting in CRM and research, site file data can help us explore the effectiveness of past fieldwork. It is a simple matter to examine site density and discovery rates, for example, in order to evaluate whether appropriate field strategies are being employed, where important resources are likely to occur, and the effectiveness of individuals and organ-

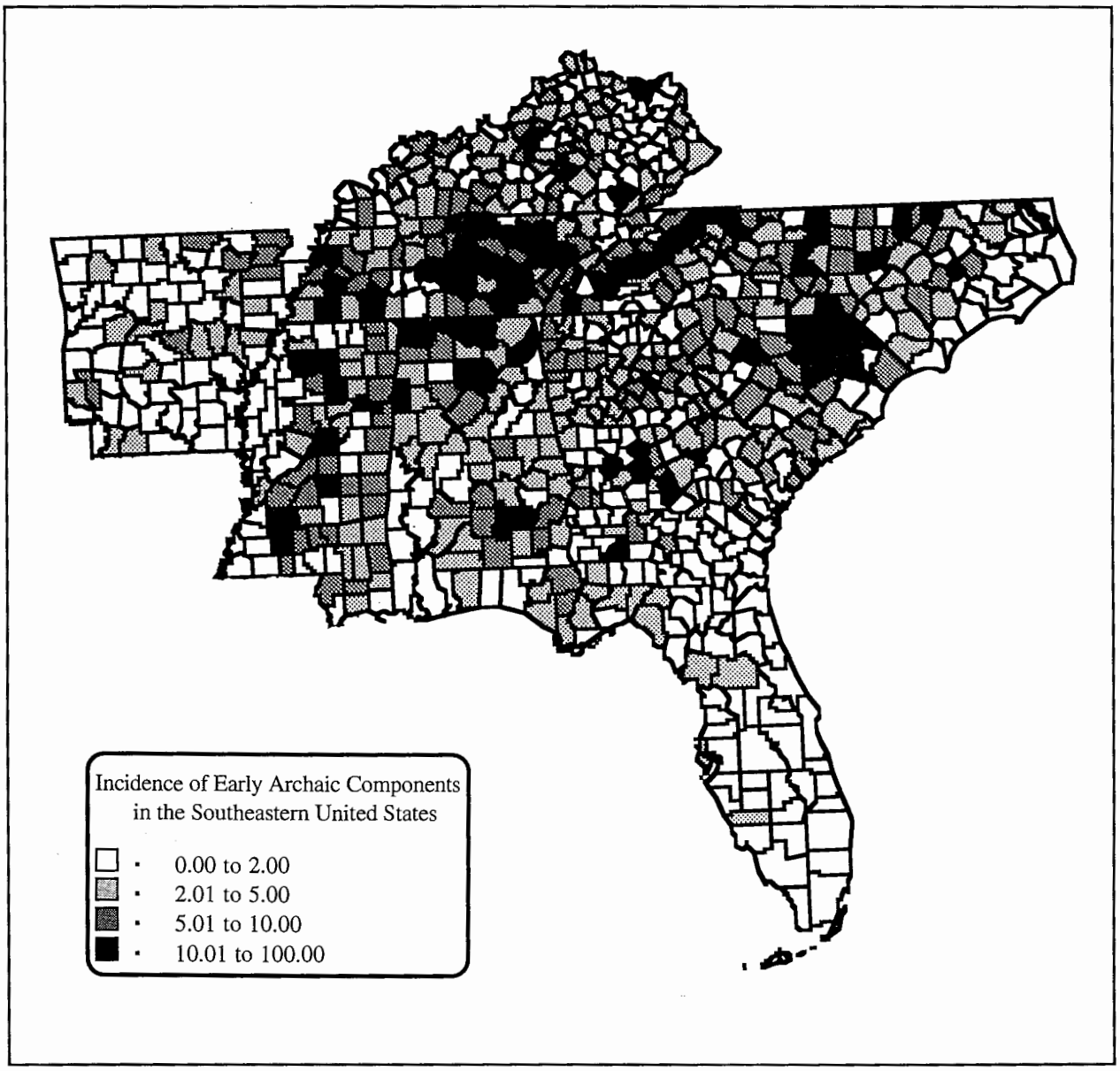

Figure 1 — The occurrence of sites with Early Archaic components in the lower Southeast as a percentage of all sites (prehistoric and historic) recorded in each county.

izations. Surveys of clear-cut tracts, which are conducted after timber harvesting has occurred, for example, can document the kinds of information missed by pre-harvest surveys (e.g., Fish and Gresham 1990; Krakker et al. 1983). As site file data increasingly become public information in the years to come, I expect it will lead not only to better research and more effective fieldwork but to a far greater understanding of the past occupation of our region.

SITE FILE MANAGEMENT IN CYBERSPACE

Given the vast numbers of sites recorded in the Southeast in recent years and the importance of this data for resource management/research, efficiently compiling and accessing site file data has proven to be one of the most critical challenges facing the regional archaeological community. Increasingly, computerization, or

the electronic storage and retrieval of information in digital format, has been seen as the solution to problems of information overload. In every state in the Southeast, and in Puerto Rico and the U.S. Virgin Islands (administratively part of the National Park Service's Southeast Field Area), site file data has been or is being placed on-line. Much of the rest of this article examines how this process is likely to proceed.

As many of the articles in this volume testify, computerization has resulted in appreciable benefits to both research and resource management. The most important benefits have resulted from increased ease of access to the data, vastly faster search times, and an ability to provide the data in a range of output formats. Data that formerly required shelves or rooms to store can now be maintained on a desktop and quickly accessed, analyzed and explored, and downloaded onto maps or as text, tables, or summary statistics. Perhaps the most miraculous aspect of computerization is the speed with which queries can be addressed. This is forcefully documented in the articles by Futato and Hoyal and Smith describing records searches in Tennessee and Alabama. Simple questions, such as the number of Middle Archaic sites represented in the files, can be answered in minutes in states where such data is on-line. In Alabama, as Futato points out, the site file manger is able to answer these kinds of questions while on the phone with the person making the query! Collecting this same kind of data by hand took weeks of full-time effort during a recent historic context project undertaken in South Carolina (where file data are not on-line). The resulting synthesis marked the only use, to date, of the entire site file records for research or management purposes (Sassaman and Anderson 1994).

Several of the articles illustrate that along with increased access to site file data comes increased use—to the betterment of both research and resource management. Planners in federal, state, county, and local governments now routinely use site file data in states where the data are on-line and easy to query (i.e., Arkansas, Florida, Kentucky, Tennessee). These same people, the site file mangers testify, typically avoided using site file data when it was cumbersome and time-consuming to access the files (at least until they were literally forced to do so as part of the environmental protection process). In these states, site file data are now used in advance of construction or legislative mandates to help plan actions and alternatives. As Tippett noted in his article, this is precisely the way archaeological data must be used if the profession is to have any hope of maintaining its public constituency. Computerization, by easing access, has meant that information mangers and regulators alike can effectively use site file data and devote their attention to their jobs instead of to shuffling through masses of paper. The other side of the coin, however, has been that as site file systems become more efficient, their use tends to go up, increasing staff workload.

The Kind of System to Use

One of the first questions asked in electronic data management is how the data should be maintained, that is, what hardware/software should be in place. The consensus of the workshop participants was that, regardless of the kind of equipment used in the past (i.e., mainframes, minicomputers), site file data should reside in or, minimally, be accessible from desktop computers, or PCs. The system's software should have mapping capabilities—ideally through linkage with a GIS. It should also require a fairly short learning curve to maximize user access. Finally, the system should be secure, but also accessible by remote users (i.e., it should be on-line but password protected).

The ability to access site file data on PCs, where it could receive the widest possible use, was apparent to everyone at the workshop. Data can, after all, always be exported to more complex or sophisticated systems. In those cases where site file information is maintained on high-end platforms (e.g., Arkansas), the primary data can be downloaded as text files into PCs. The primary site file data from most southeastern states typically occupies no more than 10 to 20 megabytes, if that, and can be placed on a few diskettes. For example, last year, to

carry out my own research, several site file managers from across the region sent me their complete databases—information that currently resides quite comfortably in my Mac (although it must be emphasized that, given the rate at which new sites are being recorded, such information rapidly becomes obsolete).

Site file data should minimally encompass locational, assemblage, and management characteristics (i.e., UTM coordinates, presence or absence of components, condition, NRHP status, collection/records location and content, and bibliographic references, to list the more obvious kinds of data that should be entered). In every state component/assemblage data is included in summary format, and in several states complete artifact lists are either attached to site forms or maintained in linked files. Ideally, site file data should be linked with collections, primary records, and bibliographic data files. Some states use National Archeological Database (NADB) report citation numbers on their site forms, facilitating the linkage of these data (see Childs, this volume, for a discussion of NADB). Of particular importance, the data need to be maintained in a relational database so as to facilitate queries and analyses.

Most approaches to computerization in the region have been pragmatic—working with what was available to get something on-line, rather than waiting for ideal systems or technologies to emerge. As a result, most states have a decade or more of experience with computerized information management. Although almost every state system uses different software (dBase is the only program used in more than one state), the kind of basic site data being recorded is quite similar across the region. Future research/resource management efforts employing large regional datasets are thus likely to proceed smoothly, especially as the groundwork for standardization is being laid through workshops and publications.

GIS Development

As Futato noted during the workshop, "the natural focus of a site file is geographical," highlighting the importance and relevance linking GIS and site file data. GIS applications permit the manipulation and graphic display of information that can be of critical importance to research/resource management projects (see also Allen et al. 1990; Briuer 1992; Kvamme 1989). The downside of this technology is that it can be extremely expensive and labor intensive to develop, and, in some cases, it employs software that has a steep learning curve, requiring appreciable effort to master. Fortunately there are ways to overcome these obstacles. A wide array of data layers have been developed in many parts of the country, and many are already integrated into state or local systems (see Scurry and Carlson, this volume). Most military bases and national forests are also developing or already have in place GIS data layers, including for cultural resources. The lessons learned during these projects may prove invaluable on a larger scale, such as in the development of statewide systems (e.g., Warnecke 1990; Wood 1990).

As an alternative to massive GIS system development, inexpensive GIS software that can run on PCs is now available and capable of addressing many current research/resource management needs. Such systems, as Williams demonstrates in his article (this volume) on the Georgia approach, can offer a good, mid-range solution until more sophisticated systems and data layers come on-line. Ideally, as new systems are adopted, the digitized and coded data will be readily transferable. Wherever and however GIS development occurs, if it includes cultural resources data, it must be closely coordinated with site file managers and with the local professional archaeological community.

Some state systems and research organizations have already developed appreciable expertise in the linkage of cultural resources data into GIS systems. They may prove to be valuable sources of advice and expertise. Organizations in the Southeast with extensive experience in the integration of cultural resources data into GIS include the Center for Advanced Spatial Technologies (CAST) and the Arkansas Archeological Survey (AAS) at the

University of Arkansas, the Corps of Engineers Construction Engineering Research Laboratories in Champaign, Illinois, and the Corps of Engineers Waterways Experiment Station in Vicksburg, Mississippi. Several southeastern states, including Arkansas, Florida, Mississippi, North Carolina, and South Carolina, have high-end GIS systems under development that incorporate cultural resources data. In North Carolina and South Carolina, a state agency other than the one managing the site files is providing funding for the development of the cultural resources data layer (see Rowland and Hall; Scurry and Carlson, this volume). In two other states, Arkansas and Florida, cultural resources data layers are being prepared using federal funding, specifically ISTEA (Intermodal Surface Transportation Efficiency Act) grants administered by each state's department of transportation (see Donat; M. Smith, this volume).

Of course, when using GIS data layers (for example, for soil, slope elevation, or water courses), it behooves the archaeological user to learn the scale or resolution of the data and to control for possible sources of error when interpreting output. That is, the analyst must have some knowledge of how the data layers are put together. A final problem, discussed in several of the articles in this volume, as well as at some length herein, centered on access to site file and locational data incorporated into on-line systems, particularly those developed by agencies other than those managing the archaeological files. Concerns about how access to site file data would be controlled has hampered the integration of cultural resources data into GIS and other on-line systems in several southeastern states. Most of these concerns have been solved by making access contingent on having formal written permission from the site file manager and/or user-specific passwords.

STRATEGIES FOR IMPROVING SITE FILE MANAGEMENT

How we can improve site file data across the Southeast was a subject that received appreciable, wide-ranging discussion during the March 1995 workshop. One thing everyone agreed needed emphasis was the amount of trouble incomplete or careless recording efforts created, for site file managers and site file users alike. Inconsistencies or errors in locational data, assemblage content, or component identification are typically extremely difficult to resolve and, if undetected, can lead to serious problems when later investigators try to relocate the site or work with data collected from it. Location was considered the single most critical variable to determine precisely, and the workshop participants unanimously agreed that if a site could not be accurately located, it would not be assigned a state number.

Documenting Survey Areas and Intensity

Knowing where past investigation has occurred is as critical to effective research/resource management as knowing where and what kind of sites were actually found. An important part of Section 106 review is determining whether survey work had occurred in a given area and if any sites were found. Unless we know whether an area has been examined in the past, it is impossible to know whether sites might be present if none are recorded. Project locational information is systematically recorded in most southeastern states, although in only two states, Arkansas and North Carolina, is this information maintained as a GIS data layer (see Donat; Rowland and Hall, this volume). In most other states, survey areas are hand plotted on USGS quadrangle sheets. In North Carolina, a record of areas that undergo State Historic Preservation Office (SHPO) review is also maintained, whether a survey occurred there or not.

Reporting coverage ***intensity***—whether or not shovel testing occurred, at what intervals tests were placed, whether they were screened or not, what kinds of surface collection procedures were used, and so on—is as critical as documenting coverage ***area***, since this is the only way we have at present to evaluate the effectiveness and hence reliability of the survey. Usually older research is characterized by less

intensive coverage and lower reliability. As Futato noted during the workshop, in the old days researchers for the most part spent their time looking for "good" sites and were unlikely to record isolated finds or small scatters. It is only with the onset of CRM archaeology that systematic coverage and the recording of a wide range of sites has occurred, giving us a more accurate picture of past settlement and land-use practices. To effectively evaluate coverage, archaeologists must provide data in their reports and on their site forms about the number, size, and depth of shovel tests or test pits opened, the kind of surface collection strategies employed, the time spent in collecting data, and so on. Coverage intensity categories must be developed and incorporated into maps showing survey areas.

Ground cover and depositional conditions (i.e., erosion, alluviation, disturbance factors, vegetation), must also be controlled if researchers or resource managers are to effectively interpret site file data. Sites, quite simply, are more readily detected in plowed fields than in woods or pasture, and more readily encountered if they are on or near the surface rather than deeply buried. It is thus crucial to record information about survey conditions and ground cover on site forms and in reports. Finally, in interpreting site file data, consideration must be paid to how thoroughly individual sites have been examined. Avocationals are likely to be of appreciable value in documenting site assemblages because they may have the opportunity to make repeated visits and accumulate substantial collections from sites that professional archaeologists may only see once or a few times.

Documenting Components and Period Assignments

The classification and recording of cultural components on site forms needs appreciable refinement and standardization in the Southeast. In some states, people submitting site forms are required to justify period or component assignments through reference to or illustration of specific artifact types or other data (radiocarbon dates, stratigraphy, etc.), but this practice is comparatively recent and by no means universal. Criteria by which components are to be assigned to a particular period or phase need to be made explicit, and references to or illustrations of diagnostics should be included with the form to justify these assignments. Several states request (but none require) that photocopies of diagnostic artifacts be attached to site forms to facilitate accurate component identification.

How period assignments are made also needs greater thought and refinement. Aceramic sites (i.e., where no pottery occurs) are not necessarily preceramic (i.e., Paleoindian or Archaic in age, before pottery appeared), but this is how they are sometimes classified. Adopting explicit, formal criteria for component and period assignments will help to ensure data comparability from state to state, and will help overcome the "state-line effect" of type names changing as state lines are crossed. That is, even if Daltons are assigned to the Early Archaic period in one state and the Late Paleoindian period in another, knowing this is the case will facilitate standardization. Having pictures of the Dalton artifacts from a site attached to the appropriate form, furthermore, will allow subsequent investigators to determine if these classifications are accurate, or, at least, how they fit in with their own classification systems. As Futato emphasizes in his article, having open-ended yet hierarchical component and period classifications permits the addition of new categories (i.e., diagnostics, periods, or phases), while simultaneously permitting data to be recombined as necessary to accommodate changes brought about by new research. Having this flexibility greatly augments the value of site file data and facilitates queries of all kind.

Site forms are often filled out early in the research process, and care must also be taken to ensure that the data in the final report is in agreement with that found on the form, which may well have included preliminary results or even been incomplete when originally submitted. The site form may require updating or revision once the final report is completed. In North Carolina, SHPO report review is done in

conjunction with an inspection of the site forms and the artifact inventory, and all of these data must be in acceptable condition and mutually consistent before agency concurrence is given. In every state, the site file mangers either edit and correct incomplete forms as best they can when they get them in, or else send them back as inadequate.

There is also a need to incorporate data generated by general research projects into state site files. The examination of old collections occurs continually in archaeology, resulting in refinement of our understanding of site occupational histories. Typically, however, little of this information is relayed to site file managers to update the primary records. In some states, primary data for many early sites is still only found at the institutions that discovered and examined them; this information also needs to be used to update site records. In this volume, Hoyal and Smith illustrate how even work with very old collections can add appreciably to our knowledge of an area. Finally, we must have better data in our files on the kinds of assemblages present on a site, so that we may be able to assess whether identified components reflect isolated artifacts or dense middens. Use of primary descriptive data (i.e., measures of site size, artifact density, descriptions of associated features) rather than qualitative or intuitive classifications should be used wherever possible. Intuitive constructs like "campsite" or "village" should be avoided unless these can be justified through reference to excavation or analysis results.

Error Checking Routines

A number of procedures for cleaning site file data were discussed during the workshop; most were directed to computerized site file data. In Louisiana, as Rivet's article indicates, people are required to submit a completed coding form along with the site form to facilitate data conversion and entry. Some states allow investigators to submit site data in electronic as well as paper format. Everyone agreed that it is far easier to proof and correct electronic as opposed to paper records. This point effectively counters arguments that it is essential to clean up paper records before computerizing site file data—the reason SCIAA gave for their reluctance to move in this direction until quite recently, as noted by Derting and Leader, this volume. (I emphatically disagree with this position; in fact, if it weren't for the leadership of another state agency—the Department of Natural Resources—the South Carolina site files would still reside solely on paper.) No state site files will ever be perfect, but the general consensus was that electronic files are far easier to clean and manage than those on paper. As Kevin Smith said during the workshop, Tennessee's decision to "computerize first and ask questions later" proved invaluable to correcting both sets of records.

Error checking routines or smart files are built into many state systems. Quite simply, entry of bad data, such as a UTM coordinate that has too many digits, is not permitted, and the machine generates a signal telling the operator that a mistake has been made. Some systems have menus enabling the operator to select from a list of choices (for county names, physiographic region, period or component assignment, etc.), reducing the possibility of spelling mistakes. Data standardization, such as the consistent recording of quadrangle names or period or component identifications, has proven to be a major chore, although the use of smart files and menus is helping overcome this problem. Where appropriate, menu lists should be left open-ended to facilitate new entries.

Having fields specifying when editing or updating occurred is critical in order to both avoid overwriting records and track quality-assurance procedures. Having codes identifying the institution doing the work and the person responsible for completing and submitting the form is also important, both in the event questions arise and also to evaluate the work itself. Care in specifying the appropriate scale was seen as the best way to avoid confusing English and metric units—a common problem. (For example, site elevations are commonly recorded in feet, while site dimensions are

commonly recorded in meters; these are often confused.) Finally, in Mississippi, as Baca and Giliberti noted at the workshop, when professional archaeologists entered the site data into the computer files, there were far fewer errors and more complete information than when untrained students, interns, or temporary workers carried out this task. Marion Smith's discussion of the high costs associated with temporary employee turnover reinforces this point. In the long run, it appears that it is more cost effective to have a permanent, well-trained staff member enter site file data (among other duties) than to rely on part-time assistance.

Cleaning UTM Data

Some discussion during the workshop centered on UTM coordinate accuracy. Most of the site file managers reported finding error rates of 2 or 3 percent to 20 percent or more in submitted UTM coordinates. Clearly, better training in map use is needed, something that is also indicated by inconsistencies in locational data (i.e., where sites are plotted and their size) between site forms and final reports. One clever procedure used to check UTM coordinate accuracy in Georgia involves plotting sites statewide and then by county. By examining the site dots that fall outside of the appropriate boundaries, obviously erroneous coordinates can be detected. Digitizing site locations from USGS and other map formats directly into GIS data layers is, of course, the best way to eliminate this problem. However, care must be taken to ensure that the maps are properly registered when entering the data. Once their accuracy has been verified, the UTM coordinates generated during the digitization process can replace those previously determined by hand. Ensuring that site size, shape, and location is plotted accurately on quadrangle or other base maps is, of course, crucial because these serve as a basis for digitization (see Scurry and Carlson, this volume).

Given the importance of accurate locational data, the collection of satellite-generated Global Positioning System (GPS) data should be routinely used in all archaeological fieldwork; hand-held GPS units are now available for a few hundred dollars and are easy to use. Minimally, the use of GPS should be required for cultural resources investigations undertaken as part of the environmental protection process. At least one GPS measurement should be taken from the center of the site and, where the site is large enough, from a number of points on its perimeter as well. As Rowland said at the workshop, "if you can get them back to the center of the site, they can't really miss it." Wherever possible, corrected GPS data should be used to compensate for the Defense Department's built-in error (which renders the data accurate to within no more than about 100 meters). It is currently possible to get correction factors for most military installations, and more precise GPS data may well be available to the public at some point in the near future.

Updating Site Records

When old, already recorded sites are revisited, or collections from them are examined, it is important that this data is used to update the site form. Some states in the Southeast require the completion of a new or special update form when old sites are revisited. The South Carolina Institute of Archaeology and Anthropology (SCIAA), in fact, refuses to accept collections into their curation facility until site forms are updated. Mechanisms also need to be developed for the regular submission of data to state site files from older research projects, as well as from more recent CRM studies. As Futato noted during the workshop, some pretty famous southeastern mound groups are less well documented in the files than many recent lithic scatters!

Site forms are often filled out early in the research/resource management process, necessitating some revision when final reports are completed. NRHP status, for example, is often not known for sure at the time the site forms are submitted; it must often be added when the final report is completed. Many states have solved this problem by refusing to review reports until site forms are completed, and, in at least one case—North Carolina—the forms are

reviewed as part of the report review process. Project tracking systems have been implemented in several states to follow the submission of site form, report, and collection data, largely to ensure that everything is submitted. Arkansas has an excellent tracking system in place (see Donat, this volume).

As site file managers adopt and enforce new reporting standards, of course, many problems that once loomed large have diminished. Few reports today make use of temporary numbers, for example—a problem that plagued early CRM archaeology in the Southeast. (Many sites described in CRM reports dating to the 1970s do not have permanent site numbers assigned to them, largely because the forms were never filled out.) Site file managers should not be afraid to take a hard line when setting standards, even if this means bouncing back inadequate records until they are completed correctly.

Generating Money and Support

State management of cultural resources data is essential to the effective operation of the National Historic Preservation Act of 1966 (NHPA) and a wide array of other state and federal environmental laws and regulations. Monies are transferred annually from the federal government to each state to assist in the implementation of NHPA, and a portion of these funds are typically directed to information management concerns. In several southern states (Florida, Louisiana, Mississippi, North Carolina, and Tennessee) and in Puerto Rico, site files are managed directly by the SHPO. In the remaining states, they are maintained by other agencies or organizations, but always in close cooperation with the SHPO.

Funding levels for site file management vary appreciably from state to state in the Southeast. A few states, such as Arkansas and Florida, enjoy adequate or at least manageable funding levels. But, in most states, site file management is woefully underfunded. The Georgia site files, for example, have been maintained for years by the Department of Anthropology at the University of Georgia for a $5,000 annual stipend from the SHPO. (This figure has varied somewhat from year to year but has never been appreciably larger.) In Alabama, site file management is accomplished as a service to the state by personnel at the Office of Archaeological Research, Mound State Monument, the University of Alabama Museum of Natural History, with occasional project-specific funding provided by the SHPO. The situation is essentially the same in Kentucky, where the site files are maintained by the Office of the State Archaeologist in the Department of Anthropology at the University of Kentucky. In most cases, regardless of where the files are physically located, responsibility for maintaining them falls on one person, who must handle everything from quality control to data input, interfacing with the public and handling requests for information. In several states, funding for temporary employees is also available, although it is rarely equivalent to the amount needed for a full-time employee. In Puerto Rico the Commonwealth archaeologist maintains the files single-handedly as part of his overall duties.

Obtaining the necessary resources to accomplish their mandated management responsibilities is a critical concern facing every site file curator. The level of work that is actually accomplished, of course, depends on the amount of base funding and upon the dedication and training of the staff. Funding levels reflect priorities established by higher-level administrators, and site file managers who wish to improve their funding must, among other things, make sure their supervisors know the uses to which the data are put and their importance to the research and resource management process. One effective way to do this is to present, as part of specific requests for assistance, clear, unambiguous data about what the job entails and how workloads and responsibilities are increasing over time. As several articles in this volume demonstrate, most site file managers can provide year-by-year information on the number of site forms and requests for information they must process, and the number of visitors they must interact with. All of this data, properly

compiled and illustrated, can be used to make a case for additional funding. It can also be used to educate the user community, which may prove a useful ally in generating change.

Curiously, there is little direct relationship between the amount of money directed to archaeology by a state government and the quality of the site files. Some of the most poorly funded states have the most sophisticated information management systems, with up-to-date records (Alabama and Georgia), while in other states, where archaeology is comparatively well-funded by the state government (North Carolina and South Carolina, for example), site file computerization/data entry has only just begun or is woefully backlogged. Money directed to archaeology by state governments, therefore, does not translate into money directed to information management. Although the Georgia and Alabama cases are seemingly anomalous, in both cases the operation of these files has been subsidized by other organizations—the Department of Anthropology at the University of Georgia and the University of Alabama Museum's Office of Archaeological Research. Furthermore, in both Alabama and Georgia, the site file curators, Mark Williams and Eugene Futato, have devoted tremendous amounts of unpaid personal time to develop and maintain these systems.

Site file managers are an extremely dedicated group. While the Alabama and Georgia cases are exceptional, all of the region's site file curators work very long hours, providing appreciable voluntary labor. Most of the participants at the 1995 workshop, in fact, either privately or publicly expressed frustration and concern about the lack of support they received, and several felt their systems were barely one step ahead of total breakdown and chaos. That the region's site files are in such good shape, in fact, is strong testimony of the dedication of a number of remarkable individuals. Such altruism is not something that can be counted on, however, particularly as site numbers and requests for information continue to increase dramatically.

Some state site file systems have adopted alternative funding sources to supplement their operating budgets. ISTEA and SHPO Survey and Planning Grants, for example, have been used to undertake specific tasks, as documented in several articles in this volume. In Georgia, an access fee of $250 per project was recently implemented. The resulting outcry by users accustomed to receiving free access dramatized the lack of state funding and led to extensive lobbying for change. While most other states do not charge access fees, many charge fixed hourly and per page fees for staff search and copying time, if the users are unable to do this themselves. In South Carolina, SCIAA provides cultural resources summary data to private consulting firms at a flat rate of $50 per project plus $15 per hour if this effort requires more than one hour. Because demand for this kind of data is increasing as developers and planners recognize the value in advance planning, the SCIAA information manager must spend increasing amounts of time addressing requests for information. Access fees, while providing an important source of funds, are at present not sufficient to cover site file maintenance and are, at best, a stopgap measure. As the Georgia example indicates, perhaps the most effective method of ensuring adequate resources is to have the user community itself forcefully argue for change.

What Do We Record?

Much of the workshop discussion centered on historic site recording practices, the minimum data needed to assign a site number, and whether cemeteries should be recorded (see *Excerpts from Workshop Discussions,* this volume). One thing is clear: what is accepted as a "site" changes over time, and professionals in each state and region need to meet regularly to discuss this and other information management concerns. In most southern states, data on archaeological sites and historic structures are maintained by different agencies and are not integrated together. In Florida, however, historic structures, archaeological sites, and other cultural properties are maintained in a single integrated computerized file system (see M. Smith, this volume). Historic structure entries,

interestingly, vastly exceed archaeological sites in the Florida files, primarily because the state provides a high level of funding to communities for survey and registration projects—something other states would do well to emulate. Florida uses the fifty-year age cutoff for both sites and structures, following NRHP criteria. This policy is emulated by most other states in the region, except in Mississippi where a site must be pre-1900 before it is given a formal site number. Mississippi's policy, however, has been strongly challenged by historic sites archaeologists and is likely to be changed to the NRHP fifty-year standard. Interestingly, the beginnings of historic sites archaeology in many southern states is clearly indicated by the dates when these types of sites began to be entered into site files in large numbers. Typically, this was in the late 1970s in many states, and somewhat earlier where a strong local research tradition in historic sites archaeology existed, for example, in South Carolina and Florida.

Some southern states make use of special "isolated find" recording categories for scatters with low numbers of artifacts (typically five or less in a small area, usually twenty or so meters in extent). In other states minimal site definition criteria are left up to the archaeologist, while in still others, the decision is left up to the site file manager. While no standardized policy exists, the consensus of the workshop participants was that isolated nonmodern artifacts found in undisturbed context should be collected, and their location and description presented in final reports. Similar ambiguity surrounds the recording of cemeteries. Some states assign archaeological site numbers to old or unmarked cemeteries, while others do not. Again, whether or not site numbers are assigned, everyone agreed that cemeteries found during surveys should be documented in project reports.

Backing Up Site File Records

A major problem recognized at the 1995 workshop was that few states in the Southeast have backup copies of their site files in secure locations (see Trinkley, this volume, for an in-depth discussion of this problem). A single fire or other natural disaster, accordingly, could overnight wipe out an entire state's site files—information compiled at great effort over decades. This situation simply must change, although fortunately a number of alternatives are available. In North Carolina, for example, site forms, field notes, inventories, and even copies of final reports are microfilmed, and copies are maintained both at the site files and in a fireproof vault at the state archives (see Rowland and Hall, this volume). In Arkansas the site file data are maintained in two locations. A complete set of files is kept at the central office of the Arkansas Archeological Survey in Fayetteville, and the appropriate subsets are on file at a series of regional research stations scattered around the state.

Most states have considered various information storage procedures to back up or replace their paper records, such as optical disk, CD-Rom, or microfiche. In some states, the quantity of paper records is immense. There is a very real desire and, in some cases, need to reduce the volume. Marion Smith, for example, referred to Florida's increase in data as the "Tallahassee treadmill" because two new shelving units have to be acquired each year to handle new paper records! Although Florida currently represents the extreme case, because their files include both structures and archaeological sites, every state has accumulated a considerable volume of site forms as well as associated records and reports. In North Carolina, where the Archaeology Branch is situated in a historic house, there was a very real concern that the floor joists might break under the weight of all the paper!

Microfilming or, alternatively, electronic document management (EDM) are increasingly seen as viable solutions to the problem of records management, although to date no state has adopted the latter approach. The comparatively low cost, long-term stability, and ease of use of microfilmed data makes this an attractive option, and there is little likelihood that the technology will become obsolete. The ability to rapidly search, find, and manipulate text on

personal computers, however, is also seen as increasingly valuable and important. Perhaps the greatest concerns with EDM are obsolescence and longevity, that is, whether or not existing systems and files will be supported or even readable in a decade or two. Effective EDM, accordingly, requires the transferring of data to new mediums as they are developed. Fortunately, data recorded in digital format can be easily moved about, meaning this is unlikely to be a major problem. However, as Trinkley points out in his article (this volume), given the low funding directed to information management at present, it may be wishful thinking to assume that updating efforts will be properly supported.

Though microfilming is an ideal choice for the long-term ***storage*** of information (i.e., providing data that will be useful centuries from now, whether an advanced technological civilization survives or not), EDM is the ideal choice for those interested in ***working*** with large quantities of information. To evaluate what system is appropriate, site file managers need to assess what they use their data for, and whether and how they need to manipulate it. As evidenced from the articles in this volume, site file data is currently used almost exclusively for research/resource management purposes. Quick access, synthetic treatment of data, and output in a variety of formats are what today's users need, making EDM the clear choice. The fact that most of the states in the Southeast are already well along in computerization efforts indicates that this is recognized and that EDM will be the wave of the future (although information is also likely to be stored in more traditional formats for a long time to come).

Personnel Considerations

Information managers are the unsung heroes of our field. They are compiling and safeguarding much of what we will ever know about the archaeological resources in our region, and just about the only data that will be available in the future to test our current ideas and theories. Unfortunately, information managers are often treated as second-class citizens in many of the institutions where they work. Their salaries are typically well below those of more traditional researchers or administrators, and they are rarely provided opportunities for travel and training. This is paradoxical and shortsighted, given their data quality assurance/quality control responsibilities. Also, it is undeniable that the information manager has, by the nature of modern environmental management, extensive contact with the public, particularly the segment that shapes large-scale land use and development. In a real sense, site file managers are the public face of archaeology and archaeological research institutions. Modern site file management requires well-educated, meticulous, and computer literate personnel, who should receive salaries commensurate with their responsibilities. Quite simply, site file management personnel should be far better paid then they typically are at present; they need to be encouraged to take advantage of training opportunities; and their attendance at professional meetings must be supported.

Although the workloads in site file offices are seemingly overwhelming in many states, a number of labor-saving solutions were advanced during the workshop. In many states records searches in support of resource management actions must be done largely or entirely by contractors themselves, since they have a vested financial interest in collecting and using the data. The site file manager's responsibility in these cases lies largely in showing users how to access the data and then seeing that it is replaced properly. This strategy is most viable where records are on-line, or where back-up copies exist (since paper records can get lost or damaged with use). Another time-saving strategy involves developing efficient routines for dealing with information requests, particularly land-use planners and developers. County-level (or larger) summary reports containing a wide range of data are quickly produced in Kentucky using a statistical analysis package linked with the file data. The speed with which data queries in general can be accomplished with on-line systems has been demonstrated in the articles describing site file management in Alabama,

Arkansas, and Tennessee.

As the Florida case illustrates (see M. Smith, this volume), given the rapid turnover and resulting high training costs associated with the use of temporary personnel, every effort should be made to make site file personnel permanent employees. Finally, another way to reduce workloads is to abandon obsolete or inefficient procedures, such as performing data searches by hand. Ironically, the site file manager in South Carolina—the one state in the region where the site files are not maintained on computers—spends an increasing percentage of his time conducting manual records searches that most other site file managers accomplish quickly and at little or no cost because their data are on-line. The single and most effective strategy for reducing staff workload, accordingly, is apparently to adopt efficient, user-friendly methods of accessing and manipulating site file data, and then making this data readily accessible to those interested in using it.

Miscellaneous Data Management Concerns

A number of minor considerations were briefly touched on in the articles and general discussions at the workshop that warrant mention. Sketch maps are not uniformly required, although some site file managers believe they offer a good ancillary source of locational information and provide detail on the immediate site area that is not readily available from quadrangle sheets. Silly site names are occasionally seen as a problem, and offensive names are never entered into permanent records. Site names are an important datum to record, however, since many classic sites are best (or only) known by their name. Although the lengths of state site forms vary greatly over the region, from two pages in Georgia and Mississippi to eleven in North Carolina, many basic data categories are shared in common. Site form length does not appear to deter their completion by users. However, as Horak noted during the workshop discussion, the appearance of a form can greatly influence how readily or completely it is filled out.

Some concern was raised about the durability of existing paper records (see Trinkley, this volume). Questions were raised about whether records should be maintained on acid-free paper, and about the life span of photocopy and laser print ink. Electronic facsimiles of every state site form in the region now exist, thanks to the efforts of CRM firms, but there was some question as to whether this information/software should be considered proprietary or made available to all interested parties. Whenever possible, site file data should be submitted in electronic as well as paper format to reduce data entry time at the state level. There was general agreement that agency and site file personnel need to work together and respect one another's concerns. Given that limited copies of most CRM reports are produced, and that these documents provide important primary information, reports as well as site forms should also probably be routinely backed up. Finally, there was some concern about the intentional destruction of original records once the data are moved to other media, reflecting a general suspicion about the permanence of nonpaper media. (Ironically, electronic records may ultimately last a great deal longer, as anyone who has examined crumbling paper records in humid southern courthouses can testify.)

DILEMMAS FACING SITE FILE MANAGERS

Public Access to Data and Site Destruction

A topic heard over and over during the two days of the workshop centered on who should have access to site file data (see in particular the article by Tippett). In some states, site file data is considered sensitive information and is explicitly excluded from freedom of information requests. In other states, the data are considered public information and must be made available to anyone who asks for it. While most state site file managers routinely make data available to a wide range of users, a few refuse to. Only rarely and in special circumstances do they open

their files to nonarchaeologists, primarily because of a fear that easy access to locational data will lead to pothunting. As Tippett has argued, however, we as a profession actually have little hard data on the impact open site file data has on pothunting. Since the Florida site files are considered public information (see M. Smith, this volume), a test of this question is effectively ongoing in at least one part of the Southeast. Several curators felt that getting information out and having local individuals and communities help protect sites was better than attempting to rely on secrecy. Kevin Smith added that while many looters already know where the good sites are, most developers do not. The latter are likely to cause far more destruction (albeit unintentionally) if they are forced to operate in ignorance. There was a general consensus that, whether the files were open or not, private landowners have a right to information about their own land.

Access to on-line data is currently managed by the use of passwords. These codes are provided to organizations and individuals with a clear need for the information, who have requested access in writing. Information-sharing procedures and restrictions are sometimes codified in formal agreement documents. Some concern was expressed about the possibility of hackers making data available, or even approved users giving data away inappropriately. While this was admitted to be a possibility, the harm done by maintaining secrecy and inaccessibility was considered far worse. Among the lighter comments in the debate was Clay's statement that "90 percent of the sites we are reporting in our site files no self-respecting pothunter would want information about." In an example that may illustrate what the future will be like, the geographic data clearinghouse being established in North Carolina will list the Archaeology Branch on their World Wide Web (WWW) home page, with instructions on how to obtain permission to access the data. Similar WWW postings already exist for both AAS and CAST in Arkansas, at SCIAA in South Carolina, and are being developed or are under consideration in several other states.

While I fully agree with Tippett's argument (this volume) that there will be plenty of sites left for future generations of archaeologists, I cannot accept his statement that sites are a renewable resource and, hence, we needn't worry overmuch about possible increases in looting stemming from public access to site file data. Although new sites will admittedly continue to form, old ones are disappearing at an alarming rate, and every one lost is a page torn from the book of our species' history. The destruction that has and is continuing to occur is staggering, and there are many questions we will never be able to answer because of these losses. For this reason, I believe care must be exercised in how site file data is made available. The subject of site file access, which at times generated heated discussion during the workshop, will undoubtedly continue to be a source of concern and debate as more and more data comes on-line. If current technological trends continue, I suspect that the public will ultimately have unlimited access to our data. Although much good will likely come of a policy of openness, I am convinced that it will also lead to increased looting unless society's attitude about the importance of cultural resources changes profoundly.

Why Aren't Site Files Used More?

Paradoxically, while site files have a high research potential, few archaeologists employed in academic positions use or substantially contribute to them in most southeastern states. Why site files are little used by researchers is uncertain, although the consensus of the workshop participants was that most researchers have little idea of the potential of site file data, and that its access and use is widely perceived as too cumbersome and difficult. Both attitudes appear to be rapidly changing, however, as data becomes more accessible in electronic format and as more people achieve computer literacy.

Avocational Site Recording

Perhaps even more surprising than the minimal use of site file data by researchers is the fact

that few avocationals fill out site forms in the Southeast, even though these people are sitting on a wealth of information. Exceptions to this pattern do occur. For example, avocationals report large numbers of sites in Arkansas and Louisiana. In general, for such recording to take place on other than an occasional basis, however, it must be strongly encouraged and supported by the local professional community. Everyone agreed that avocationals who wanted to record sites and learned to do so properly were to be cherished and nurtured. Many site file managers found that avocationals typically provided far more detail on their site forms than professionals, particularly about diagnostics.

Although some site forms appear to be too long and technically oriented for most members of the lay public, some states have compensated for this by developing a short form for avocationals. Clay noted that he commonly assigned site numbers on the spot to avocationals providing sound site data, and then taught them the importance of labeling their artifacts with this number. More effort also needs to be devoted to encouraging avocationals to record sites and document collections and, ideally, making provisions to eventually donate them to state institutions or other responsible curatorial facilities.

TWENTY YEARS FROM NOW

The next twenty years are likely to see truly revolutionary changes in the way site file information is handled in the Southeast. As Childs argues in her article, paper records are rapidly becoming a thing of the past, to the point where modern records management increasingly includes electronic formats. Our very philosophy of data management is changing from a static to dynamic approach as more people realize that electronic/digital formats permit users to interact with data, to quickly access, manipulate, and transfer information. Given greater access to data, we will all be able to do our work better and faster, which should permit us to protect and manage the resource to a far better extent then we do at the present.

Hard-copy paper records will still be with us, I have no doubt, but they will be increasingly relegated to storage areas as emergency backups. Most of us will be working with digital images, and the experimental multimedia records we are now seeing in states like Alabama (see Futato, this volume) will be in widespread use. That is, when we access a site number in twenty years, what we will see, besides the data now on site forms, will be images of artifacts, the discoverer's notes, photographs, slide images, maps, and even film clips of the fieldwork and laboratory analysis. Simple commands will link the user to images of the artifact catalogs and final reports, and more complex queries will enable the user to find other sites with similar characteristics. Archaeology will become more public as our primary data becomes more accessible and, frankly, more interesting to examine. As Clay said during the workshop, "Give people data in machine readable format and they will beat a path to your door!"

CONCLUSION

Given the impact that the March 1995 workshop had, as reflected in the articles in this volume, one thing is evident: site file managers need to meet periodically to exchange ideas and information. This can take the form of regular meetings between information managers in adjoining states, a regionwide meeting (bringing managers together from a physiographic or culturally bounded area), or national-scale meetings, perhaps in conjunction with conferences like the annual meeting of the Society for American Archaeology. The cost of such meetings are minimal compared to the payoff in improved data quality. The total cost to bring together some twenty people from across the Southeast (including the Caribbean, which is within the National Park Service's Southeast Field Office's administrative area) for the 1995 workshop was just under $4,000. I would encourage supervisors of site file personnel to support travel for such purposes, and to allow

their staff to attend regional and national professional meetings, where they should establish and participate in forums related to information management. Funding can come from institutional travel budgets, federal grants, like the one that resulted in the 1995 meeting, or the use of SHPO Survey and Planning Grants. Southeastern site files are proving to be of great value for both research and resource management purposes. That this is the case is something we can all take pride in, while remaining ever mindful of the need to make things better still.

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