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Survey Log Sheet

Survey # (FMSF only) 9287

Florida Master Site File
Version 2.0 9/97

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

Identification and Bibliographic Information

Survey Project: Crescent Lake Archaeological Survey (Phase I, reconnaissance)

Report Title: Crescent Lake Archaeological Survey 2002: Putnam and Flagler Counties, Florida

Report Author(s): Sassaman, Kenneth E.

Publication Date: 2003 **T**otal Number of Pages in Report: 153

Publication Information: Technical Report Number 5, Laboratory of Southeastern Archaeology, Department of Anthropology, University of Florida, Gainesville, FL 32611

Supervisor(s) of Fieldwork: Sassaman, Kenneth E.

Affiliation of Fieldworkers: University of Florida, Gainesville
Key Words/Phrases: wet sites; changing lake levels, long-term land use

Survey Sponsors: Florida Department of State (Survey and Planning Grant No. S3070)

Recorder of *Log Sheet*: Sassaman, Kenneth E. Date *Log Sheet* Completed: 10/3/03

Is this survey or project a continuation of a previous project? No

[FMSF only] _____

Mapping

Counties: Putnam and Flagler counties

USGS 1:24,000 Map(s): ~~Johns~~ Saint Johns ~~P~~Park, 1972; San Mateo, 1968; Crescent City, 1994

Description of Survey Area

Dates for Fieldwork: Start 7/22/02 End 8/23/02 **T**otal Area Surveyed (fill in one) ca. 20 hectares

Number of Distinct Tracts or Areas Surveyed: 29 loci

Survey Log Sheet of the Florida Master Site File

Research and Field Methods

Types of Survey (check all that apply): X archaeological architectural historical/archival X underwater other:

Preliminary Methods (✔Check as many as apply to the project as a whole. If needed write others at bottom).

Florida Archives (Gray Building)	library research- *local public*	local property or tax records	
Windshield Florida Photo Archives	library-special collection		
newspaper files	aerial photography	X FMSF site property search	Public Lands Survey
X literature search	X FMSF survey search	X local informant(s)	
Sanborn Insurance maps	other (describe)		

Archaeological Methods (Describe the proportion of properties at which method was used by **writing in** the corresponding letter. Blanks are interpreted as "None.")
F(-ew: 0-20%), **S**(-ome: 20-50%); **M**(-ost: 50-90%); or **A**(-ll, Nearly all: 90-100%). If needed write others at bottom.
❑ Check here if **NO** archaeological methods were used.

F surface collection, controlled	other screen shovel test	block excavation (at least 2x2 M)
F surface collection, uncontrolled	water screen (finest size: ____)	soil resistivity
F shovel test-1/4"screen	posthole tests	magnetometer
shovel test-1/8" screen	auger (size:____)	side scan sonar
shovel test 1/16"screen	A coring (see beow)	unknown
shovel test-unscreened	test excavation (at least 1x2 M)	

A other (describe): 3-inch diameter piston cores in lake bottom at 25 loci of known or suspected site

Historical/Architectural Methods (Describe the proportion of properties at which method was used by **writing in** the corresponding letter. Blanks are interpreted as "None.")
F(-ew: 0-20%), **S**(-ome: 20-50%); **M**(-ost: 50-90%); or **A**(-ll, Nearly all: 90-100%). If needed write others at bottom.
X Check here if **NO** historical/architectural methods were used.

___ building permits	___ demolition permits	___ neighbor interview	___ subdivision maps
___ commercial permits	___ exposed ground inspected	___ occupant interview	___ tax records
___ interior documentation	___ local property records	___ occupation permits	___ unknown

___ other (describe): _____

Scope/Intensity/Procedures _____

_____

_____

Survey Results (cultural resources recorded)

Site Significance Evaluated? No If *Yes*, circle NR-eligible/significant site numbers below.
Site Counts: Previously Recorded Sites: 11 Newly Recorded Sites: 14
Previously Recorded Site #'s with Site File Update Forms (List site #'s without "8." Attach supplementary pages if necessary): FL9, FL157, FI158, FL159, FL161, FL162, FL163, PU15, PU90, PU723, PU827, PU840

Newly Recorded Site #'s (Are you sure all are originals and not updates? Identify methods used to check for updates, ie, researched the FMSF records. List site #'s without "8." Attach supplementary pages if necessary.): FL237, PU1380, PU1381, PU1382, PU1383, PU1384, PU1385, PU1386, PU1387, PU1388, PU1389, PU1390, PU1391, PU1392

Site Form Used: X SmartForm FMSF Paper Form Approved Custom Form: Attach copies of written approval from FMSF Supervisor.

DO NOT USE SITE FILE USE ONLY DO NOT USE	
BAR Related	BHP Related

9287

BAR Related

Related

θ 872 θ 1A32

θ CARL θ UW

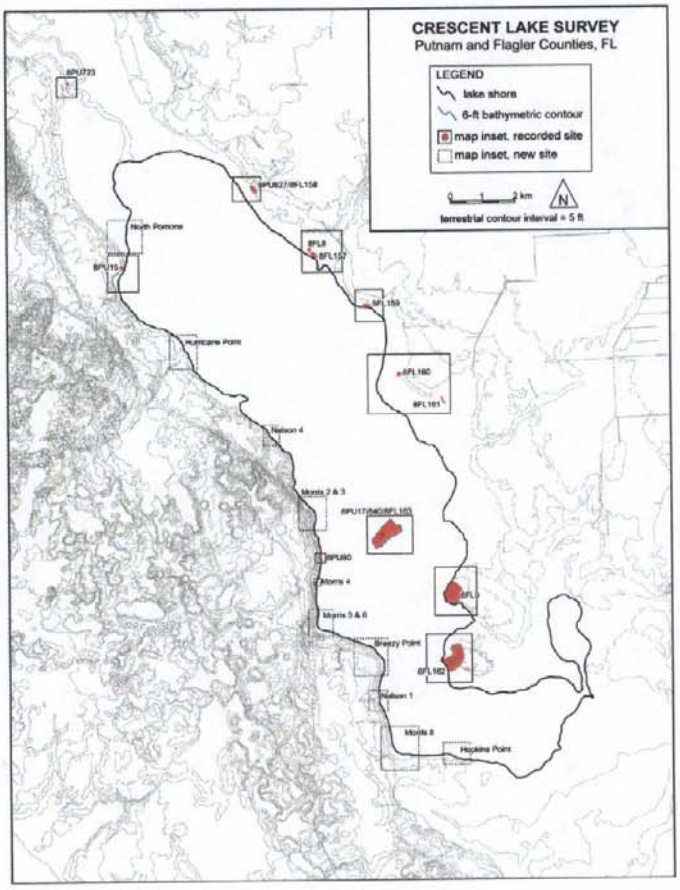
#_____

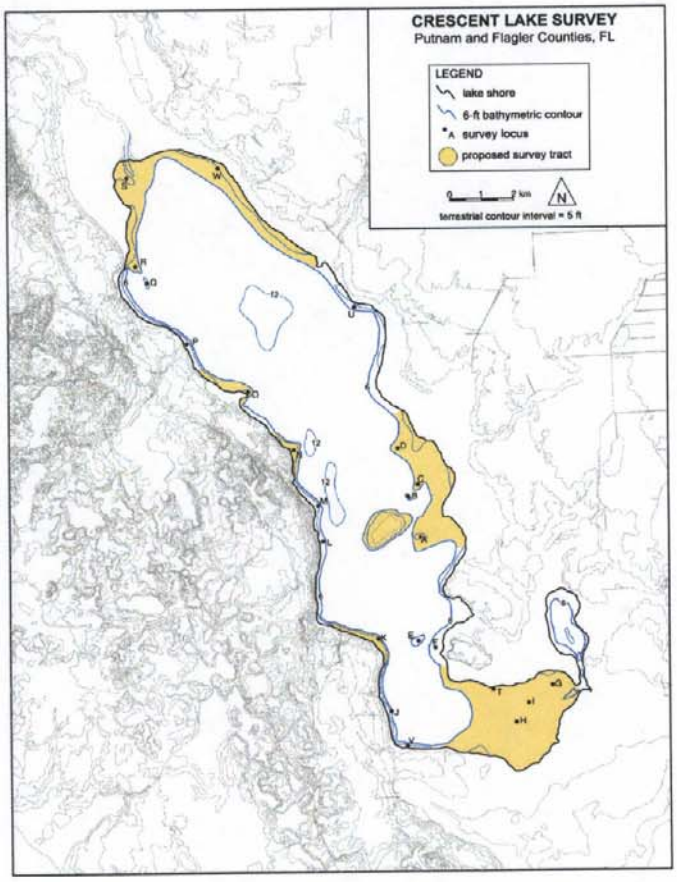
BHP

θ State Historic Preservation Grant

θ Compliance Review: CRAT

ATTACH PLOT OF SURVEY AREA ON PHOTOCOPIES OF USGS 1:24,000 MAP(S)





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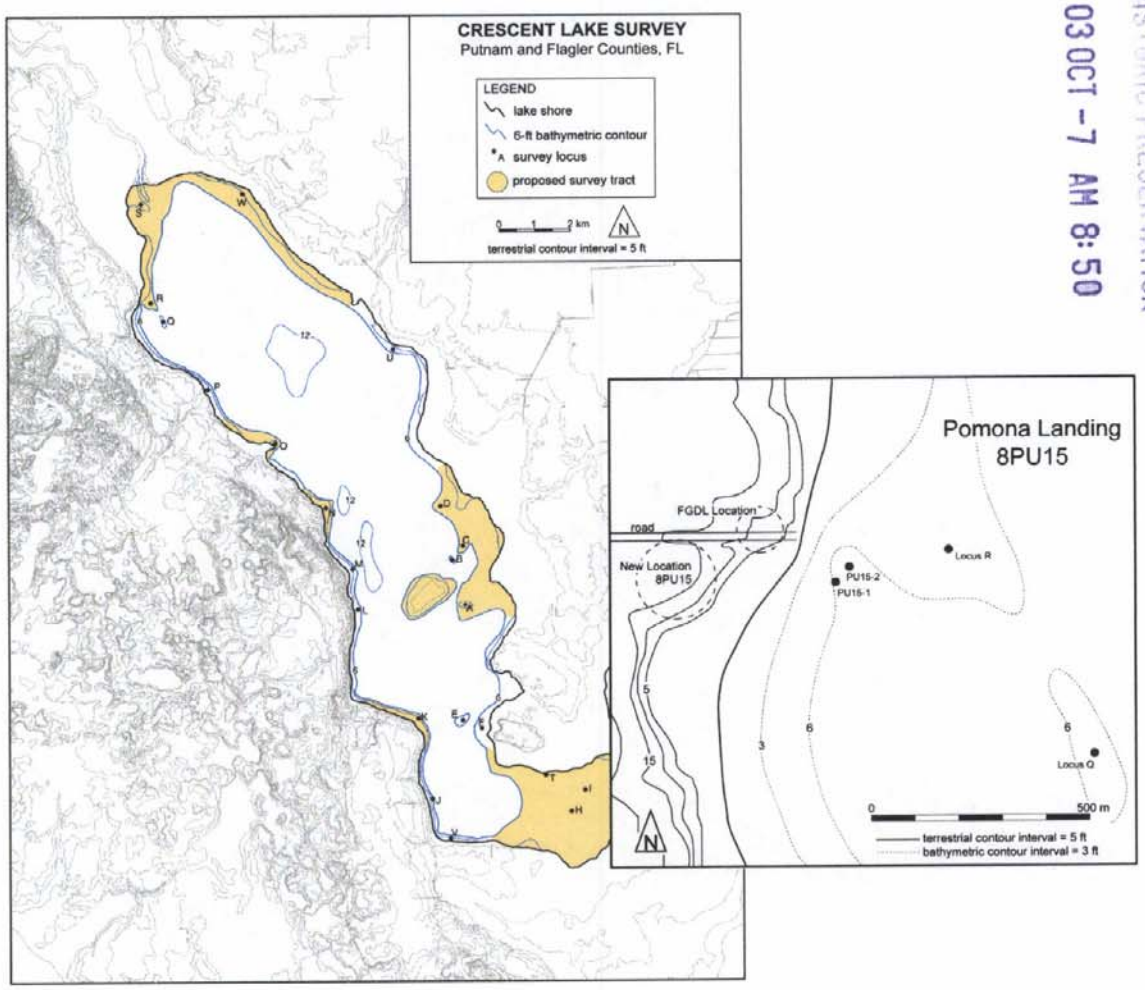
CRESCENT LAKE ARCHAEOLOGICAL SURVEY 2002
Putnam and Flagler Counties, Florida



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Technical Report 5
Laboratory of Southeastern Archaeology
Department of Anthropology
University of Florida

CRESCENT LAKE ARCHAEOLOGICAL SURVEY 2002: PUTNAM AND FLAGLER COUNTIES, FLORIDA

Kenneth E. Sassaman

with a contribution by
Jon C. Endonino

Technical Report 5
Laboratory of Southeastern Archaeology
Department of Anthropology
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Gainesville, FL 32611

September 2003

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Management Summary

The Crescent Lake Archaeological Survey was designed to locate submerged prehistoric sites in the near-shore margins of Crescent Lake, Putnam and Flagler counties, Florida. A sampling design based on bathymetry of the lake bottom proved largely unsuccessful at locating sites, but local informants shared information about several locations of artifacts, including two fully submerged shell middens. A total of 151 piston cores were extracted from the lake bottom at 25 locations of known or suspected archaeological sites. In addition to coring, surface survey and limited subsurface testing was conducted at 12 locations of known or suspected archaeological sites. The combined effort resulted in verification and further documentation of 11 of 14 previously recorded sites and preliminary testing and documentation of 14 new sites.

The record of submerged and near-shore terrestrial sites at Crescent Lake attests to an overall rise in water levels since the late Pleistocene, punctuated by a possible higher-than-present stand at ca. 4000 B.P., and generally lower, but fluctuating elevations over the late Holocene. The vulnerability of the lake shore to changing water levels along the north, east, and south margins of Crescent Lake is contrasted with landform stability along the flank of the Crescent City Ridge to the west. A transition to eutrophic conditions after ca. 3500 B.P. may have rendered Crescent Lake incapable of sustaining productive shellfish beds and hence precluded intensive human settlement predicated on their economic utility. Still, the lake area supported limited human settlement throughout prehistory and may likely have played a significant role in the regional dynamics of populations centered on the St. Johns River and on the Atlantic Coast. The collective potential of Crescent Lake's archaeological sites for advancing knowledge about culture-history and paleoenvironment in northeast Florida warrants a nomination as a National Register District.

Acknowledgments

The Crescent Lake Archaeological Survey was initiated by Dr. Barbara A. Purdy, whose combined experience with wet sites in Florida and personal interest in Crescent Lake created an opportunity to see what lies in the bottom of this huge body of water. Dr. Purdy not only initiated and encouraged this project, she financed much of it with matching funds for a Survey and Planning Grant from Florida Department of State. The field crew used Dr. Purdy's dock and boathouse as a base of operations for the field work, and she loaned to the project her piston coring equipment. For all the material and moral support given to this project, Dr. Purdy deserves our heartfelt thanks.

Field work for this project was conducted by University of Florida graduate students Patrick O'Day, Jon Endonino, Sean Connaughton, and Ashley Weser. Some of the laboratory work for this project and background research was done by Weser; the prehistoric archaeology background reported in Chapter 2 was adapted from material authored by Endonino.

Dr. Mark Brenner of the Department of Geological Sciences, University of Florida enabled access to the Multisensor Core Logger used to document sediments from Crescent Lake. Drs. John Jaeger and Jason Curtis, as well as Graduate Student Lisa Marie Mertz, were generous with their help using the core splitter and logger.

Assistance provided by staff of the Bureau of Historic Preservation is gratefully acknowledged. The project benefited from the expertise of the Florida Master Site File staff under the direction of Dr. Marion Smith, as well as the administrative efforts of Historic Preservation Planner Mary Rowley.

Karen Jones lent her usual talents to administration of the grant at the University of Florida, and the project enjoyed the programmatic support of Anthropology Department Chair Dr. Allan Burns.

This project was financed in part with historic preservation grant assistance provided by the Bureau of Historic Preservation, Division of Historical Resources, Florida Department of State, assisted by the Florida Historical Commission. However, the contents and opinions do not necessarily reflect the views or opinions of the Florida Department of State, nor does the mention of trade names or commercial products constitute endorsement or recommendation by the Florida Department of State.

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CHAPTER 1
INTRODUCTION AND RESEARCH ORIENTATION

Florida has a vast and diverse record of archaeological resources beneath its lakes, wetlands, and coastal waters, and an equally impressive history of scientific investigations of wet-site resources (Purdy 1991). Unfortunately, many such resources are discovered accidentally in the course of dredging (e.g., Bullen 1955), land development (e.g., Doren 2002), or during periods of drought, when freshwater bodies shrink and expose hitherto submerged land (e.g., Wheeler et al. 2003). Underwater surveys directed toward the discovery of submerged sites have been fruitful, and the registered underwater collectors of Florida have contributed to a growing body of information on submerged site locations, content, and condition. The need for long-term, directed survey of underwater sites is especially acute in north-central and northeast Florida, where reduced water levels in many shallow-water lakes have exposed hundreds of sites to erosion and irresponsible collecting. This report summarizes the results of a modest effort to locate and document archaeological sites in the near-shore, underwater margins of Crescent Lake in Flagler and Putnam counties, Florida.

Crescent Lake is a 25-km-long freshwater lake at the northern end of the relict channel of the St. Johns River (Figure 1-1). Long before humans occupied northeast Florida, the middle St. Johns River was diverted westward when its headwaters were captured by seasonal flows of depressional wetlands and lakes. The resulting new channel, known as the St. Johns Offset (White 1970), attracted human settlement throughout prehistory, and especially after about 6000 years ago, when the modern regime of sea level and climate became established. The archaeology of the middle St. Johns is fairly well established, as investigators since the 19th century have continuously delved into its many shell middens and mounds. In contrast, the relict channel of the middle St. Johns has garnered very little archaeological attention, and is, in fact, *terra incognito* in the greater scheme of northeast Florida prehistory. The few sites recorded along Crescent Lake, for instance, were brought to the attention of archaeologists by local informants; until now none of these sites were investigated professionally.

Our lack of knowledge about the relict channel of the St. Johns in general and Crescent Lake in particular results from a number of factors. First, the area has never been known to contain large shell and earthen mounds, or any spectacular finds for that matter, and therefore has not drawn the attention of antiquarians and academic archaeologists. To some extent, this is a self-fulfilling prophecy: having never looked intensively in the area, archaeologists assume it boasts few archaeological resources. Collectors in the area know otherwise, for they have mined dozens of sites along the banks and in the near-shore waters of the lake and retrieved thousands of artifacts spanning 10,000 years of prehistory. Granted, counterparts to the massive shell mounds of the middle and lower St. Johns may not exist along Crescent Lake, but not for lack of intensive human occupation. Indeed, it is curious that Crescent Lake has not seen more academic research to understand why it does not support the same massive shell mounds known from the St. Johns.

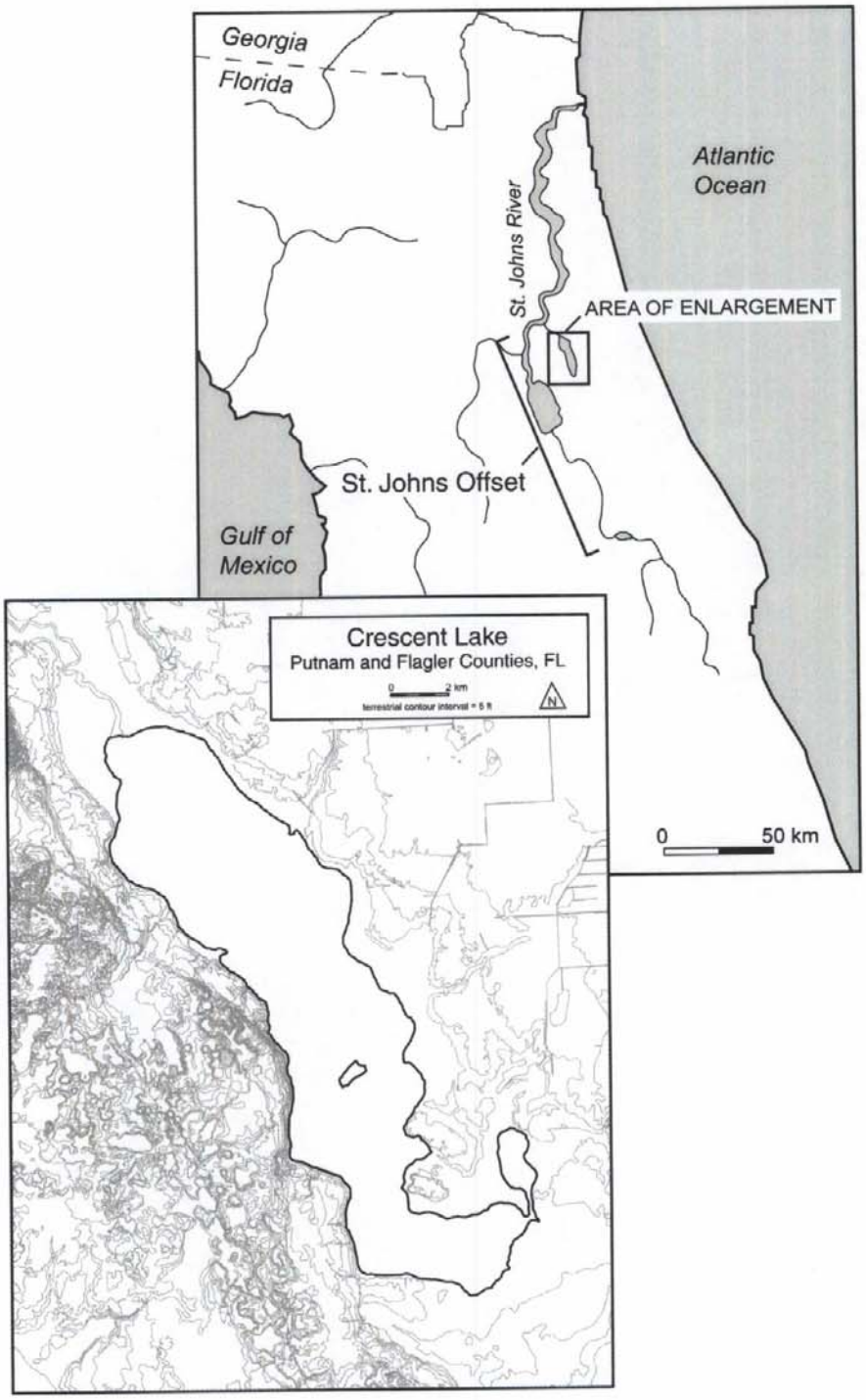

Figure 1-1. Map of northeast Florida showing St. Johns Offset, and inset map of Crescent Lake, Putnam and Flagler counties, Florida.

Second, the area is not heavily developed, and thus no archaeological work has been initiated in advance of development. Much of the generally low terrain of this area is wet year-round and even more is seasonally inundated. Residential development is

thus difficult and expensive. Nonetheless, the lake continues to attract its share of homebuilders, even in wet areas that require drainage and fill. What is more, the relict channel lies on a pathway of unrelenting urban sprawl from major centers like Orlando and Daytona. Inevitably, places like Crescent Lake will be developed at any costs to keep pace with one of the nation's fastest growing state populations (Sassaman et al. 2003). Over the course of this project we observed recent damage to two archaeological sites due to residential construction.

A third factor for the lack of archaeological knowledge about Crescent Lake, and the primary motivation for the present project, is that so many of its archaeological resources are underwater or at least seasonally inundated. Archaeological prospecting in water is difficult and generally cost-prohibitive. As noted above, wet sites known to archaeologists have been largely found by accident. The experience of this project bears this out for had it not been for information provided by local collectors, several of the sites documented herein would have been missed entirely. Driving 3-inch-diameter cores into a lake bottom over 16,000 acres in size to look for small archaeological sites is like looking for the proverbial needle in a haystack.

The primary purpose of this project is thus the search for near-shore, submerged archaeological sites in Crescent Lake. A related goal is documentation of several sites already recorded for the lake. Crescent Lake has never been professionally investigated and despite its inclusion in a Flagler County survey in 1988 (Historic Property Associates 1988), none of the seven sites recorded then were field checked. Conversely, several individuals have been prospecting for artifacts along the shore of Crescent Lake for decades. The artifact collection of one such individual was inventoried in 1983 by students at the University of Florida under the supervision of Barbara Purdy. If the success of collectors to locate and retrieve artifacts in near-shore, submerged contexts is any measure of its larger archaeological potential, then Crescent Lake indeed preserves a rich and varied record of prehistoric human occupation.

Reconnaissance survey to locate sites along the lake margin involved a combination of stratified random sampling and purposive survey. The former was based on bathymetric data of the lake bottom. Crescent Lake is generally a shallow, flat-bottomed lake with well defined "shelves" along its east and west margins under less than 6-8 feet of water. Various points of land punctuate otherwise smooth, arcuate lake margins and reflect possible locations for prehistoric occupation. Some such points extend several hundred meters into the lake and are likely to preserve archaeological residues of lake-side occupations when lake levels were well below current elevations. Although we have no prior knowledge that water levels in Crescent Lake were actually lower over the course the human prehistory (i.e., the past 12,000 years), the overall effect of rising sea levels and moister climate since the late Pleistocene has been increasingly wet surface conditions as water tables rose and recharge areas for near-surface aquifers approached modern conditions. Inasmuch as the submerged contexts of early Holocene artifacts collected by locals reflect the actual locations of early human occupation, Crescent Lake records an overall trend for rising water levels through time. However, some of these same submerged contexts include late Holocene artifacts, suggesting that

an overall trend for rising water was occasionally reversed. Moreover, several of the known sites along the eastern margin of the lake are currently well above and landward of the present-day shoreline, suggesting that lake levels were at times higher than at present. Local informants have noted that Crescent Lake has experienced substantial drawn-downs in the past half-century due to drainage of adjacent wetlands and diversion of its feeder streams. It follows that water levels in Crescent Lake have been erratic over the course of human prehistory and history and thus hard to predict from age alone. That is, we should not expect direct correlation between the age of particular archaeological components and lake levels, with, for example, early Holocene sites currently under 10 feet of water, middle Holocene sites under 5 feet of water, and late Holocene sites along the present-day shoreline. Whereas an erratic pattern of lake levels over the course of human prehistory makes it difficult to generalize about regional paleoenvironmental trends, it does suggest that given enough samples and requisite chronological control, the archaeological record of Crescent Lake holds enormous potential for a fine-grained reconstruction of local environments and human strategies for dealing with relatively unstable circumstances.

The basic technique employed in our reconnaissance survey of Crescent Lake was piston coring. This technique is a common means for sampling lake and wetland sediments, and archaeologists have used it to great effect for retrieving samples of midden from wet sites (Purdy 1988). Typically, samples from piston cores are returned to the lab, where they are exposed by splitting the core tube longitudinally. We expanded on this typical method in our survey of Crescent Lake to include extraction of sediments in the field. This enabled immediate and ongoing observations of lake-bottom deposits as much as 2 m thick and thus mimicked in some respects the reconnaissance-level survey methods of terrestrial shovel testing. A full account of the methods of piston coring is provided in Chapter 3 of this report.

In short, 151 piston cores were extracted from the lake bottom at 25 locations of known or suspected archaeological sites in Crescent Lake. In addition to coring, surface survey and limited subsurface testing was conducted at 12 locations of known or suspected archaeological sites. The combined effort resulted in verification and further documentation of 11 of 14 previously recorded sites and preliminary testing and documentation of 14 new sites. Among the new sites are two shell middens and several other midden deposits that are fully or partially submerged. Eight radiocarbon assays from various locations and depths across the lake provide a preliminary basis for inferring changes in lake levels over time.

ORGANIZATION OF THE REPORT

Chapter 2 of this report summarizes the environmental and archaeological backdrop against which the Crescent Lake survey was conducted. Featured in this chapter are the results of a geological survey of Crescent Lake reported in a 1976 M.S. thesis by William D. Adams (Adams 1976). Adams not only retrieved several cores from portions of the lake beyond the reach of the present survey, he also obtained seven radiocarbon assays on sediment from three of the cores. Together with the age estimates

from cores of this survey, the Adams data enable a fairly good chronological reconstruction of lake levels over the past 20,000 years.

The review of previous archaeological findings in Chapter 2 includes summaries of the 14 Crescent Lake sites on record with the Florida Master Site File, many of which were recorded through hearsay by a Flagler County survey of 1988 (Historic Property Associates 1988). Also included of course is an overview of the prehistory of the region. The present survey was restricted to the search for and identification of prehistoric archaeological resources.

Chapter 3 presents the methods of field survey and laboratory work. As noted, a modified piston core technique was used to enable in-field observation of sediments as much as 2 m deep. Besides the usual laboratory work to identify and characterize archaeological remains recovered in the survey, the project employed the use of a multisensor core logger to characterize and photograph the 12 piston core samples returned to the lab.

The results of survey are reported in Chapter 4. This chapter is divided into three sections: (1) results of reconnaissance survey at locations whose bathymetry suggested a great likelihood for submerged archaeological remains; (2) results of both terrestrial and underwater survey at extant sites; and (3) results of terrestrial and underwater survey at sites discovered in reconnaissance survey or through the assistance of local informants.

Chapter 5 provides a inventory and description of artifacts assemblages recovered from the present survey effort, as well as a summary of the Eddie Morris collection analyzed by students of Barbara Purdy. The Morris collection provides a large-sample basis for contextualizing results of the survey.

The sixth and final chapter of this report places the results of the Crescent Survey into diachronic and regional contexts. A model of fluctuating lake levels over the Holocene is proffered to account for recorded sites and as a predictive tool for locating additional sites. Throughout the Holocene, the western margin of the lake appears to have supported more continuous and intensive occupation relative to the eastern margin, which, due to its low gradient and susceptibility to flooding, apparently could not sustain long-term land use. These same properties, however, enhances the interpretive potential of eastern-margin sites because they more accurately register fluctuations in water levels and thus enable more fine-grained reconstructions of human response to unstable environments.

CHAPTER 2
ENVIRONMENTAL AND ARCHAEOLOGICAL CONTEXTS

The review of environment and archaeology in the study area begins at the scale of regional context and moves more specifically to the immediate context of Crescent Lake. Environment is considered first, followed by a review of regional and local archaeological knowledge.

ENVIRONMENTAL CONTEXT

Crescent Lake is located in northeast Florida 35 km west of the Atlantic coastal strand and some 12 km east of the active channel of the St. Johns River, although it is technically part of the St. Johns Basin. At 500 km in length, the St. Johns is Florida's longest river. It is also one of the widest rivers in the world. For much of its lower reaches, the St. Johns is wider than the Mississippi, North America's largest river. Its dimensions are deceiving, however, for the St. Johns actually discharges only about 6000 cubic feet of water per second (Tanner 1992). In comparison, the Apalachicola River of west Florida discharges four times that amount, the Mississippi 103 times that amount. The great width of the St. Johns is owed to the relatively low gradient of its basin. Flow velocity is extremely low, so a wide channel is needed to accommodate a relatively small amount of water.

The characteristics that make the St. Johns unique among Florida rivers are those that make Florida different, physiographically, than other southeastern U.S. states. On a foundation of igneous rock lies a thick mantle of limestone known as the Florida Platform that formed over millions of years through marine deposition. On this deep geological structure lie marine sediments that were deposited and reworked whenever the sea covered the land. The tandem forces of marine erosion and deposition have left their mark in the swamps, plains, terraces, and ridges of Florida's older topography, as well as the active coastal regimes of marshes, lagoons, dunes, barrier islands, and beaches. Chemical dissolution of underlying limestone has been equally important in shaping the land. Sinkholes and related collapse features reflect a geological history of fluctuating water tables attending sea level change. Together these structural and geomorphic processes have resulted in a low-sloping, virtually flat terrain with surface geology consisting of easily eroded sediment and negative spaces. Naturally, when sea level is high (as it is now) and climate is moist, the terrain is well watered. In addition to the rivers, swamps, and marshes so common to Florida are over 7700 lakes greater than 10 acres in size. Over 16,000 acres in size, Crescent Lake is among Florida's largest bodies of water.

Physiography

About one half of the Florida Platform is subaerially exposed today as the state of Florida (see Schmidt 1997 for a cogent summary of the state's physiography). The other half is submerged beneath the waters of the Atlantic Ocean and the Gulf of Mexico. The submerged platform is also known as the continental shelf; seaward from the edge of

shelf is the continental slope. The shelf assumes a relatively steep gradient on the Atlantic Coast, dropping as much as 600 ft in under 10 km from the coast north of Miami. The gradient is increasingly gentler farther north along the Atlantic coast of Florida, but still steep compared to the Gulf coast, where one must travel 150 km west of Tampa to find water 600 ft deep. One of many implications about this contrast in shelf morphology is that much greater expanses of land were submerged with rising sea level on the Gulf coast than on the Atlantic coast. Conversely, during periods of lower sea level, the Gulf coast was much farther seaward from its present location than was the Atlantic coast.

Elevations in Florida are relatively low. Its highest point is 345 ft (104 m) in the panhandle of west Florida, and well below 200 ft throughout most of the northeast Florida. Elevational zones throughout the state are largely the result of ancient ocean transgressions, which left diagnostic erosional scarps at their leading edges (Schmidt 1997). Eight marine terraces have been identified from correlations of the scarps (Healy 1975). Four terraces in the St. Johns region occur at roughly 10, 30, 100 and 150 ft above mean sea level (amsl). Minor units of higher and older terraces occur along the western margin (central highlands) of the basin. Remnant lagoonal and near-shore swales parallel the escarpments of terraces and serve to channel portions of the area's rivers.

Finer physiographic divisions of the study area were defined by Cooke (1939) and later revised by White (1970). The roughly two dozen physiographic units of Cooke can be grouped in two major zones: the Central Highlands and the Atlantic Coastal Lowlands. The survey area is situated fully within the latter zone, but it is proximate to the Central Highlands.

Central Highlands. The Central Highlands consist of dissected sedimentary remains of fluvial, deltaic, and shallow-water marine origins (Schmidt 1997:7). Eroding from the southeastern Coastal Plain, these sediments prograded southward with transgressions of the sea, eventually spilling over the shallow waters of the carbonate platform and forming the clayey sands of the spine of the northern peninsula. Subsequent reworking of these sediments by near-shore currents of ancient coasts created the many elongated ridges of the upland unit. Trail Ridge, Mount Dora Ridge and Lake Wales Ridge together define the eastern margin of the Central Highlands, and lesser ridges assume coast-parallel locations in the adjacent lowlands of the St. Johns basin and coastal zone.

Karst features of the Central Highlands include sinkholes on the ridges and other upland landforms, some which are deep and steep-walled, such as Devil's Millhopper in Alachua County. Many of the region's springs are sinkholes that became charged with rising water levels in the Holocene. The largest, Silver Spring, is the source for the Oklawaha River in the Central Highlands. As the main tributary of the St. Johns River, the Oklawaha occupies the so-called Central Valley of the interior peninsula, being sandwiched between the Sumter Uplands to the west and the Mount Dora Ridge to the east. East of the Mount Dora Ridge is the Marion Upland unit, followed by the St. Johns River. This midsection of the St. Johns basin is known as the "offset" (White 1970; see

below), a stretch of some 90 km that captured the headwaters of the river during low sea levels of the Pleistocene. The upland ridge that was stranded by this offset—the Crescent City Ridge—is the only part of northeast Florida containing sinkholes.

Coastal Lowlands. The study area consists of terrain that is broadly defined as the Atlantic Coastal Lowlands, according to Cooke (1939). Cooke maintained that this zone consisted of Pleistocene marine terraces, which have remained in position and retained most of their original marine character. Conversely, White (1970) divides Cooke's Lowland zone into two units: the Eastern Valley and the Crescent City Ridge. White considered the Eastern Valley to be a former beach ridge plain that was lowered by solution during an episode of lower-than-present sea level (Pamilico). Estuarine deposits in and around Crescent Lake are attributed by White to a subsequent high stand of sea (Silver Bluff).

The majority of the Atlantic Coast in Florida is dominated by barrier beaches, barrier islands and spits, and overwash fans (Schmidt 1997:4). A series of elongated, broad lagoons parallel the coast roughly 25 km north and south of St. Augustine. Another tidal-inlet system is situated southward, beginning about 20 km north of Daytona Beach and expanding into the back-barrier regime that dominates the coastline all the way to south Florida. Such tidal lagoons mirror the configuration of relict features that contributed to the establishment of Crescent Lake.

The St. Johns River in the Eastern Valley of the Coastal Lowlands is comprised of three distinct segments. The southern segment includes its headwaters, which are essentially poorly integrated braided streams across a broad expanse of undifferentiated, flat terrain. Drainage in this headwater has been affected in recent decades by channelization and other modifications that render the area more conducive to agriculture and development.

The middle segment consists of the "offset," essentially a westward rerouting of an older channel to the east. Coast-parallel topographic features of the Coastal Lowlands (e.g., relict lagoons) are generally believed to have determined the flow of the St. Johns River. Surface flow then penetrated underground and dissolved limestone to form a series of sinks that connect in a relatively straight channel (Schmidt 1997:12). The middle stretch of the river, between Sanford and Palatka, deviates from this pattern in being offset some 20 km west of the relict channel. Crescent Lake occupies the northern portion of the relict channel; lesser bodies of water mark the remaining expanse of relict channel. Factors believed to have enabled the establishment of the offset channel include tectonic uplift of limestone, solution of carbonate sediments, and enhanced artesian flow (Schmidt 1997:12). Irrespective of the factors creating the offset channel, when sea level was low, the new channel captured the headwater flow of the St. Johns. Geologists estimate that this process occurred during the late Tertiary to early Pleistocene (White 1970; Pirkle 1971 cited in Schmidt 1997:12). Thus, the relict channel of the middle St. Johns was never active during human occupation of the region. Nevertheless, its associated lakes, wetlands, and adjacent sand bodies certainly supported human populations, including perhaps intensive habitation.

The northern or lower segment of the St. Johns cuts east at Palatka (i.e., the northern end of the offset segment) and then flows north to Jacksonville, where it empties into the Atlantic Ocean. This lower segment is essentially a drowned estuary. Its incredibly broad channel is flanked by relatively steep bluffs and levee formations that render access difficult to many parts of the river. Being tidally influenced throughout, the lower St. Johns is especially dynamic in terms of salinity levels, current velocity and direction, and faunal communities. Although tidal influence in Crescent Lake is minor, water salinity is sufficiently high to support some fauna common to brackish water, such as blue crab.

Groundwater Hydrology

Basic features of channelized surface flow in the Coastal Lowlands has already been summarized. Most of the surface water in the region, however, consists of various types of wetlands. Especially abundant and highly diverse, wetlands in northeast Florida include marshes, estuaries, river floodplains, low-relief plains (e.g., Osceola Plain), areas with near-surface water tables, and areas fed by artesian springs.

Precipitation is the source of all fresh water in Florida (Miller 1998:69). Most of the precipitation is returned to the atmosphere via evapotranspiration, but some moves directly into lakes, rivers, and streams as runoff, and some percolates through soil to both near-surface and deeper aquifers. Throughout the state, precipitation outstrips runoff, so much of it is available to recharge aquifers.

Surface water levels in Florida's rivers, lakes, and wetlands are directly related to aquifer levels. Florida has five principle aquifers. The deepest and most extensive is the Floridan Aquifer, which not only covers the entire state, but also underlies portions of Georgia, Alabama, and South Carolina. Despite its expansiveness, the Floridan system is not exposed at or near the surface in the immediate study area. A clayey confining unit caps the system in the area of the middle St. Johns. Remaining portions of the study area consist of surficial aquifer systems (Miller 1998:71). The surficial systems are predominately unconsolidated sands. Except where clay beds create locally confined conditions, water in the surficial aquifers is unconfined (Miller 1998:74). Local precipitation is the source of most recharge, and most of this is locally discharged into streams of lakes. The Floridan Aquifer, in contrast, is recharged by regional precipitation, and its limestone confining units enable long flow paths. Clearly the surficial aquifers are much more vulnerable to localized droughts than is the Floridan system.

Sinkholes in northeast Florida are most common where the Floridan system is thinly confined or unconfined, namely in the area of the Central Highlands and middle St. Johns. Springs that issue directly from the Floridan Aquifer include all of the first-magnitude springs, including Silver Spring, Silver Glen Springs, and Blue Springs.

The karst topography of the Central Highlands involves a dynamic relationship between groundwater and limestone that greatly affects the size and accessibility of surface water. Circulating groundwater gradually erodes limestone underlying lakes. After periods of drought and concomitant lowering of the water table, once-buoyed cavern roofs underlying sinkholes sometimes collapse and thus drain the sink of impounded water. An example of a massive "disappearing lake" is Paynes Prairie in Alachua County (Schmidt 1997:11). The Crescent City Ridge is peppered with scores of lesser sinks.

Crescent Lake Geomorphology and Hydrology

As noted above, Crescent Lake occupies what is believed to be the northern end of the relict channel of the St. Johns River, and its elongated configuration mirrors this ancient channel morphology, as well as the ancient lagoonal system that preceded it. The lake's massive size (25 km long, 4 km wide) is not matched by great depth. Maximum depths in the center of the lake reach only about 13-14 feet, and the wide littoral shelf around its circumference is only a few feet deep. The lake bottom is relatively flat, although the drop-off from the shelf to the bottom is rather abrupt. This steep transition between relatively deep and shallow water attracts sports fisherman who find great success catching largemouth bass and crappie. Good habitat for blue crab is found on the upper end of this drop-off zone, as numerous crab traps attest.

Crescent Lake is fed by a series of streams flowing from the south and west. The major source is Haw Creek and its many tributaries, which fed the lake at its southeastern end, where Crescent Lake joins the smaller Dead Lake. Haw Creek assumes the position of the relict river channel, although it is disjointed in various places apparently from the structural consequences of substrate solution. Lesser streams feeding Crescent Lake include Bull Creek at the eastern margin of Dead Lake, and Salt Creek, at the northeast end of Crescent Lake.

Crescent Lake is connected to the active channel of the St. Johns River by Dunns Creek at its northern end. This sinuous watercourse is a source of both inflowing and outflowing water. The inflow is due to tidal influence in the St. Johns River as far south as Welaka. A tidal gauge placed at the northwest end of Crescent Lake by Adams (1976:4) registered only 1 cm of tidal fluctuation. Adams also noted that the predominate northeasterly winds can raise water levels by as much as 60 cm, and that countervailing winds can have the opposite effect. Storm surges up the river are likely to have even greater effects. Over the course of the present survey, water levels fluctuated by as much as 40 cm, due largely to the strong winds of summer thunderstorms.

Topography on either side of Crescent Lake varies dramatically. The western slopes are much steeper than those of the eastern side, owing to the Crescent City Ridge and its limestone substrate. Elevations on the ridge vary from 50 to 100 ft amsl, with occasional peaks as high as 125 ft. The surface sediments of the Crescent City Ridge are either Upper Miocene or Pleistocene in age (Adams 1976:12). Present elevations would have been entirely covered by 200+ ft Late Miocene seas levels, but it is possible that the

lower elevations of the ridge are due to karst development during lower sea level stands, meaning that all or a large portion of the ridge was above sea level during the late Miocene. Structural geological factors also contributed to the topography of the Crescent City Ridge. Adams postulates a system of faults that account for uplift of the limestone substrate between Lake George and Crescent Lake and thus the "seemingly anomalous elevation at Crescent City" (Adams 1976:19).

The Crescent City Ridge figures prominently in the water levels of Crescent Lake. The entire area of Crescent Lake, including Dunns Creek and the Haw River drainage, is an area of artesian flow. The ridge itself is a huge recharge area for artesian flow, as its numerous sinkholes have penetrated the confining surface layers and enabled extensive groundwater flow. Seeps and springs are not known for Crescent Lake aside from one at Shell Bluff Landing, so artesian flow from the ridge is clearly the dominate source of groundwater recharge. Although this source of flow is highly vulnerable to localized drought, the relative relief between the lake basin and the ridge buffers lake levels from short-term, low-intensity droughts.

In contrast to the ridge to the west, low-lying terrain to the east, north, and south of Crescent Lake consists of shelly and clayey sands deposited in lagoons associated with Plio-Pleistocene sea levels of +25 and +18 ft. Lacking the geological facies seen on the west side of the lake, the eastern margin is poorly defined and changes significantly with even minor fluctuations in lake levels.

Lake Bottom Sediments. Adams (1976) cored the lake bottom of Crescent Lake and characterized its general stratigraphic sequence. Basal peats 3-4 m deep in two cores from the center of the lake were estimated by C14 assays to date from 21,000-26,000 years B.P. He describes this as a marsh-type, autochthonous peat whose sponge spicules establish a freshwater biome for peat formation. This age of this peat corresponds with substantially lower sea levels of the late Pleistocene. Currently under 12 ft of water and at least 10 feet of overlying calcitic mud, this peat must have formed in near-shore conditions and thus at appreciably lower lake levels.

The upper contact of the peat in one core showed signs of desiccation and dated to approximately 17,000 B.P. (Adams 1976:56). Hydrobiid snails in this upper peat confirm a freshwater biome. Overlying the peat in cores throughout the lake, Adams observed shell marls, calcitic muds, and silt muds in varying sequences, all apparently derived from the older estuarine deposits surrounding the lake to the north, east, and south. A layer of "gyttja" overlies these redeposited muds and silts in the lake bottom and lies directly on estuarine deposits in shallower, near-shore waters. Gyttja is a term that refers to common lacustrine sediment of eutrophy, that is, a nutrient-rich sedimentary peat consisting mainly of plant and animal residues and mud. A sample of gyttja some 150 cm BS in a core below 12.5 ft of water returned a radiocarbon assay of 7135 ± 70 B.P. (Adams 1976:57). This dates just prior to the establishment of sea level in the modern regime and thus relates directly to the establishment of modern lake conditions.

Notable within the gyttja throughout the lake were beds of the banded mystery snail, *Viviparus georgianus*. One zone of dense shell in gyttja 75-90 cm BS in 12.5 feet of water returned a radiocarbon assay of 3480 ± 75 B.P., and gyttja roughly 20 cm above this snail zone provided an age estimate of 3285 ± 85 B.P. (Adams 1976:54). Not knowing the range of tolerance for *V. georgianus* habitat, it is difficult to extrapolate lake levels from the depth of shell beds, nor we know in any of the beds observed by Adams are indeed *in situ* or if any are anthropogenic (i.e., midden). Given the presence of near-shore snail middens ranging in age from ca. 4000-750 B.P., it seems unlikely that any of the snail zones observed by Adams are anthropogenic. Nonetheless, the age and pervasiveness of snail strata observed by Adams suggests that accurate estimates of lake levels relative to snail habitat can be achieved with accurate information on the depth tolerances of this species.

Climate, Soils, And Biota

The climate of the study area is humid subtropical. Some 50 inches of rain per year falls mainly in the summer months, when thunderstorms prevail. Summer precipitation is greatest near the coast. Occasional hurricanes and tropical storms punctuate an otherwise monotonous pattern of afternoon thundershowers from June to September. Droughty conditions are not unusual during the remainder of the year, particularly during the spring and fall in the interior.

Seasonal temperatures follow rainfall patterns, with hot summers and mild winters interspersed with short transitional periods. Average annual temperature for Flagler County is about 70 degrees Fahrenheit; Putnam County averages slightly over one degree less (Readle 1990; Readle et al. 1997). Freezing temperatures occur occasionally during the late fall and winter months, although very rarely do temperatures remain below freezing for more than a few hours.

Soils in the study area can be broadly divided into those of the poorly drained, low-lying terrain of the Coastal Lowlands and wetlands of the Central Highlands, and the moderately to well drained soils of the coastal dune-beach complex and the uplands of the Central Highlands. Soils of the low-lying, eastern margin of Crescent Lake are in the Terra Ceia Series and consist of very poorly drained formed in nonwoody hyrophytic plant remains (Readle et al. 1997:120). Soils of the Wabasso Series are found on the adjacent broad flatwoods and consist of deep, poorly drained soils that formed in sandy and loamy marine sediments (Readle et al. 1997:122). Soils on land fronting the western margin of Crescent Lake are from the Pomona, Candler, and Myaak series and consist of well-drained to poorly drained soils formed in marine sands or eolian material (Readle 1990).

Vegetation across northeast Florida has been greatly affected by modern land use practices and is thus difficult to characterize without abundant qualification. In general the area between the coast and St. Johns River is dominated by pine flatwoods (longleaf, slash, and/or pond pines) with understories of herbs, saw palmetto, wax myrtle, and

wiregrass. Interspersed throughout the flatwoods are small hardwood forests, cypress and bay tree swamps, marshes, and prairies.

Longleaf pine forests occur along much of the middle to lower St. Johns, especially on the high terraces. The well drained relict dune soils of the Marion Upland (Ocala National Forest) support an expansive sand pine forest. Cypress swamp forests dominate low-lying, wet terrain along the river and associated lakes. Other swamp forests dominated by hardwoods such as bay and gum are associated with wetlands throughout the region.

Natural vegetation at Crescent Lake includes an extensive cypress fringe swamp, as well as hydric hammock, pine flatwoods, sand pine scrub, and sandhills communities. Once dominated by bald cypress (*Taxodium distichum*) and black gum (*Nyssa sylvatica*), the cypress swamp is now dominated by red maple (*Acer rubrum*) and sweetgum (*Liquidambar styraciflua*), which colonized areas of timber harvest. The hydric hammock bordering the swamp along the east side of the lake supports live oak (*Quercus virginiana*) and saw palmetto (*Serenoa repens*). Pine flatwoods dominate the landscape farther to the east, most of which is under silvicultural management. The west side of the lake consist of sand pine scrub and sandhills communities. Scrub pine and scrub oak species occur throughout and are joined by longleaf pine (*Pinus palustris*) and turkey oak (*Quercus laevis*), along with pervasive wire grass (*Artistida stricta*), in the sandhills biome.

Inshore marine habitat exists along the entire stretch of the lower St. Johns, just below Crescent Lake Many fish and shellfish spend their entire life cycle in this habitat, most notably shrimps, blue crabs, and spotted seatrout. Upstream the freshwater component of the St. Johns has long-been home to a variety of shellfish species, most notably members of the genus *Viviparus*, as well as apple snail (*Pomacea*) and bivalves. Fish and turtle species are likewise abundant and diverse. Lakes in the study area also supported mollusks of importance to humans, along with some 40 species of native fishes. The many swamps of pine flatwoods supported rich faunal communities, including invertebrates, fishes, amphibians, reptiles, birds, and mammals.

Terrestrial fauna of the pine flatwoods consists of white-tailed deer, black bear, and numerous other smaller mammals of economic importance to humans, as well as an array of reptiles and birds.

ARCHAEOLOGICAL CONTEXT

Several reviews of the archaeology of the greater St. Johns region and its broader context in Florida have been issued since the 1950s (Goggin 1952; Milanich and Fairbanks 1980; Milanich 1994; Miller 1991, 1998; Purdy 1991), and a recent review of the Mount Taylor culture (Wheeler et al. 2000) synthesizes extant knowledge of the beginnings of intensive settlement in the region. We do not attempt to duplicate those efforts in this chapter, but rather provide a context for the specific field efforts reported herein. Much of the summary that follows was adapted from a recent study of

archaeological site distributions in northeast Florida (Sassaman et al. 2000), and a report on archaeological investigations at Blue Spring and Hontoon Island State Parks in Volusia County (Sassaman 2003a). A summary of previous field work in the Crescent Lake area is reported at the close of this section.

Paleoindian Period

When members of the founding Paleoindian populations reached Florida some 11,500 radiocarbon years ago, the environment was significantly different than it is today. Sea levels were 60-100 m lower (Gagliano 1977) and the Gulf shoreline extended 40-70 miles farther west. Climate was significantly drier and cooler than at present. Potable water in the interior of the state was found primarily in "water holes, lakes, and prairies fed by rainfall and very deep sinkholes that were fed at least occasionally by ground water from springs" (Milanich 1994:39). With limits to the amount of available moisture and cooler climate, vegetative communities were patchy. Xeric scrub covered the southern part of the peninsula, while the northern portion was covered with pine forest mixed with oak and hickory stands.

Due to the generally poor preservation of organic materials outside of aquatic contexts, stone tools and lithic debris from their manufacture and use are the defining elements of Paleoindian material culture. In addition, items of bone and ivory attributable to the Paleoindian period have been recovered in the rivers and springs of north and central Florida (e.g., Dunbar and Webb 1996; Dunbar et al. 1989). Many of these items may prove to be highly diagnostic of late Pleistocene technological traditions.

Paleoindian lithic technology placed an emphasis on high quality lithic resources and is characterized by "fine workmanship" (Borremans 1990:4). Projectile points such as the Clovis, Suwannee, and Simpson types are diagnostic of this period, as are a variety of other formal unifacial tools such as the endscraper. Informal, expedient tools, such as utilized flakes, are also common in Paleoindian assemblages. In general, these materials reflect a technology designed to be flexible and multipurpose (Daniel and Wisenbaker 1987). Other Paleoindian artifacts include abraders and hones of sandstone, groundstone tools, and egg-shaped bola weights (Milanich and Fairbanks 1980:39). Other items of Paleoindian material culture not made from stone include a host of organic tools such as bi-pointed bone tools, beveled ivory points/foreshafts, socketed antler projectile points, worked shell, and bone beamers, awls, and anvils (Dunbar and Webb 1996).

By and large, Paleoindian sites are most numerous in areas where water and lithic resources coincided in the Late Pleistocene (Dunbar and Waller 1983). Often referred to as the "oasis hypothesis," this model predicts that Paleoindians were more or less tethered to areas where these resources were available. Inasmuch as the distribution of Paleoindian artifacts shows a strong association with karst topography in about one-third of the Florida peninsula (north-central and gulf coast) (Dunbar and Waller 1983), this model appears valid. In the St. Johns Basin, Paleoindian sites are much fewer, suggesting that occupation of the region was sporadic, possibly reflecting an environment not suitable for prolonged habitation (Miller 1998:51-53). The few Paleoindian sites known

from the region are generally associated with "spring fed rivers of the Tertiary karst region" (Miller 1998:51).

Paleoindian sites in the St. Johns Basin ought to occur in areas where surface water would have been available, such as places where sinkholes penetrated the Floridan Aquifer. Possible spring sources of water in the St. Johns Basin include Salt Springs, Silver Glen Springs, Juniper Springs, Fern Hammock Springs, Green Cove Springs, Beecher Springs, and Blue Springs (Miller 1998:54). Neill (1964) reports the presence of Suwannee points at Silver Glen Springs, a first-magnitude spring in eastern Marion County that flows into Lake George. Another possible location for Paleoindian sites in the St. Johns Basin would be ridges containing uplands environments and sinkholes adjacent to the river. An example of this situation would be the Crescent City Ridge with its many sinkholes possibly providing "reliable water sources during the Late Pleistocene Epoch" (Miller 1998:55). Systematic searches of these potential site locations have yet to be conducted.

Archaic Period

The Archaic Period of Florida can be divided into three subperiods, Early (10,000-7000 B.P.), Middle (7000-5000 B.P.), and Late (5000-2500 B.P.), based largely on changes in projectile point styles. The appearance of fiber-tempered pottery signals the beginning of the Late Archaic Orange Tradition at about 4200 B.P. In general, a fishing-hunting-gathering lifestyle was followed by all Archaic Period peoples. Social formations are thought to be essentially egalitarian (although this is the subject of intense debate), and regional population levels appear to have increased from early to late periods.

Early Archaic. The Early Archaic immediately followed the Paleoindian period and is distinguished from it by the appearance of notched and then stemmed hafted biface forms after ca. 10,000 B.P. In general, the Early Archaic was characterized by wetter conditions than the preceding Paleoindian period and as a result of more surface water, there are more Early Archaic sites in more locales. A change in subsistence practices also accompanied the environmental changes that contributed to the extinction of many Pleistocene animals. Despite the changes, many Early Archaic sites are found at the same locations as earlier Paleoindian sites (Milanich 1994:63).

With the exception of projectile point types, Early Archaic material culture is very similar to that discussed for Paleoindians. Numerous formal unifacial tools and expedient flake tools are present in Early Archaic lithic assemblages. Projectile point types diagnostic of this period include the side- and corner-notched Bolen, with stemmed types such as the Kirk Serrated, Hamilton, and Arredondo appearing later. Some investigators (Bullen 1975; Milanich 1994; Milanich and Fairbanks 1980; Purdy 1981) consider the Bolen type to be Late Paleoindian in age despite pan-southeastern similarities among well-established Early Archaic projectile point types. Big Sandy, Taylor, and Kirk Corner Notched points from Georgia and South Carolina, as well as the Autaga type from Alabama, bear many similarities with Florida Bolens.

As was the case for the Paleoindian period, few Early Archaic sites are recorded in northeast Florida, although among them is arguably one of the more spectacular in the Southeast, namely the Windover Pond cemetery in Brevard County (Doren and Dickel 1988; Doren 2002). In general, Early Archaic sites are found at springs and high ground overlooking wetlands such as site 8SJ3135 in St. Johns County, located on a sand ridge overlooking a swamp (Miller 1998:61). Land use patterns for the Early Archaic, as they relate to the St. Johns Basin, are poorly documented, and we have little insight regarding the movement of populations between the Central Highlands, the St. Johns, and the Atlantic Coast. Presumably, the St. Johns Basin and Atlantic Coast were still not extensively utilized by Early Archaic populations for the same reason they were underutilized by Paleoindian groups. Yet, given an increase of surface water, especially perched sources rather than deep sources associated with the Floridan Aquifer, greater utilization during the Early Archaic period is expected. Perhaps the limited number of Early Archaic sites in the St. Johns Basin is more a result of poor sampling in the region, ineffective models for settlement and site location, and the inability to detect sites that may be buried or inundated beyond the reach of standard archaeological site-detection methods. In fact, private artifact collections from Crescent Lake and Lake George include many examples of Early Archaic points, as well as earlier and later materials (see Chapter 5). Apparently, the record of Paleoindian and Early Archaic settlement in northeast Florida lies largely beneath freshwater lakes, ponds, and wetlands.

Middle Archaic. A general environmental trend toward wetter conditions and more and larger surface water sources characterized the Middle Archaic period. These environmental changes are thought to be responsible for changes in Archaic lifeways, resulting in different settlement, subsistence, and technological systems from previous periods. The beginning of the Middle Archaic is generally placed at about 7000 B.P. and its terminus around 5000 B.P. (Milanich 1994). As with all other prehistoric periods without ceramics, changes in projectile point styles signal the beginning of the Middle Archaic and are used as temporal indicators in assigning sites to particular traditions. Within the St. Johns Basin, the late Middle and preceramic Late Archaic is defined by the Mount Taylor culture, an archaeological construct named after the Mt. Taylor site of Volusia County (Goggin 1952; Wheeler et al. 2000).

Compared to sites of previous periods, Middle Archaic sites are widely distributed throughout Florida, and it is during this period that shell middens began to accumulate along the St. Johns River and the Atlantic and Gulf coasts. Numerous sites are found in upland, riverine, coastal, and wetland locations and are suggestive of growing populations. The shell middens of the late Middle Archaic (Mount Taylor) period may indeed represent base camp functions, although independent evidence to verify this (e.g., traces of habitation structures) has yet to be found. Special use sites, on the other hand, contrast sharply with base camps with regard to their size and material content. Such sites often contain a modest assemblage of lithic debitage and a few tools or tool fragments. The small size and limited assemblages of these sites suggest short-term occupation and limited or specialized activities. Special use sites are interpreted often as temporary campsites or extractive locations.

Several Middle Archaic cemeteries have been investigated, most of which are subaqueous pond burials (e.g., Beriault et al. 1981; Clausen et al. 1979; Wharton et al. 1981). Although such sites are located to the west of the study area, the precedent of subaqueous burials at Windover suggests that this mortuary tradition was both widespread and long-lived in Florida. Other Middle Archaic cemeteries involve midden burials, such as those from the base of the Harris Creek shell mound at Tick Island (Aten 1999; Jahn and Bullen 1978).

Middle Archaic hunter-gatherers utilized a diversity of resources, and here again the importance of wetlands and other aquatic environments becomes apparent. Clearly, the presence of numerous shell middens along the St. Johns, Atlantic, and Gulf coasts attests to the use of shellfish by Middle Archaic hunter-gatherers after about 6000 B.P. Numerous fish bones, as well as reptile and amphibian remains, likewise speak to the importance of aquatic resources in the subsistence regime. Terrestrial faunal resources were also consumed by Middle Archaic peoples as is evidenced by the presence of deer, raccoon, opossum, and gopher tortoise, among other vertebrate remains (Russo 1990a). Important plant foods likely included hickory nuts, acorns, saw palmetto, persimmon, and a variety of other plant resources.

Middle Archaic material culture is represented in a number of media: stone, bone, shell, and wood (Wheeler and McGee 1994a, 1994b; Wheeler et al. 2000). Perhaps the best known and most studied are the stone artifacts, specifically projectile point types. In general Middle Archaic points are stemmed, broad bladed, and triangular. The most distinctive is the Newnan point, but Marion, Putnam, and Hillsborough points are also typical of the period. One technological trait of great importance in the Middle Archaic is thermal alteration. The effects of intentional, controlled heating on chert are well documented (Purdy 1981). This procedure reaches its zenith during the Middle Archaic, and is thought to be an adaptation to reduced band ranges and a means of improving the flaking quality of mediocre and poor lithic resources (Ste. Claire 1987).

Other than the point types just mentioned, Middle Archaic lithic assemblages are lacking in formal tool types. Rather, expedient and informal types are the norm. Common tools found in Middle Archaic lithic assemblages are utilized flakes, bifacial scrapers, hammerstones, perforators, drills, and a number of tool forms made from the reworked basal portion of broken points. Bone tools from the Middle Archaic have been recovered from midden sites along the St. Johns River and its tributaries as well as the subaqueous cemeteries mentioned earlier. Bone artifact types include decorative pins, points, awls, perforators, atlatl triggers, socketed antler points, and fish hooks (Russo 1990a; Wheeler and McGee 1994a). Also found in middens along the St. Johns are shell tools. Common Archaic types include adzes, celts, columnella chisels and planes, and hafted *Busycon* tools (Goggin 1952; Wheeler and McGee 1994a). Wooden artifacts are quite rare, as are other artifacts made of perishable materials. The Groves' Orange Midden, a wet site on Lake Monroe in Volusia County, has provided a glimpse into the organic components of Mount Taylor assemblages that are generally absent or poorly preserved form terrestrial sites (Purdy 1994; Wheeler and McGee 1994b). Another

recent project at the Lake Monroe Outlet Midden (8VO53) has added an enormous amount of new insight on Middle Archaic diet, ecology, and material culture (Archaeological Consultants 2000).

Late Archaic. The Late Archaic period begins at about 5000 B.P. and ends by about 2500 B.P., although the criteria for this time period are variable and hard to define at the regional scale. The Late Archaic is sometimes divided into preceramic and ceramic subperiods. The preceramic subperiod ends when fiber-tempered pottery of the Orange tradition began to be produced after about 4200 B.P. The production of this pottery marks the beginning of the Orange period which itself has been subdivided into five subperiods based on primarily ceramic attributes (Bullen 1972). Recent radiocarbon dating of the pottery types used to define the Orange sequence give reason to suggest that the Orange chronology and typology for the middle St. Johns needs to be completely rethought (Sassaman 2003b).

Environmental trends that began during the Middle Archaic reached essentially modern conditions in the Late Archaic. Increasing surface water and productive coastal environments led to the occupation of almost every habitable locale in the state, particularly in east Florida (Milanich 1994:89). One possible exception is the interior uplands which, according to Milanich (1994), appear to have fewer Late Archaic sites than in the preceding Middle Archaic. This is thought to be due to the focus of Late Archaic peoples on wetland environments and the lack of extensive wetlands in the interior of the same nature as those in the St. Johns River basin and the Atlantic and Gulf coasts.

In contrast to the interior uplands, the St. Johns Basin and the Atlantic coast saw dramatic increases in the number of sites during the Late Archaic (Milanich 1994:87). While permanent or semi-permanent Middle Archaic sites may have existed on the coast (Russo 1996b), such sites were certainly present by the Late Archaic. Site types of the Late Archaic are essentially much the same as they were in the Middle Archaic, with the exception that there were more of them in coastal locations and they may have been occupied for longer periods of time. According to Milanich (1994:85), Late Archaic sites of considerable size are found in a number of locations: along the northeast coast and inland waterway from Flagler County north, along the southwest coast from Charlotte Harbor south into the Ten Thousand Islands, and the braided river-marsh system of the central St. Johns River below Lake George. In these areas, sites are large, densely clustered and associated with sedentary, or at least semi-sedentary populations.

Large populations, semi-sedentary villages, and the development of regionalization are some of the more important developments during the Late Archaic. During this time regional populations began to take on characters of their own, possibly as a result of adaptations to different ecological zones in which they were located. Several regional Late Archaic cultures have been identified by Milanich (1994) and are distributed along the coasts and in the St. Johns Basin. One regional entity is situated along the Atlantic coast and St. Johns Basin, another along the Gulf coast in Northwest Florida, the Greater Tampa Bay area, and the southwest Gulf coast. In each of these

areas preceramic Middle and Late Archaic and Orange period sites have been identified and differences in material culture and subsistence practices have been observed.

Fiber-tempered pottery of the Orange tradition began to be made and used by Late Archaic communities of the study area after about 4200 B.P. According to Milanich (1994:86) there was little change in the basic lifeways of Late Archaic peoples following the introduction of pottery. Material culture from Late Archaic sites is much the same as that of the preceding Middle Archaic. Besides pottery, the only notable changes in material culture are changes in projectile point styles. Point types typically found in Late Archaic sites are the Culbreath, Lafayette, Clay, and Levy types (Milanich 1994; Milanich and Fairbanks 1980), often in association with Orange pottery (Cumbaa and Gouchnour 1970).

Fiber-tempered pottery is clearly the most diagnostic item in Late Archaic material culture inventories from northeast Florida. Orange pottery is widely distributed and easily recognized. According to Bullen (1972), during the Orange 1 subperiod (4000-3650 B.P.), pottery was manufactured by hand modeling and unadorned with surface decoration. Vessels were flat bottomed and rectangular in shape (Bullen 1972). During Orange 2 (3650-3450 B.P.) incised designs appear on pottery in the Orange Incised and Tick Island types. Vessel forms are thought to be the same as Orange 1. Orange 3 (3450-3250 B.P.) is characterized by the appearance of rounded vessels with flat bottoms. Incised designs persist and rims are thickened and flanged. Sand appears in the pastes during Orange 4 (3250-3000 B.P.) and simple incised motifs are common. By Orange 5 sandy and chalky ware pastes are common and bowl forms predominate. Originally coiling as a method of manufacture was thought to begin during this subperiod (Bullen 1972), but a radiographic analysis of Orange period sherds from the St. Johns Basin has shown that this practice began as early as Orange 2 (Endonino 2000). Many other details of Bullen's (1972) Orange sequence have yet to be verified. One recent project at the Summer Haven site (8SJ46) produced a large assemblage of Orange sherds whose physical and decorative attributes would, according to the Bullen sequence, postdate by several centuries the C14-age of ca. 3840-4000 for associated oyster shell (Janus Research 1995). Likewise, new AMS dates on Orange Incised from sites in the middle St. Johns suggests that attributes of the sequential Orange 1-3 subperiods were actually coeval (Sassaman 2003b).

St. Johns Period

Following the Late Archaic/Orange/Transitional period is the long-lived St. Johns period. Beginning no later than 2500 B.P. and ending with European contact, St. Johns chronology is divided into two periods, St. Johns I (2500-1250 B.P.) and St. Johns II (1250 B.P. to contact). These periods are further divided into St. Johns I (2500-1900 B.P.), Ia (1900-1500 B.P.) and Ib (1500-1250 B.P.); and St. Johns IIa (1250-950 B.P.), IIb (950-487 B.P. [A.D. 1050-1513]), and IIc (A.D. 1513-1565). These divisions are based on internal changes and responses to regional influences in pottery technology, mortuary ritual, and, late in the period, European contact. The appearance of chalky, spiculate ceramics marks the onset of the St. Johns I period; check stamping on chalky,

spiculate pottery ushers in the St. Johns II period. The St. Johns IIc people are the various Timucuan-speaking groups described by European chroniclers (Milanich 1994:247).

Environmental conditions during the St. Johns I period were essentially like those of their Late Archaic and Orange ancestors. Archaeological surveys have demonstrated that Orange and St. Johns period components are found in the same locales and often at the same sites (Milanich 1994:254-255; Miller 1998:80). Wetlands in both coastal and riverine settings were still as important as they were during the preceding periods. Additionally, numerous sites are found around the many lakes and wetlands of central and east-central Florida (Milanich 1994:254). Along the coast, lagoons, barrier islands, and marsh environments attracted St. Johns peoples. Inland, the St. Johns River, its tributaries, and marshes also proved to be attractive to St. Johns peoples. According to Milanich (1994:254) the basic life-way of St. Johns peoples "seems to have been little changed from their Late Archaic, Orange period predecessors." Similarly, there is also a significant degree of continuity between the locations of St. Johns I and St. Johns II sites (Miller 1998:80-82). Populations increased through time from Orange to St. Johns II as indicated by an increase in the number of sites for each period per century (Miller 1998).

Continuity of site occupation from one period to the next underscores the importance of wetlands to peoples of the St. Johns region (Milanich 1994:263). The dietary regime and procurement strategies used by St. Johns I peoples were continued by St. Johns II peoples. Maize agriculture, which was important to populations in northwest and north-central Florida, does not seem to have played an important role in the subsistence strategy of St. Johns II groups. Evidence for maize agriculture is almost nonexistent in the St. Johns region. One cultigen that has been identified as being used by St. Johns II populations, and was probably used by previous populations, is the bottle gourd (*Langeria siceria*). These were probably not a major food source, but were used instead as containers. More than 2000 seeds and rind fragments were recovered from Hontoon Island by Purdy (1991; Newsom 1987).

Populations during the St. Johns II period evidently were larger than those in St. Johns I period (Miller 1998:85) and, with this growth came the development of complex sociopolitical system like those of the Ft. Walton and other Mississippian period societies (Milanich 1994:263). It is not certain whether chiefdom level societies could be supported by the economic system of this region. St. Johns IIb mounds at Shields, Mount Royal, and Thursby—all along the St. Johns River—mirror the mounds of Mississippian chiefdoms in morphology and artifact content, suggesting widespread ideological influences. Conversely, the local St. Johns IIb economies apparently did not involve intensive food production, specifically maize farming.

Material culture during the St. Johns I period differs significantly from that of the Archaic periods. As noted earlier, the widespread use of chalky, sponge-spiculate pottery marks the onset of the St. Johns ceramic tradition. St. Johns I village ceramics are plain or otherwise display incising, pinching, or punctations. Some Deptford tradition ceramics, or local copies, also occur. In the St. Johns Ia period, surface decoration

disappears as nearly all wares are plain. St. Johns Ib village ceramics are still almost all plain. Nonlocal ceramics are present throughout St. Johns I, I a, and Ib times, but they are often restricted to burial contexts.

The St. Johns II period is marked by the appearance of check-stamped pottery, and this has allowed archaeologists to distinguish between St. Johns I and II sites and/or occupations at the same site. About the same time that check-stamped ceramics first appeared in the St. Johns region, they also appeared in regions of the Weeden Island culture (Milanich 1994:262). Some archaeologists speculate that the appearance of check-stamped ceramics coincides with the spread of maize agriculture, although evidence to substantiate this is lacking at present (Milanich 1994:263). St. Johns IIb ceramic assemblage diversified to include extraregional trade goods and stylistic motifs of Mississippian-influenced cultures found along the Gulf Coast and to the north.

Stone tools in St. Johns sites are similar to those in earlier sites in the St. Johns Basin with the exception of projectile point forms. Overall during this period, points tend to be smaller (Bullen 1975:3) and not as well made as earlier forms. Diminutive representations of Archaic forms are still manufactured, as are new ones. New point types include the Jackson, Florida Copena, Bradford, Columbia, Broward, Taylor, Westo, Florida Adena, Gadsen, Sarasota, and Ocala types (Bullen 1975). According to Purdy (1981:47-48) other stone tool forms from the late ceramic period tend to be nondescript and resemble Archaic specimens. Drills, microtools, blades, hafted end scrapers, and other tool forms were also made.

Similar lithic artifact types are found in both St. Johns I and II. An exception worthy of mention is the transition from the Columbia, Bradford, Duval, Leon, and O'Leno points to the Pinellas, Ichetucknee, and Tampa points types around St. Johns IIa or IIb times (Bullen 1975:6). Tools of shell and other materials were also made during this period. Shell adzes, celts, picks, hammers, and cutting tools have been recovered from numerous sites, as have ornamental shell items, such as beads and gorgets. Wood was also utilized to make a host of items. Purdy (1991) recovered large numbers of wood chips in her Hontoon Island investigations. These chips are thought to be the result of wood-working activities such as making dugout canoes, paddles, bowls, tool handles, and small points, among other things (Milanich 1994:266). Cordage, fabric, and matting were also made as in earlier periods as evidenced by the presence of fabric impressions on the bottom of ceramic vessels (Milanich 1994:259). St. Johns IIc period sites contain European objects such as nails, chisels, glass beads, and ceramics.

Ceremonialism in the St. Johns area appears to combine indigenous elements with extraregional aspects of practices from within and without Florida (Milanich 1994:260). Generalized Middle Woodland burial mound ceremonialism has been recognized in the St. Johns cultural area. Low truncated cone-shaped burial mounds appear for the first time during St. Johns I (Milanich 1994: 247). Mounds grew in size during the St. Johns II period, although late-period mound episodes was often added to existing mounds dating as early as 6000 B.P. (Sassaman 2003a). Local copies of Deptford and Swift Creek ceramics appear in burial mounds, as do exotic trade items by St. Johns Ia

(Milanich 1994:247). These exotic items include copper discs, cymbal shaped ear spools, mica and galena, greenstone celts, quartz plummets, and bird effigy elbow pipes (Milanich 1994:261).

By St. Johns Ib, Swift Creek-Weeden Island ritual and belief spread and are reflected in the types of ceramics found in mounds (Milanich 1994:262). Late varieties of Swift Creek Complicated-Stamped and Weeden Island Incised and Punctated ceramics are present, as are St. Johns Plain and Dunns Creek Red. Smaller truncated cone-shaped burial mounds decline through St. Johns IIa. Exotic trade goods are present and Hopewellian influenced ceremonialism is still present. St. Johns IIb mounds are multi-stage mounds, which is considered to be evidence for intensified ceremonialism. Fort Walton and Safety Harbor Check-Stamp ceramics appear alongside exotic trade goods and Southern Cult motifs in ceremonial burial contexts. Toward the end of St. Johns IIb, Cult motifs and truncated mounds increase. Gold and silver appear in some mounds, such and the Thursby Mound across the St. Johns River from Hontoon Island (Moore 1892-94), and indicate at least indirect contact (i.e., shipwreck scavenging) with Europeans who had expropriated these valuables from Latin American civilizations. Burial and temple mound building continued into St. Johns IIc, but European influences in the form of missionization and disease eventually ended their construction. The archaeology and history of the Spanish in the region and their effects on the Timucua are thoroughly documented in several recent works (Hann 1996; Milanich 1996; Worth 1998a, 1998b).

PREVIOUS ARCHAEOLOGICAL RESEARCH AT CRESCENT LAKE

The Crescent Lake area has witnessed virtually no archaeological field investigations by professionals in the modern era, although local collectors have worked its margins and near-shore lake bottom for the past few decades, recovering thousands of lithic tools and pottery from dozens of locations.

The earliest record of sites on Crescent Lake dates to the 1884 publication of J. Francis LeBaron, who noted a shell midden on Bear Island. John Bartram (1942) likewise commented on this site. In his 1952 treatise on the northern St. Johns region, Goggin (1952:86) records this site as 8PU17, which is consistent with the current listing and location in the Florida Master Site File (FMSF).

Two other sites on the eastern side of the lake are listed by Goggin: 8PU16, a mound near Crescent City, and 9PU15, a midden at Pomona. Both of these sites are problematic as far as current records are concerned. The location of the mound site (8PU16) is ambiguous in the FMSF. A completely different site number (8PU90) is given to a mound in Crescent City (see Chapter 4), and this may be the very one recorded by Goggin. Alternatively, one of the other sites recorded in the present survey just north of Crescent City may have once supported a mound and corresponds to Goggin's 8PU16.

The other Goggin site, 8PU15, is shown on his map as a midden at the south end of Lake Broward near Pomona Park, a little over a mile west of the northwest shore of

Crescent Lake. The FMSF has 8PU15 listed as a midden at Pomona Landing. A collection of artifacts from Pomona apparently is curated at the Peabody Museum at Harvard, although Goggin neither described nor illustrated any such objects.

Two Flagler County sites along the lake margin were apparently recorded in the 1950s as part of Goggin's effort at establishing site files at the (then) Florida State Museum, although neither is included in his 1952 synthesis. Crescent Lake 1 (8FL8) is recorded in the FMSF as an artifact scatter at the location at the junction of Road 20/100 and Salt Creek. Crescent Lake 2 (8FL9) is listed as a 19th-century house site at Grimsley Neck. Apparently neither site has ever been field-checked and were recorded on the basis of local informants.

All other Flagler County sites along Crescent Lake in the FMSF were entered into record in 1988 from informant leads gathered during the Flagler County Archaeological Survey conducted by Historic Property Associates of St. Augustine. Although described as a "reconnaissance" survey (Historic Property Associates 1988:3), very few sites were actually visited in the field. Rather, the project collected information from local informants and thus suffered from the biases of incomplete and unverified data, including precise locations, site size, site conditions, and content. Seven new sites were filed; the descriptions of each of these sites is given below in verbatim form (Historic Property Associates 1988:28-30). The locations of each of these sites is provided in Chapter 4 of this report.

> 8FL159: Located one-quarter mile south of Andalusia (SR 100), a still-standing turpentine camp. The site is a shell mound directly on Crescent Lake. It is twenty-five feet long and one to two feet high with a crescent shape. It was reported to have once been five feet high before excavated for fill material. Numerous Spanish bayonets were noted near the midden, which was comprised of univalve shell and St. Johns Plain and St. Johns Check Stamped pottery. Another informant said "arrowheads" were found in the vicinity. Even though the site has been disturbed, its location is important to understanding Indian lifeways.
>
> 8FL158: Also located on the northeast shore of Crescent Lake, this shell midden is one-half mile south of SR 100. About 400 feet from the lake, this site is on a five-foot high slope near a jeep trail. An informant reports that it has been removed for fill. It is possible that some of the site may be intact. It should be field checked.
>
> 8FL157: These are two small shell middens west of Salt Creek on Crescent Lake, directly on the lakeshore. An informant indicates that some of the middens have been removed for fill. Lithic tools are reported to have been found in the vicinity. The sites should be field-checked to determine their nature, integrity, and exact location. The sites are very close to the previously recorded 8FL8, and they should be checked for possible duplication.
>
> 8FL160: On the shore of Crescent Lake, this shell midden is one-quarter of a mile from the edge of the lake in a hardwood swamp, which is frequently inundated. An informant reports that it is twenty feet long, twelve feet across and three feet high. Prehistoric ceramics were found there (type unknown). According to the owner the site

has already been vandalized. It should be field-checked to assess integrity and cultural affiliation.

8FL161: Also on the eastern shore of Crescent Lake, the site is a pair of shell middens, 1200 meters from the water's edge along White Oak Swamp. The shell middens are low (no more than one meter high) and are frequently flooded. They are approximately 3 meters long. Prehistoric ceramics were found there (type unknown). The owner does not wish the site's location to be published.

8FL162 (McReynold's Island): This area is part of a Spanish Land Grant (Sect 38/39) on Crescent Lake. An informant reports that a small, historic orange grove operated there, with docks for shipping to Crescent City. This site should be thoroughly field-checked for any historic or prehistoric materials.

8FL163 (Bear Island): This small island is located in Crescent Lake, about one mile west of a sawgrass marsh, Buzzard Roost, and across the water from several Spanish land grants. An informant reports that projectile points and gold coins have been found there. This area deserves a complete field check for site type, integrity, and cultural period.

When the Bear Island site (8FL163) was entered in to the FMSF, the eastern, Putnam County portion was designated site 8PU840. The existed Bear Island site in Putnam County, 8PU17, is encapsulated by 8PU840. Together, sites 8FL163 and 8PU840 encompass the entire island.

Only one other site is recorded in the FMSF for the immediate Crescent Lake area. The Piney Bluff Landing site (8PU723) was entered into record in 1990 as a prehistoric midden with Mount Taylor, Orange, and St. Johns I components. Apparently the site was recorded in conjunction with resource assessment of the undeveloped Dunns Creek State Park of the Florida State Parks system. Additional details on 8PU723 are sketchy, but the site was visited briefly during the present survey to collect additional information (see Chapter 4).

The only other archaeological research on Crescent Lake known to this study is the 1983 inventory of the artifact collections of Eddie and Artie Morris conducted by students of Barbara Purdy. A summary of this work is reported in Chapter 5, but suffice to say at this point that the numerous hafted bifaces collected by Eddie Morris along the western margin of Crescent Lake reflects a continuous trend of relatively intensive human occupation dating from at least the Early Archaic period.

CONCLUSIONS

Crescent Lake is an unusual body of water for northeast Florida in both physiographic and archaeological terms. Occupying the geological boundary between the Crescent City Ridge and the Eastern Valley, Crescent Lake has contrasting shorelines: a western margin with a steep escarpment that is invulnerable to minor changes in lake levels, and a eastern margin of low-lying, wet terrain that is susceptible to flooding and being stranded by even slight changes in lake levels. Archaeologically, this means that sites on the eastern shore and near-shore areas will provide good proxy data

for changing lake levels, because such locations were unlikely to have sustained human settlement for long periods of time and therefore promoted frequent relocation and resultant small, single-component sites. Conversely, the record of human occupation on the western margin of the lake ought to reflect greater landform stability and its potential for sustained human settlement. The extant record of archaeological sites on the lake is insufficient to determine whether such an inference holds true, but judging from the Morris collection alone, the western margin of Crescent Lake indeed enabled long-term, repeated settlement over many millennia.

The geological work of Adams (1976) provides preliminary evidence for an overall increase in lake size and depth since the early Holocene. This is unlikely to have been a unidirectional trend, with no short-term reversals or long periods of stability. It will take many more data points to establish a fine-grained record of changing lake levels. For now, we have sufficient reason to believe that many sites lie beneath the waters of Crescent Lake and it is the purpose of this survey to locate such sites and assess their potential for archaeological research.

CHAPTER 3
SURVEY METHODS

The Crescent Lake Survey was designed primarily as a reconnaissance operation to locate and assess submerged archaeological sites in the near-shore and shallow areas of Crescent Lake. Although the methods for reconnaissance survey in shallow water bear some resemblance to terrestrial survey in terms of sampling interval and sediment processing, the physical means of extracting sediment from the lake bottom is vastly more challenging than shovel testing. The primary means to extract sediment was piston coring, a technique widely applied in geosciences and used to great effect to sample archaeological deposits (Purdy 1988). However, piston cores are not typically extracted in the field; rather, they are delivered to a laboratory setting where they are split in two, profiled and analyzed. In adapting piston coring to our needs for reconnaissance survey, we had to devise a method to extract sediment from cores in the field. In addition, core sample from known or suspected sites were extracted and returned to the University of Florida, where they were treated in the more typical fashion. Profile descriptions and radiometric samples for this project were derived from these more traditional sources.

The methods of sampling, coring, and sediment processing are described the sections that follow. Included as well are details of our limited efforts at terrestrial survey at previously recorded sites with which we had access, and at several new sites.

RECONNAISSANCE SURVEY OF NEAR-SHORE LAKE BOTTOM

Near-shore lake bottom of Crescent Lake was stratified for sampling purposes based on bathymetric data issued with the Florida Geographic Data Library (FGDL). The FGDL is a rich source of satellite imagery, aerial photographs and spatial (GIS) data for the state of Florida. Maintained and distributed by the GeoPlan Center at the University of Florida, FGDL data are organized by county on CD-ROM. Well over 200 layers of GIS data currently exist for Florida counties, including data on geology, soils, hydrology, topography, and bathymetry, as well as roads, zoning, schools, and other cultural features, and historic and modern land use. GeoPlan compiles information from all sorts of data-collecting agencies and ensures that they are projected and integrated in a consistent fashion. The lead agency in developing FGDL data has been the Florida Department of Environmental Protection, with the Florida Department of Transportation also contributing much to the program.

Bathymetry from FGDL data is illustrated in Figure 3-1. The contour interval of the bathymetry is 3 feet for water depths 6 feet or less, although not all submerged surfaces in less than 6 feet of water are accurately depicted in this map. Several areas with water depth 12 feet or more are shown in the center of the lake, and in Dead Lake and the channel linking it to Crescent Lake. No 9-foot contours are depicted in Figure 3-1.

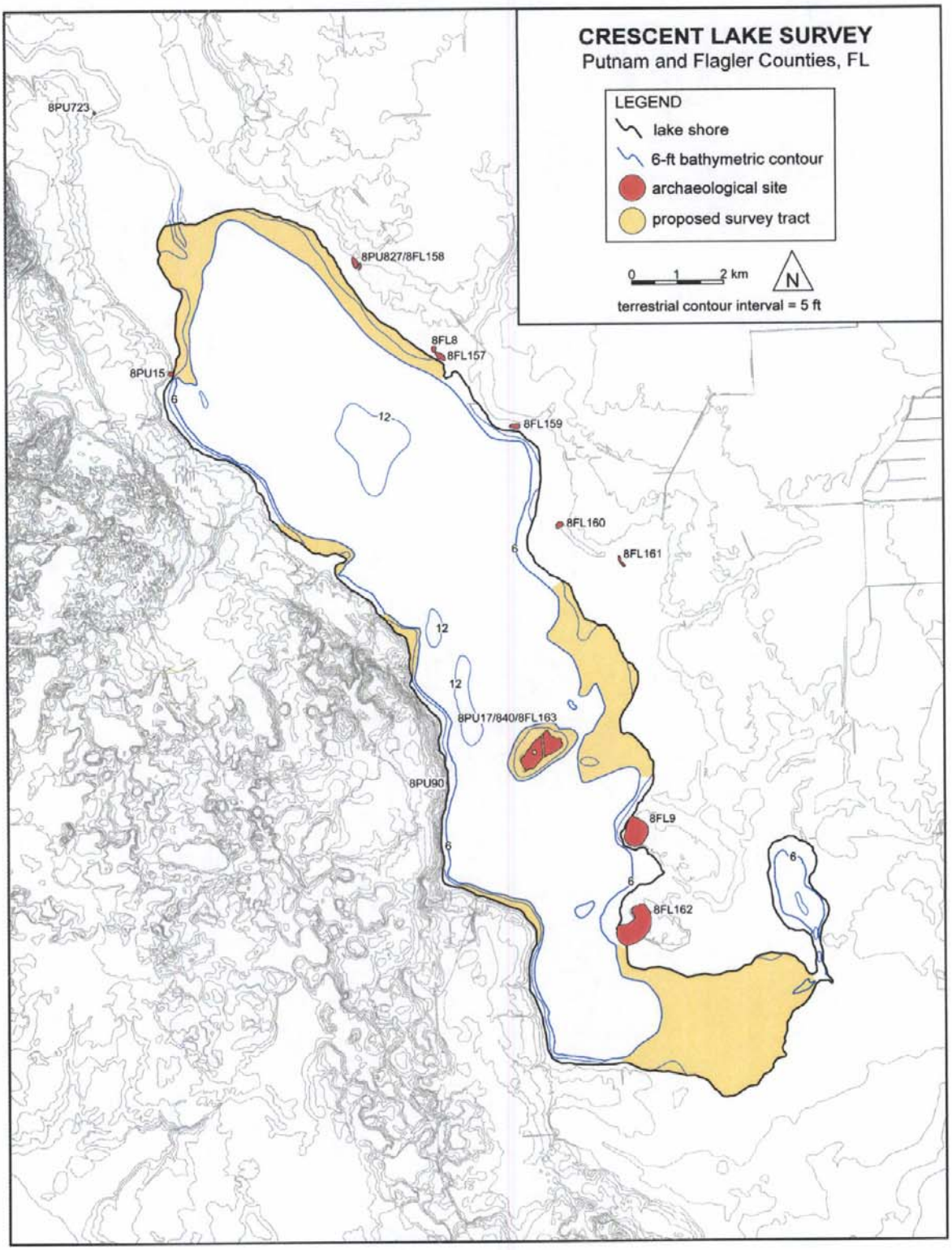

Figure 3-1. Map of Crescent Lake showing bathymetry of the lake bottom, previously recorded archaeological sites, and sample strata.

Given the watercraft and coring technology available for this project (see below), lake bottom under more than 6 feet of water was excluded from consideration. The 6-foot bathymetric contour of Crescent Lake is shown in Figure 3-1 as the emboldened line. Lake bottom from this line landward constitutes the sampling universe for this project. This area comprises about 24 percent of the total lake surface area, or roughly 3800 acres. Dead Lake is not included in the present survey effort.

Within the roughly 3800 acres of lake bottom under 6 feet or less of water, areas including marked 3-foor contours were targeted for survey. Added to this sample are several locations of apparently submerged points or isolated hillocks in 6 feet of water or less, as well as the broad, submerged plain at the southeast end of the lake. All such area is shaded in Figure 3-1 as "proposed survey tracts." Ultimately, 23 locations chosen on the basis of bathymetry were actually tested (see Chapter 4). Field work showed that the FGDL bathymetric data were often off by several feet, and not consistently enough to attribute the discrepancy to fluctuating water levels alone.

Universal Transverse Mercator (UTM) coordinates for 23 sample locations were derived from USGS topographic maps and each located on the lake with the use of a hand-held Geographic Positioning System unit. Water depth was recorded at each location of testing with the use of graduated section of ½-inch galvinized conduit dropped from the edge of a 15.5-feet jonboat. As reported in Chapter 4, several locations purported to hold less than 6 feet of water were actually much more deeply submerged.

At locations at or below the purported bathymetric water depths, testing began with judgmental probes with a 4-inch bucket auger and ½-inch soil tube. In water less than 4 feet deep, the crew of 2 to 4 surveyors also traversed the lake bottom on foot searching for obvious signs of midden or artifacts. Eventually, one or more piston cores were dropped into the lake bottom to retrieve subsurface samples at each bathymetric locus.

Piston cores consisted of various lengths of 3-inch (inside) diameter PVC pipe. The distal end of a section of PVC was beveled with a file to form a cutting edge. The opposite end was drilled transversely with a 3/-8-inch bit to accept a bolt assembly for retrieving the core. After positioning a section of pipe over the sample locus, a metal piston was placed over the upper end and hammered into the lake bottom with a sledge hammer (Figure 3-2). Various types of pistons were used, starting with a conventional cap consisting of a section of 4-inch diameter galvanized metal pipe with threaded cap, followed by a galvanized metal flange held in place with cordage anchored to a cleat mounted to the pipe with a hose clamp. This latter device proved sufficient and cost-effective in the relatively soft sediments of the lake bottom. Generally, one or more crew members positioned and stabilized the section of pipe, while another crew member, positioned on the deck of the jonboat, drove it into the lake bottom.

Cores were retrieved by first filling the upper portion of the pipe with water then plugging with a bung. Often cores could be extracted manually, but when sunk into basal clays or dense sands, cores had to be extracted with a tripod and come-along. Loaned to

Figure 3-2. Views of piston coring operation: driving PVC into lake bottom with sledge hammer (top), and extracting core tube with tripod and come-along (bottom).

the project by Barbara Purdy, this very equipment is described by her in an article on piston coring (Purdy 1988).

Except for 12 cores returned to the lab for analysis, sediment from cores was extruded in the field with the use of a PVC ramrod. Custom-made for this project, the ramrod consisted of a 2-inch diameter, 7-ft long section of PVC with a concrete/bondo plug at the distal end and a galvinized metal piston at the proximal end. The distal end of the ramrod was inserted into the proximal end of the core, then hammered to push the sediment out the opposite end (Figure 3-4). All extruded sediment was captured in a hand-held screen fitted with ¼-inch hardware cloth. The crew made notes about the depths stratigraphic breaks in the sediment, and, especially, occurrences of anthropogenic soil and/or artifacts. All artifacts, vertebrate faunal remains, and samples of invertebrate (shellfish) remains were bagged by core. Also recorded for each core was information on water depth, total sediment (core) depth, and GPS location. Each core was assigned a unique value in the GPS unit and in the paper notes. An inventory of all cores with information of location, water depth, sediment depth, and content is provided in Appendix A.

Figure 3-3. Extruding sediment from core tube with PVC ramrod.

SURVEY OF KNOWN OR SUSPECTED SITES

The bathymetric sampling effort proved largely unproductive as regards site discovery. Fortunately, three independent informants provided information on several known or suspected sites. In addition, most of the extant sites along the margins of Crescent Lake held good potential for near-shore, submerged deposits. Thus, the bulk of the survey effort focussed on piston coring and limited terrestrial survey of these known or suspected locations of sites.

Piston cores at known or suspected sites followed the procedures outlined above, with the exception that test locations were not chosen randomly. At all such locations, cores were driven in at arbitrary locations within the near-shore vicinity of sites, with subsequent cores dropped along either linear transects paralleling the lake shore, or more-or-less cruciform patterns running both parallel and perpendicular to the lake shore. Again, all fill from piston cores was passed through ¼-inch hardware cloth and recovered artifacts and/or ecofacts bagged and labeled by core number. All locations were mapped with the GPS unit. Twelve cores from known or suspected sites were collected and returned to the lab for analysis (see below).

Terrestrial survey of known or suspected sites was not anticipated in the original research design of this project, but was attempted whenever permission could be obtained from landowners. Generally, terrestrial survey consisted on a simple pedestrian inspection of exposed surfaces and lake shore. All observed artifacts on surfaces were collected and bagged by site provenience; faunal material, when observed, was usually sampled (i.e., grad sample) and not thoroughly collected completely. None of the sites visited in this project yielded more than a handful of artifacts or faunal remains.

Shovel tests at a few of the known or suspected sites consisted of judgmental tests some 50 x 50 cm in plan and as much as 120 cm deep. All fill from shovel tests was passed through ¼-inch screens and artifacts and ecofacts bagged by unit and stratum, if applicable. Sketches were made of shovel-test profiles with two or more distinct strata.

ANALYSIS OF CORES

Piston cores from 12 locations of known or suspected sites were returned to the University of Florida (UF) for analysis and description. At the courtesy of Dr. Mark Brenner and colleagues of the Geosciences Department of UF, we were able to utilize the state-of-the-art equipment housed at the Florida Institute for Paleoenvironmental Research (FLIPER). Particularly useful was their Geotek Multi-Sensor Core Logger (MSCL), a device that measures magnetic susceptibility, p-wave velocity, and sediment density on intact cores, and can produce high-resolution digital images of sediment sections (Figure 3-4). Cores were first passed through the MSCL to collect data on bulk density, and then split lengthwise with a circular saw and jig to expose one a clean face for photographic with the digital instrumentation of the MSCL. These photographs and bulk density data are provided in Appendix B of this report.

Figure 3-4 View of Geotek Multisensor Core Logger (top) and split core (bottom).

Additional analysis of the cores was conducted in the Laboratory of Southeastern Archaeology. Here cores were described for texture, Munsell color, and stratigraphic sequence, as well as sampled for radiocarbon dating. All obvious anthropogenic strata from one half of each core was extracted and passed through 1/8-inch waterscreens. Notes were made on the presence of microfaunal remains, artifacts, and charcoal. Details of these profiles are given in Appendix B.

CONCLUSION

A total of 151 cores were extracted from 25 locations in Crescent Lake. Twenty-three of these cores are classified as "bathymetric" in Appendix A, and consist of cores sunk in locations of purposive survey. One-hundred-sixteen cores consist of piston cores driven into known or suspected archaeological sites, and are coded in Appendix A as "test/site." Each one of these test cores was extracted in the field. The remaining 12 cores were returned to the archaeology lab at the University of Florida, where they were split and analyzed. These 12 cores are coded in Appendix A as "sample" cores.

The average water depth at core locations was 104.0 cm and ranged from a low of 40 cm to a high of over 220 cm. Sediment thickness in cores varied from 20 to 200 cm, averaging 89.8 cm. Cultural material or suspected anthropogenic soil (i.e., midden) was observed in 38 of the 146 cores sunk. Another nine cores were placed in locations with sherds and/or faunal remains on the surrounding submerged surface. A detailed account of the survey effort follows in Chapter 4 of this report.

CHAPTER 4
SURVEY RESULTS

As described in the preceding chapter, survey of Crescent Lake involved three types of sampling loci: (1) submerged, near-shore locations whose potential for archaeological sites was predicted from bathymetry; (2) submerged land adjacent to previously recorded archaeological sites along the lake margin; and (3) near-shore and submerged contexts for archaeological remains frequented by local relict collectors. The first of these, by definition, was fully subaqueous, and thus involved primarily piston cores and augers. Several of the 23 bathymetric loci, however, were adjacent to previously recorded sites or collector locations and thus included some terrestrial reconnaissance. The second and third sampling realms involved both underwater coring, as well as survey on shore whenever such land was accessible. Regardless of the mix of underwater or terrestrial survey, the results are organized in this chapter by location, segregated by the three major sample types.

To briefly summarize the results of survey, 151 piston cores were extracted from the lake bottom at 25 locations of known or suspected archaeological sites. Cores were dropped in an average of 104 cm of water to an average depth of 89.8 cm. In addition to coring, surface survey and limited subsurface testing was conducted at 12 locations of known or suspected archaeological sites. The combined effort resulted in verification and further documentation of 11 of 14 previously recorded sites and preliminary testing and documentation of 14 new sites. Among the new sites are two shell middens and several other midden deposits that are fully or partially submerged.

BATHYMETRIC RECONNAISSANCE SURVEY

Twenty-three locations were earmarked for reconnaissance survey based on the bathymetry of USGS topographic quads. For the most part, this aspect of the survey was not terribly fruitful, mostly because USGS bathymetry proved to be largely inaccurate. Locations of submerged knolls and points could not be located with UTM coordinates derived from topo quads. Some of the discrepancies are no doubt due to dredging that has altered the lake bottom adjacent to the central channel. In no case was archaeological remains detected apart from independent (non-bathymetric) information about actual or suspected site locations.

Survey Loci

Figure 4-1 depicts all locations that were examined for submerged archaeological remains based on bathymetric properties. Table 4-1 summarizes information on each of these 23 loci.

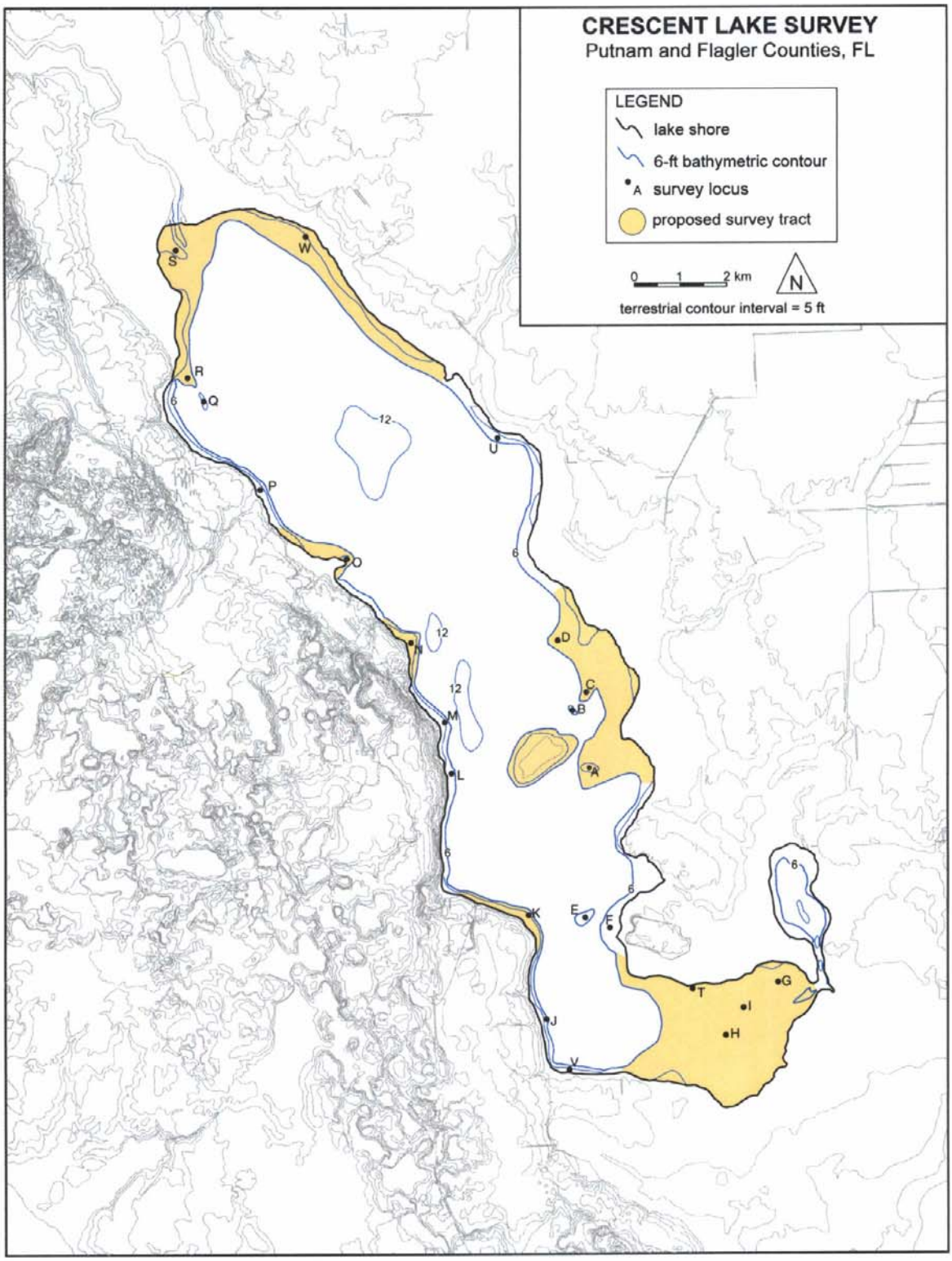

Figure 4-1. Bathymetric survey loci, Crescent Lake Survey, 2002.

Table 4-1. Coordinates and Core Information on Bathymetric Loci Surveyed at Crescent Lake.

Locus	Northing (m)	Easting (m)	Accuracy (m)	Water Depth (cm)	Sed. Depth (cm)	Cultural Material	Notes
Locus A	3256341	453647	4	170	20	N	too deep
Locus B	3257420	453340		>190			too deep
Locus C	3257750	453650		>190			too deep
Locus D	3258800	453130		>190			too deep
Locus E	3253474	453466	4	190	30	N	
Locus F	3253283	453937	5	190	100	Y	bone, shell
Locus G	3252144	457109		200	110	N	
Locus H	3251144	456075	4	>220			
Locus I	3251665	456441	4	>220			
Locus J	3251551	452677		120	60	N	
Locus K	3253493	452324		100		Y	flake; Morris 7
Locus L	3256266	450998		90		Y	organic soil, charcoal; Morris 3
Locus M	3257283	450876	5	136	91	N	
Locus N	3258839	450256	5	75	162	N	
Locus O-1	3260499	449039	5	122	84	N	
Locus O-2	3260474	449087	5	123	99	N	
Locus P	3261189	447719	6	80		Y	fish bone
Locus Q	3263510	446470					too deep
Locus R	3264000	446160					see North Pomona
Locus S	3266600	445850					too deep
Locus T-1	3252132	455478	6	100	100	Y	bone
Locus T-2	3252123	455459	4	140	95	N	
Locus U	3262598	452657	6	90	70	Y	shell, bone
Locus V	3250554	453158				N	pottery on shore; Morris 8
Locus W-1	3266054	449093	5		30	N	8PU827/8FL158
Locus W-2	3266053	449089	5	115	115	N	8PU827/8FL158
Locus W-3	3266027	449110	4	120	33	N	8PU827/8FL158
Locus W-4	3266028	449103	5	115	43	N	peaty; 8PU827/8FL158

Locus A. An area shown on the USGS topo map as a 300-by-150-m knoll 600 m southeast of Bear Island proved to be submerged by 6 feet of water, not the 3 feet shown bathymetrically. Repeated efforts to retrieve sediment with a bucket auger failed. Only 20 cm of sediment was observed in one auger (A-1); the light brown sandy loam contained no cultural material or evidence of anthropogenic soil. Apparently, the bathymetry for this area of the lake is inaccurate. Water depth across the entire vicinity of Locus A was not less than 170 cm (5.6 ft).

Locus B. Similar to Locus A, Locus B is defined on the USGS topo map as 250-by100-m knoll between Bear Island and the terrestrial point known as Buzzard Roost, approximately 1 km north of Locus A. The bathymetry of this locus shows a water depth of 6 ft, but nothing this shallow was observed in repeated attempts to probe the locus. No augers or cores were successfully retrieved at this locus.

Locus C. According to USGS bathymetry, northeast of Locus B some 500 m is a point of land under less than 6 ft of water. Probing in the location showed water depth to be substantially greater. Augers or cores were not possible at this locus.

Locus D. One kilometer northwest of Locus C is a similar point of submerged land, likewise shown as under less than 6 ft of water. Again, probing in the location showed water depth to be substantially greater. No augers or cores were recovered at this locus.

Locus E. Three kilometers south-southeast of Bear Island, at the area of constriction between Breezy Point and McReynolds Island, is a knoll some 400-by-200 m in size and under approximately 6 ft of water. Probing showed that water depth on USGS bathymetry was accurate at this locus. Repeated augers at this locus revealed a surface stratum of light gray sand. No cultural material or anthropogenic soil was observed.

Locus F. Southeast of Locus E some 500 m is the submerged shelf of the western margin of McReynolds Island, location of 8FL162. Sediments under 6 ft of water were probed with the auger, which resulted in the recovery of a small fragment of bone. A piston core driven 100 cm into lake bottom contained one fragment of bivalve shell. Sediment in the piston core was homogeneous gray fine sand, lacking any evidence for anthropogenic influences or other inputs of organic matter. Still, combined with suggestive evidence for archaeological deposits and proximity to 8FL162, the locus was earmarked for additional piston cores (see section of site testing below).

Locus G. In the extreme southeast cove of Crescent Lake, some 700 m west of the channel outlet connecting Dead Lake and Haw Creek to the lake, a bucket auger was used to probe what purportedly was a shelf of land under no more than 4 ft of water. Water depth was actually some 6.5 feet in this location and augered sediments 110 cm thick consisted of soft, black silty mud. No cultural material or anthropogenic soil was observed.

Locus H. A small knoll some 1.4 km southwest of Locus H punctuates the flat plane of submerged land submerged under at least 6 ft of water west of Green Bay Point. Repeated probes in the locus failed to locate the knoll. Water depth was instead well over 7 ft and no sediment was sampled.

Locus I. Equidistant between Locus G and Locus H is a point of submerged land purportedly under less than 6 ft of water. Repeated probes at this locus failed to locate lake bottom in less than 7 feet of water. No augers or core samples were retrieved.

Locus J. A small shelf of land submerged under a recorded 3 ft of water along the southwest margin of Crescent Lake was submerged by 4 ft of water. Approximately 60 cm of sediment in a piston core contained modern bivalve in a light brown fine sand. No cultural material or anthropogenic soil was observed.

Locus K. At a submerged point of land adjacent to Breezy Point, in the southwest corner of the lake, a bucket auger driven into sediments under 3.25 ft of water recovered a flake. As this location coincides with one of the sites collected by Eddie Morris (Morris 7) and is this reported further in the section below on site survey.

Locus L. The long, continuous shelf of submerged land fronting the western shore of Crescent Lake is punctuated by a series of broad points. Locus L is one such point at the north end of Crescent City. A series of bucket augers in about 3 ft of water revealed organically stained sands and scattered bits of charcoal, but no definitive cultural material other than fragments of modern asphalt shingles and wood. Locus L coincides with the offshore margin of one of the sites collected by Eddie Morris (Morris 3) and is this reported further in the section below on site survey.

Locus M. A broad point of land approximately 1.5 km north of Crescent City on the western margin of the lake is submerged by only 2 to 4 ft of water. A series of six bucket augers in shallow water near the shore turned up a small fish bone in possible anthropogenic soil; no evidence of midden observed along shore. A piston core in 4 ft of water (M1) consisted of 91 cm of homogeneous light brown sand.

Locus N. A submerged point of land under less than 3 ft of water along the western margin or Crescent Lake, some 3 km north of Crescent City was tested with a single piston core. Actual water depth (2.5 ft) matched USGS bathymetric data. A piston core of 162 cm of homogeneous light gray-brown fine sand yielded no cultural material or anthropogenic soil. Additional auger tests were made about 400 m to the north, where a local informant pointed out the occurrence of shell (Nelson 5). Water in this location was relatively deep (>120 cm) and augers revealed consistently a thin yellow-brown sand over gray sandy clay. No artifacts, shell or anthropogenic soil was observed.

Locus O. Two kilometers northwest of Locus N is a spit of submerged land off of Wiedernoch Point. Four feet of water was found in the locus bathymetrically recorded as 2 ft deep. Two piston cores, one 84 cm, the other 99 cm deep revealed a profile with an upper 5-15-cm-thick light brown sand over a medium to dark brown medium sand with degraded bits of coral, limestone, and clay. No cultural material or midden was observed in either core.

Locus P. Immediately to the south of Hurricane Point, on the western shore of Crescent Lake, a series of bucket augers were driven into sandy deposits under 80 cm of water. Two fish bones were observed in one of the cores, but no definitive cultural material or anthropogenic soil. Locus P is on the southern, offshore margin of one of the sites collected by Eddie Morris (Morris 1) and is this reported further in the section below on site survey.

Locus Q. A knoll of submerged land southeast of Pomona Landing proved to be under more than the 6 ft of water shown on USGS bathymetry. No augers or cores were recovered at this locus. Cores to the northwest of Locus Q coincide with the submerged

margins of previously record site (8PU15) and a new site to the immediate north (North Pomona), which is reported below.

Locus R. Locus R was originally designed to test the point of submerged land southeast of Pomona Landing, locus of 9PU15, but was moved slightly north to test a site brought to our attention by a local collector. This new locus, dubbed North Pomona, was subject to extensive coring and is reported fully in the section below on site survey. Coring at 8PU15 is reported separately below.

Locus S. Located in the extreme northwest corner of Crescent Lake, at the outlet to Dunns Creek, is a submerged terrace that parallels the 12-to-14-foot-deep channel of the creek. Probing in this locus found no less than 6 feet of water. No augers or core samples were retrieved.

Locus T. The shore-parallel submerged terrace 1 km southeast of McReynolds Island at the south end of the lake was tested with two cores. The core near shore was in 100 cm of water and contained a compacted silty fine sand with rooted peat and two bone fragments. A second core some 20 m farther from shore was sunk in 140 cm of water and consisted of 95 cm of compacted dark brown clayey silt with rooted peat and no cultural material.

Locus U. The submerged shelf of land west of Shell Bluff Landing on the eastern shore of the lake was probed with five augers and then tested with a piston core in 90 cm of water. One gastropod shell and bone was found in 70 cm of light brown sand with stringers of organic matter. Locus U coincides with the offshore location of one of the previously recorded sites (8FL159) and is this reported further in the section below on site survey.

Locus V. The shelf of submerged land in a bend along the southwestern margin of the lake was probed repeatedly along the shore where the crew found sherds on the surface of the bank. Sediment consisted of a thin lens of sand overlying gray-green clay. No cultural material was observed. Because Locus V coincides with the offshore margin of one of the sites collected by Eddie Morris (Morris 8), it is given further consideration in the section of site survey below.

Locus W. A location near 8PU827/8FL158 on the broad shelf of submerged land in the northeast corner of the lake was tested with four cores. Due to the soft, muddy nature of substrate, the crew experienced difficulty retained sediment in the cores. The lake bottom in the vicinity was also littered with submerged logs. Some peat was observed in one of the cores (W-4). Because Locus W coincides with the offshore margin of a recorded site, it is given further consideration in the section of site survey below.

PREVIOUSLY RECORDED SITES

Twelve locations in and around Crescent Lake have been recorded as archaeological sites in the Florida Master Site Files with 15 site numbers (Figure 4-2).

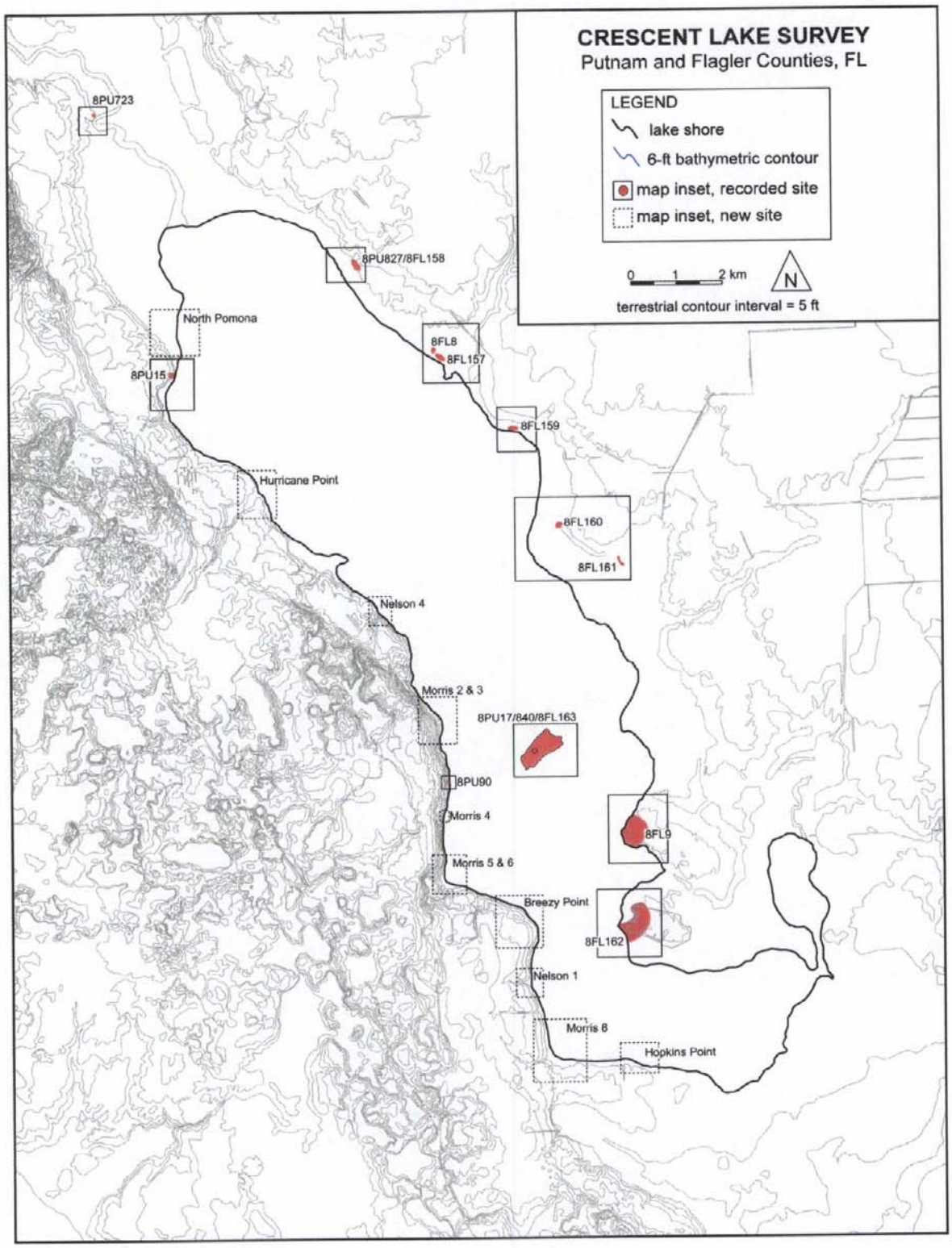

Figure 4-1. Locations of known or suspected archaeological sites, Crescent Lake Survey, 2002. Note: boxes in figure refer to enlargements found in the site maps that follow in this chapter.

Pomona Landing (8PU15)

A site recorded as a St. Johns II midden at Pomona Landing was inspected for terrestrial surface condition and tested offshore with two piston cores (Figure 4-3). The site was accessible from land by a road leading directly to the landing. The site location is recorded in the FGDL as a 0.13 acre exposure at the lake shore. The field crew found no evidence for midden or artifacts at this location but did locate midden in fill of sea wall immediately to the south. The entire area to the south of the landing is developed with numerous docks and a trailer park. The latter is situated in the area labeled "new location" in Figure 4-3. An undulating surface across this area suggests that it was roughly leveled for development. Some whole and crushed shell was observed in small exposures around trees, and finely crushed shell was seen in fire ant mounds, but otherwise surface visibility was poor. Based on the maximum height of the undulating surface, a mound at least 1 m tall may have stood in this location.

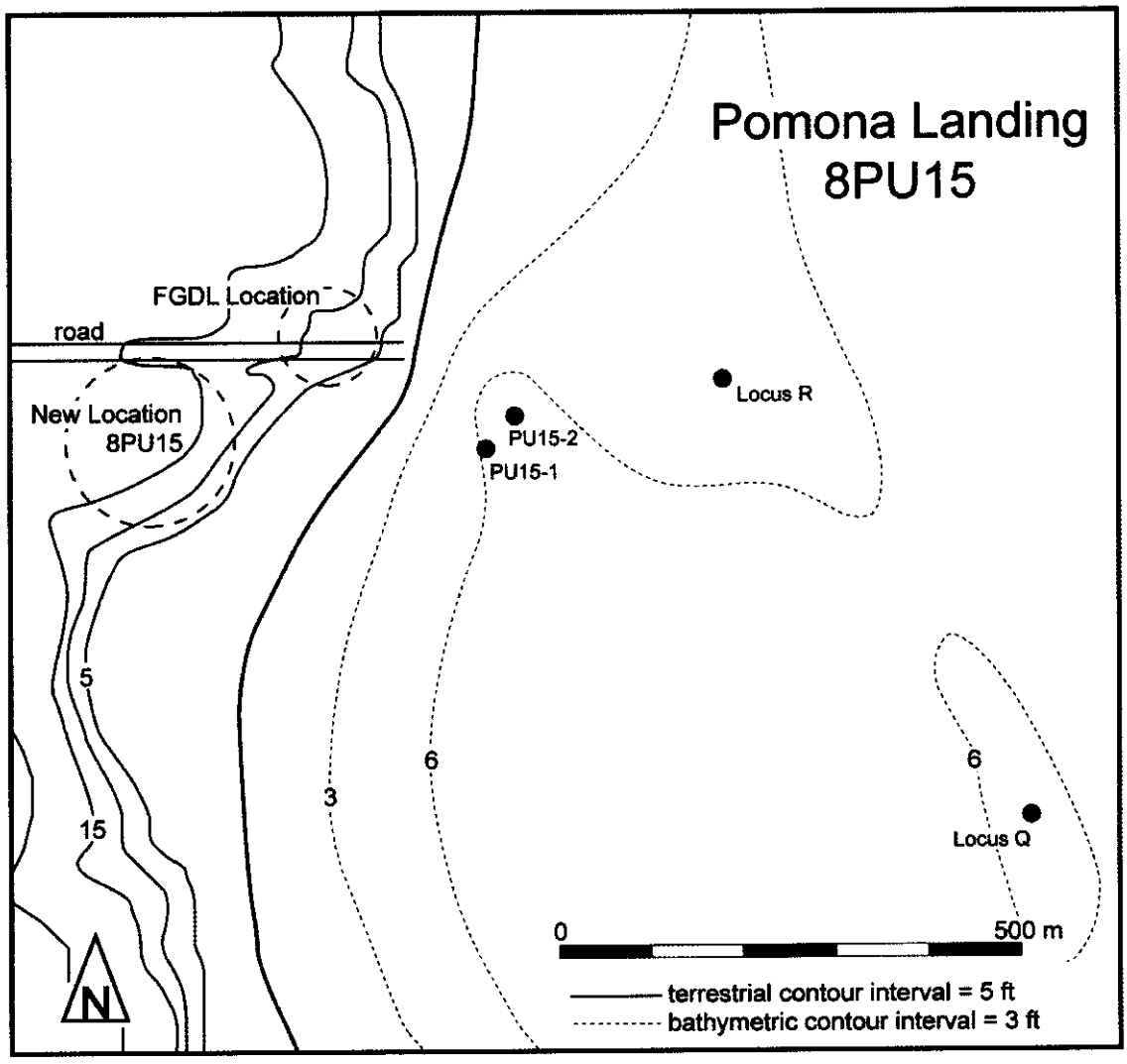

Figure 4-3. Topographic map of vicinity of Pomona Landing site (8PU15), showing locations of piston cores and revised site boundaries.

The only artifacts observed were three small, eroded St. Johns sherds and a fragment of vertebrate bone, all from the midden soil at the back of the sea wall, presumably fill pushed in from the midden upslope. No subsurface tests were made.

Subsequent to the field check on land, two piston cores were sunk in the offshore locations shown in Figure 4-3, on opposite sides of a new dock (not shown on map). The USGS bathymetry shown in this figure is incorrect. Both piston core locations (PU15-1, PU15-2) were in less 3.5 ft of water. Core PU15-1 penetrated 90 cm into the lake bottom to expose a 10 cm stratum of light yellow sand overlying light yellow-brown sand. Core PU15-2 reveled a darker profile, with 86 cm of light gray sand overlying a dark brown silty sand to 124 cm, the terminus of the core. No cultural material or anthropogenic soil was observed. The organically enriched sands of the second core is encouraging, but the shore and near-shore area of Pomona Landing has been extensively modified. Regardless, the terrestrial component of this site is potentially significant, as the subsurface portion of the presumably leveled mound may yet contain intact midden.

~~8PU90~~ PU16 -PU90 IS A NR STRUCTURE

Site 8PU90 is a St. Johns period sand mound located on the western bank of Crescent Lake at the north end of Crescent City. This may be the mound Goggin noted in his 1952 study of the northern St. Johns, although he listed it as 8PU16. The mound was largely destroyed in the early 1950s with residential development at the end of East Edgefield Ave. A remnant of the mound now sits on the western edge of property owned by Mr. Tim Bowser (Figure 4-4), who availed the site for surface inspection and limited subsurface testing. Bowser recently installed a new driveway on the east side of his house, and terraced the adjacent surface, cutting into presumed mound fill. He collected a few St. Johns check-stamped sherds. Bowser also noted that artifact-bearing soil in this remnant of the mound extending 1-2 ft below the surface, but was highly "scattered" owing to numerous surface disturbances.

When the field crew first arrived in the vicinity of 8PU90 they noted scatted shell at the end of Edgefield Ave. A shovel test was excavated in the locus of surface shell (STP1; Figure 4-4). Dug to 80 cmbs, STP1 revealed a mixed profile of construction fill and redeposited soil. A metal bottle cap and a whiteware sherd were recovered at ca. 60 cmbs. With Bowser's permission, the crew excavated a second shovel test (STP2) in the presumed remnant of the mound. Dug to a depth of 120 cmbs, the profile of STP2 reveled a nicely stratified sequence of mounded sand over an apparent buried A horizon at ca. 45-70 cmbs (Figure 4-5). The overlying mound fill consisted of a 10-cm surface stratum of gray sand, over a 5 cm of light tan-gray sand and 10 cm of orange sandy clay, which in turn capped a 20-cm-thick stratum of compacted dark gray sand with charcoal. A sample of charcoal from this stratum was submitted for radiocarbon dating and returned an age of 550 ± 50 B.P. (cal AD 1300-1440). This assay effectively dates the age of the mound, if, as we suggest, the underlying brown sand (45-70 cmbs) is a buried A horizon. Four Orange Incised sherds recovered at ca. 90 cm BS provides an age estimate for this deepest stratum of ca. 4000-3500 B.P. No other artifacts were recovered from STP2 or any other locations on the site. Again, however, the landowner has

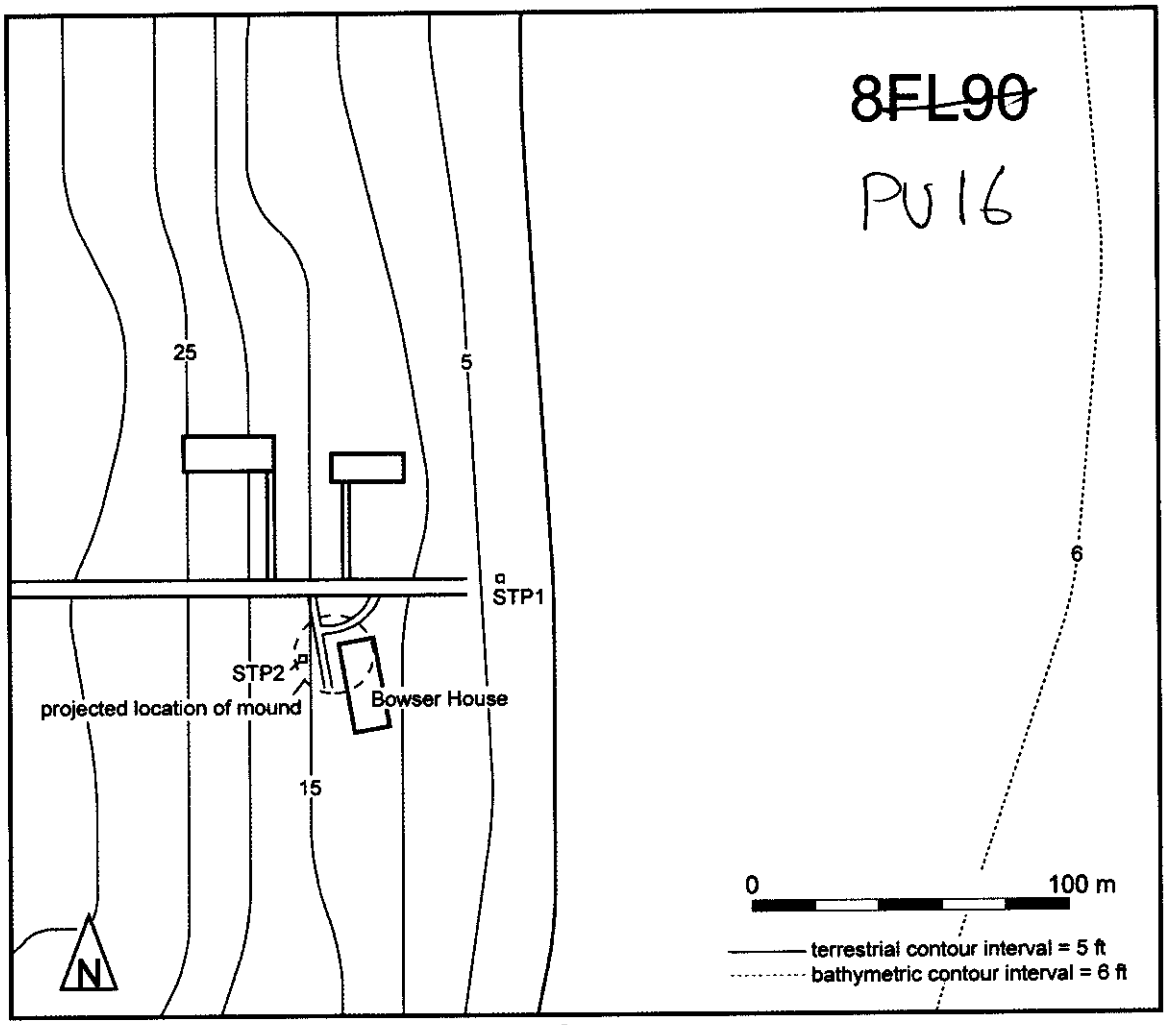

Figure 4-4. Topographic map of vicinity of ~~8PU90,~~ PU16 showing locations of shovel test pits (STP), and projected location of mound. (Note: houses, roads, and driveways sketched and not to scale).

collected sherds and flakes from the mound area and showed two St. Johns check-stamped sherds to the field crew.

In sum, 8PU90 is a severely damaged St. Johns II sand mound whose only intact remnants lie on the east side of a residence at the end of Edgefield Ave. At an estimated 25 m in diameter, the mound was erected late in the St. Johns II period at ca. AD 1300-1440. Underlying the mound is a buried soil that contains at least one earlier component dating to ca. 4000-3500 B.P. No midden was observed outside the immediate context of the mound remnant. Shell on the surface near the lake's edge was apparently redeposited

when houses were constructed in the area in the 1950s. A seawall along the lake shore obscures any profiles afforded by the relatively steep slope of this landform. Preliminary probing in the near-shore lake bottom encountered construction debris and/or sunken dock remnants. No submerged archeological deposits were observed but more testing is required to verify this. The same can be said for the terrestrial component: work to date has documented a remnant of mound, but extensive subsurface testing in the surrounding area is needed to detect surviving remnant of affiliated midden and earlier, submound components.

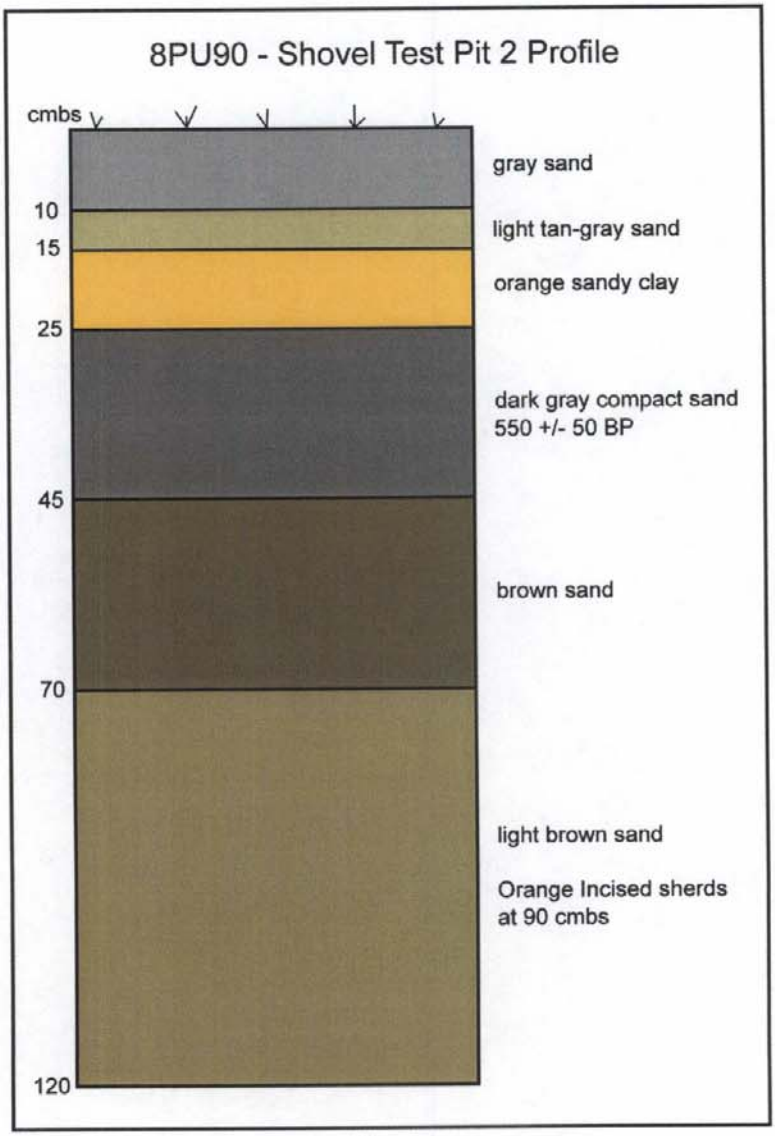

Figure 4-5. Idealized profile of Shovel Test Pit 2, 8PU90.

Piney Bluff Landing (8PU723)

A poorly defined shell midden at Piney Bluff Landing overlooks Dunns Creek about 3 km north of Crescent Lake (Figure 4-6). An attempt to access the site from land failed, so the crew traveled by jonboat to the bank of the site, located at the first major bend of Dunns Creek. No artifacts or midden were observed along the bank. Inspection of the area between an abandoned house and the creek revealed scattered shell. Additional scattered shell and midden soil was observed along road west of the house. Midden was not observed in a ditch on the west side of the road, so it seems unlikely that the road midden is intact. Source of this probable redeposited fill not observed. Collected from the road were six eroded St. Johns sherds, a *Busycon* spire fragment, and the midsection of an Archaic stemmed biface with Marion-like morphology and an impact flute.

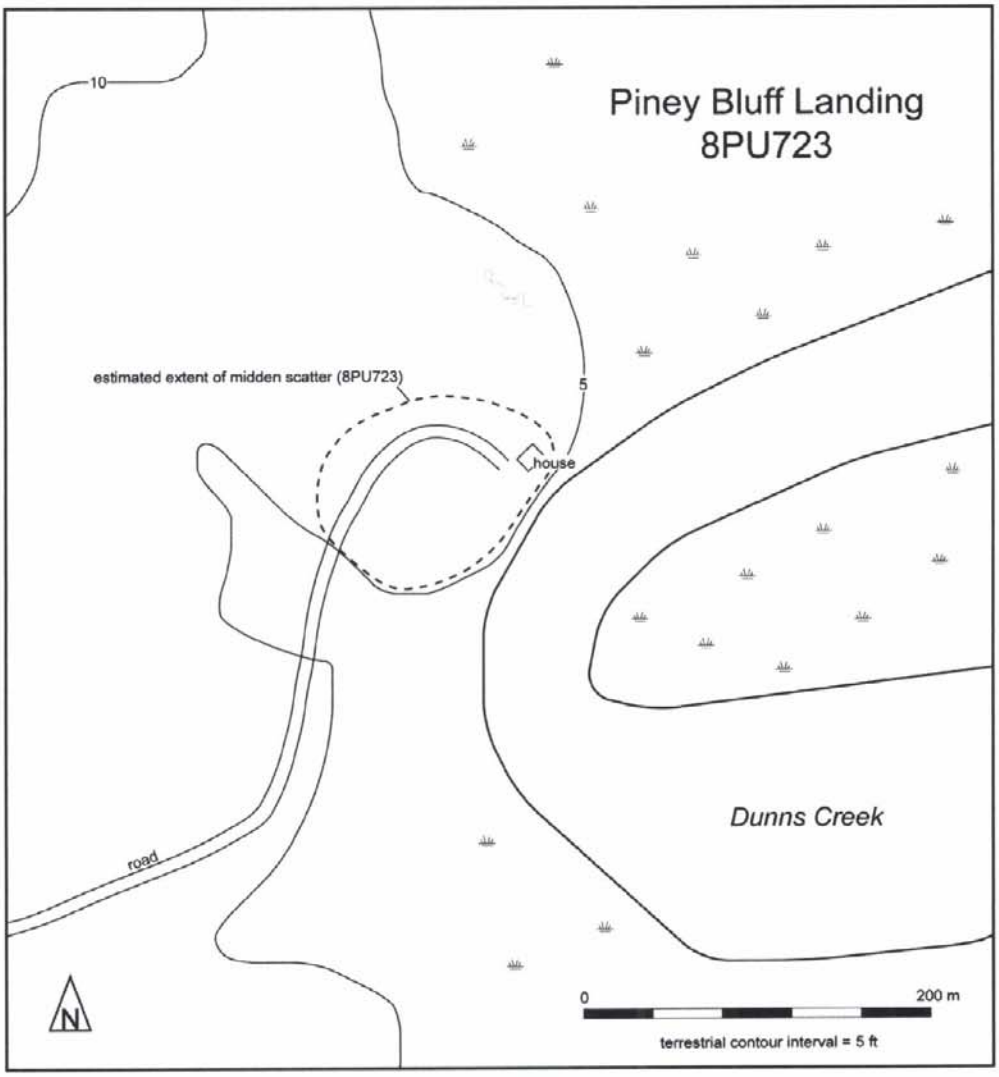

Figure 4-6. Topographic map of vicinity of 8PU723, showing projected location of midden. (Note: house and road sketched and not to scale).

Subsurface testing is needed to determine if Piney Bluff Landing has preserved midden. Subsequent to the present survey, we learned that Florida State Parks has jurisdiction over the site. Normal Edwards of Florida State Parks contacted the author about deploying ground penetrating radar to locate subsurface midden at Piney Bluff Landing. As of this writing, no such effort has been launched. Preliminary coring in the river bend to the east of the site offered little hope for intact submerged deposits. Given the channel flow typical of outside meander bends, the lack of intact midden in the channel is not surprising.

The Archaic stemmed biface and plain St. Johns sherds verify two of the three components recorded in the Master Site File in 1990 (Mt. Taylor, St. Johns I). No evidence was found of the third component (Orange). Nothing in the extant surface topography of Piney Bluff Landing would suggest the presence of mounds, intact or mined.

8PU827/8FL158/8PU1380

Attempting to locate 8PU827/8FL158 through a clearcut to the north, the crew encountered a 1- to 2-m-high shell mound on the north side of a stream emptying into the northeast corner of Crescent Lake (Figure 4-7). The mound (8PU1380) lies opposite the reported location of 8PU827/8FL158. Oval in shape and at least 50 m long along its north-south axis, the mound is severely compromised by logging operations, tree throws, and most recently, an east-west cut across the north end to build a dock access road through the cypress swamp. Observed on the disturbed surface in the highest part of the mound was dense bivalve and snail shell in a dark gray loamy matrix; on the lower slopes to the north and south was scattered shell in tan sandy matrix. Collected from the surface was a single rim sherd of Orange Incised, a fragment of fossil coral, and a sandstone abrader. Vertebrate faunal material was noted but not collected.

Some consideration was given to the possibility that this mound site was actually 8PU827/8FL158, but this seems unlikely. Although 8PU827/8FL158 was apparently recorded from hearsay and never field checked, the Flagler County survey report is unambiguous about its location off the jeep trail, plus it described the site was "removed for fill" (Historic Property Associates 1988:28). It is not clear how 8PU827/8FL158 was determined to be a St. Johns period site, but no St. Johns pottery was observed at the shell mound north of the stream. Until further inspection is made on both sides of the stream, the shell mound to the north ought to be considered a separate site, one with good potential for intact Orange period deposits, despite the many disturbances to its surface.

Four piston cores were sunk in the lake bottom off of 8PU827/8FL158. Only one these, Core 2, penetrated more than 43 cm due to dense, woody debris and rooted peat. In 3.5 ft of water, Core 2 contained 115 cm of sediment consisting of a 28-cm surface stratum of light brown sand over 40 cm of silty peat, and dark gray silty clay to the base. No cultural material or anthropogenic soil was observed in any of the cores.

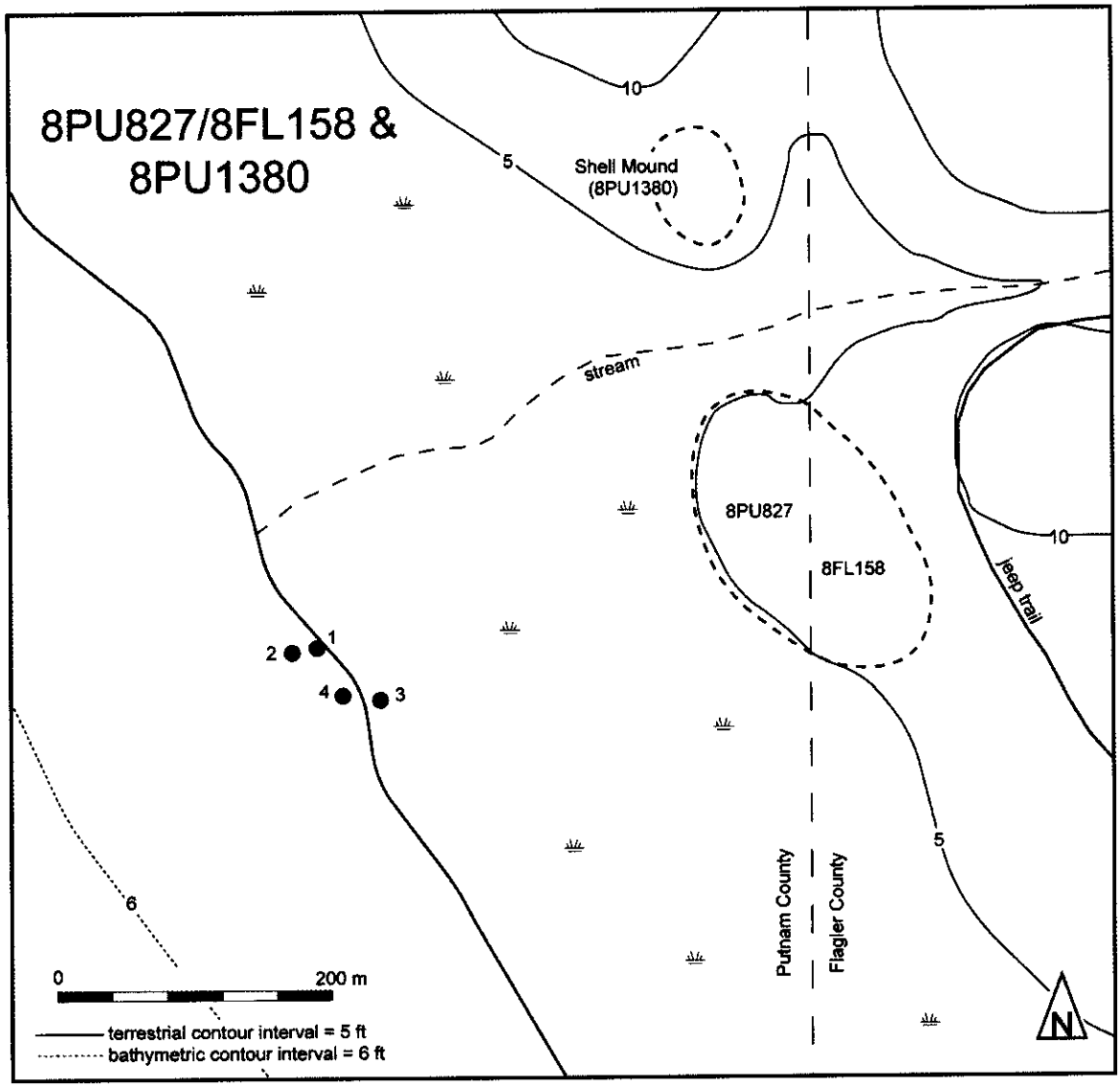

Figure 4-7. Topographic map of vicinity of 8PU827/8FL158, showing projected location of new mound site (8PU1380) and piston cores off shore.

Bear Island (8PU17/8PU840/8FL163)

The entirety of Bear Island, in the center of Crescent Lake, is on record as an archaeological site (Figure 4-8). It actually consists of three site numbers (8PU17, 8PU840, and 8FL163), but very little information is available in any of the files. The island-wide site, 8PU840/8FL163, was recorded from hearsay and never field checked (Historic Property Associates 1988:30). The third site number, 8PU17, refers to a small, unspecified midden in the west-central part of the island. The lack of information about Bear Island's archaeological content or condition was quickly remedied when the field crew encountered on the very first day of the project two collectors gigging for artifacts in waist-deep water off the northeast end of the island.

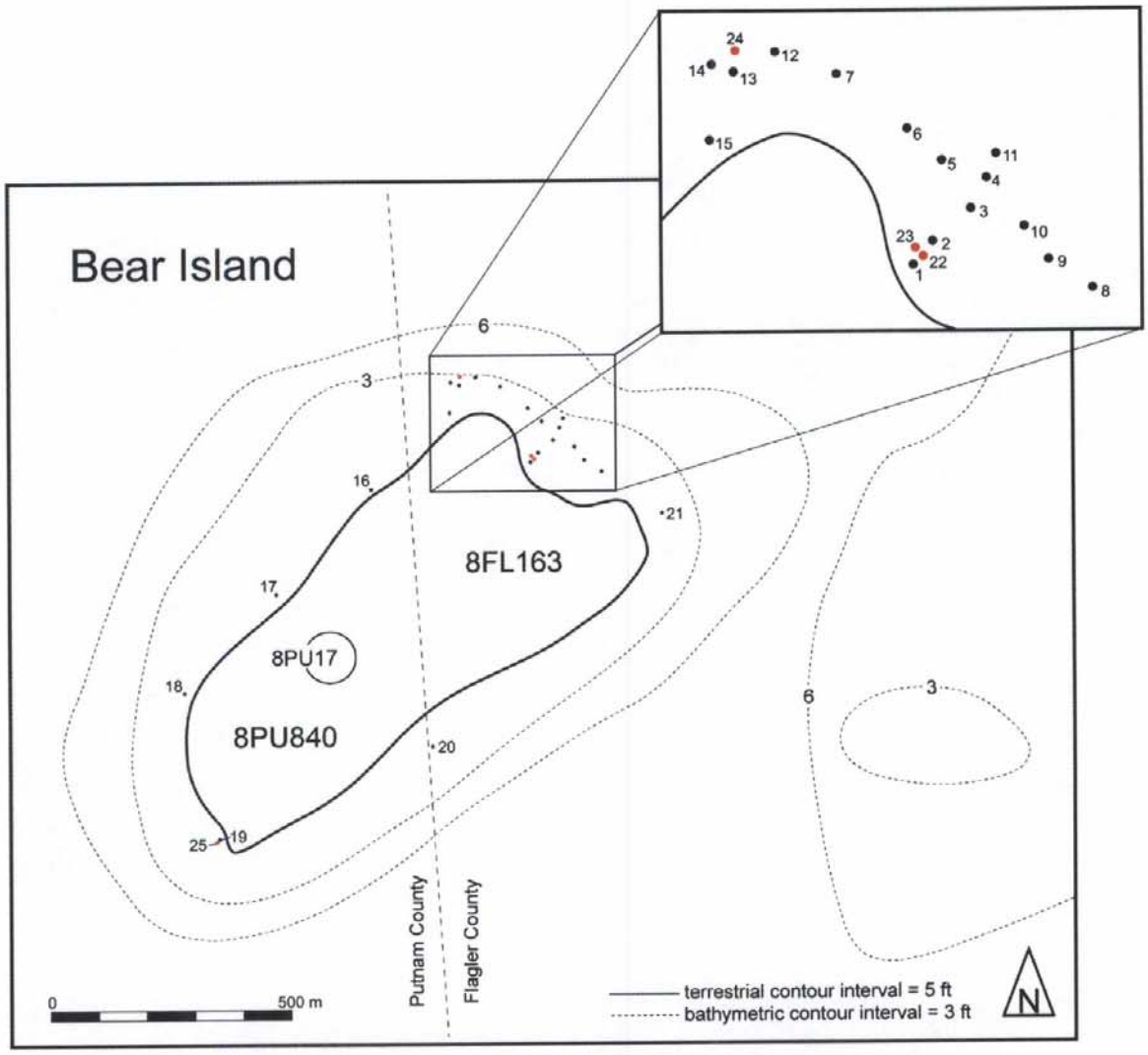

Figure 4-8. Topographic map of vicinity of Bear Island, showing locations of offshore piston cores (note: cores in red are sample cores).

Over the course of several visits to the offshore waters of Bear Island, 25 piston cores were sunk, including four that were returned to the University of Florida for analysis (Figure 4-8). Land of the privately owned island was not inspected for lack of permission. Coring efforts focused on the cove at the northeast end of the island, where collectors were observed working, and around the point to the west of the cove, at the suggestion of one of these collectors. In addition to coring, the crew traversed this area up to neck-deep water and collected sherds and other artifacts they encountered. Six piston cores around the perimeter of the island provided additional lake-bottom samples.

Sherds were especially abundant at the northeast end of the island, particularly off the point west of the cove, near Core 24 (Table 4-2). Sherds of the St. Johns ceramic

tradition dominated the collection, with plain and check stamped varieties both well represented. A single St. Johns incised sherd near Core 24 was also punctated. Sand-tempered plain was also well represented, along with single examples of cordmarked and check stamped. The cordmarked sherd is similar to a variety common in the lower St. Johns dating to cal. A.D. 900-1250 (Keith Ashley, personal communication, 2002). A single eroded fiber-tempered sherd rounds out the pottery assemblage.

Table 4-2. Sherds Collected Near and in Cores at Bear Island, Crescent Lake.

	St. Johns				Sand-Tempered				
	Plain	Check Stamped	Incised	Eroded	Cord-marked	Check Stamped	Plain	Fiber-tempered Eroded	Total
Core 3	2						2		4
Core 6				10					10
Core 7	5	2		2					9
Core 12	15	2					2	1	20
Core 13	64	35	4	14	1	1	20		139
Core 24	12	3	1	1			2		19
Total	98	42	5	27	1	1	26	1	201

Sherds with exterior soot and/or interior carbon residue were relatively common among the sherds from surfaces near cores 13 and 24. A disproportionate number of St. Johns check-stamped sherds had carbon residues, but several St. Johns plain were also sooted. A sample of soot from one of the plain sherds near Core 24 was submitted for AMS dating and returned an assay of 640 ± 40 B.P. or cal AD 1280-1410. This is generally equivalent to the age estimate for the mound at 8PU90.

Additional artifacts collected from the Bear Island vicinity include small bits of vertebrate fauna from the lake bottom near cores 13 and 19, and isolated chert flakes near cores 6, 7, 10,and 24. In addition, collector Delwood Nelson donated to the project three Orange Island sherds and a soapstone vessel sherd he collected from the northwest corner of Crescent Lake, possibly from the midden recorded as 8PU17. Soot from the soapstone vessel sherd was submitted for AMS dating and returned an assay of 3500 ± 40 B.P. or cal 1920-1720 B.C.

The field crew noticed while coring and collecting sherds from the lake bottom a consistent correlation between artifacts and compacted brown sands. Sediment otherwise was unconsolidated and light gray-brown. Shell was never encountered in any of the cored locations of Bear Island, nor did the crew notice any in the extensive pedestrian survey they made of the near-shore lake bottom.

Water depth in the 21 reconnaissance cores at Bear Island averaged 114.7 cm and ranged from 63 cm at Core 2 and 145 cm in Core 14. Sediment depth in these same cores averaged 129.6 cm and ranged from 40 cm in Core 20 and 200 cm in cores 11 and 12. Brown midden-like sediment was detected in most of the cores sunk along the western edge of the cove and around the point at the northeast end of the island. Brown sands were found in as much as the upper 1.5 m of many of these cores. Brown sands gave way to yellow sand in the cove, and to gray sands over gray clay off the point. The compacted brown sands associated with artifacts was not observed in any of the cores elsewhere around the island.

Based on the results of reconnaissance testing, the lake bottom off the northeast was earmarked for sample cores. Two cores in the cove, cores 22 and 23, were dropped in about 60 cm of water. Each had a thin surface stratum of clean medium sand over an organically enriched medium sand, some 20-30 cm thick, grading to increasingly lighter medium and eventually finer sands. Bulk density data do not represent explicitly the compactedness of this brown sand. Preserved wood in a light brown matrix of the upper part of Core 22 reflects recent near-surface disturbances, but not likely a period of subaerial exposure since the midden soil formed.

Core 24, off the northeastern point, was placed in deeper water (141 cm) in the location of dense pottery. Sediment in this location is a graded profile with the greatest organic content at ca. 100 cm, or roughly 2.4 m below the lake surface. A bulk sample of soil from this organic zone was submitted for radiocarbon dating and returned an assay of 20,480 ± 160 B.P. Although this is much older than expected, it is good datum for low lake levels during the last glacial maximum of the Pleistocene. How the upper sands relate to late Holocene occupation is unknown; the bulk density data are no help in this regard.

One additional core was sunk off the southwest end of Bear Island in 122 cm of water. The 150 cm of Core 25 consist of a thick upper mantle of clean sands over a buried soil with an organically enriched horizon that grades to lighter and somewhat coarser sands.

In sum, Bear Island proved challenging from the perspective of piston cores, but was otherwise pretty transparent as regards artifact distributions. Collectors have been working the cove and point for many years and have collected not only late period artifacts but a number of Archaic points as well, including early Holocene Bolen points. The Pleistocene date for a deeply buried soil provides a pre-human datum for maximum lake levels and the absolute age and cross-dating of pottery from submerged context gives a ca. A.D. 1300-1400 maximum lake level. In addition the soot date on soapstone and associated Orange pottery suggests that lake levels at ca. 1900-1700 B.C. may have been a few feet higher than at present.

8FL8/8FL157

The exact locations of 8FL8 and 8FL157 are uncertain as neither was apparently ever field checked and terrestrial access to these sites was not possible during the present survey. Site 8FL8 (a.k.a. Crescent Lake 1) was recorded long ago as an "artifact scatter" and is shown in the Florida Master Site File as the location at the junction of Road 20/100 and Salt Creek (Figure 4-9). The digital version of this site in the FGDL places it directly on the shore of Crescent Lake, the westernmost polygon of the location shown in Figure 4-9 as 8FL157. This location for 8FL157 was taken from the Flagler County survey report, which described the site as two "small shell middens west of Salt Creek on Crescent Lake, directly on the lakeshore" (Historic Property Associates 1988:29). The FGDL layer lists only the easternmost of these paired middens 8FL157.

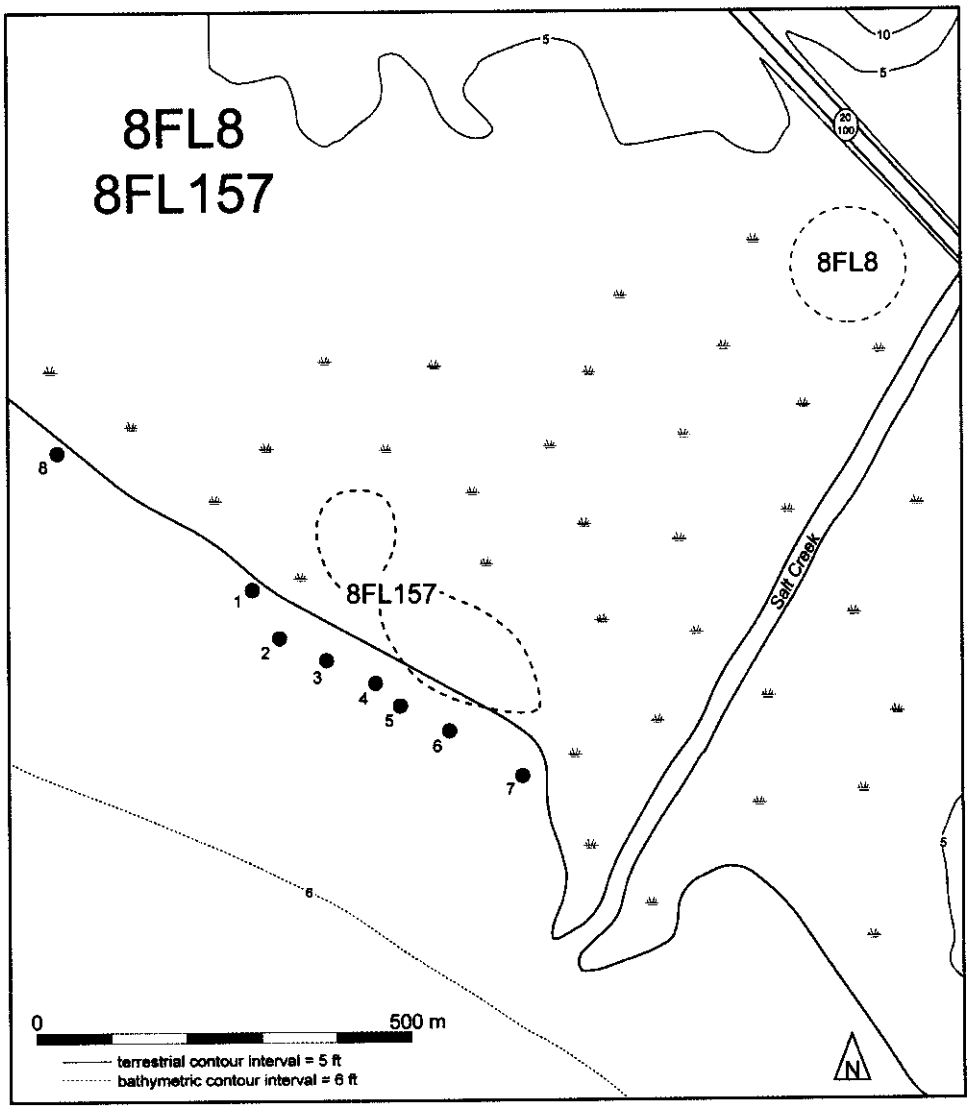

Figure 4-9. Topographic map of vicinity of 8FL8 and 8FL157, showing locations of offshore piston cores.

According to an informant for the Flagler County survey, 8FL157 was partially removed for fill. This same informant indicates the location has produced lithic tools. This was verified by Mr. Delwood Nelson, who alerted the survey crew of this location (recorded in the field as Nelson 2)

A series of eight piston cores was driven into the lake bottom in an average of 110 cm of water offshore from the presumed location of the shell middens. Cores 1-5 and 8 contained a surface stratum of yellow-brown sand 5-15 cm thick over a greenish-gray clay to a maximum core depth of 53 cm. Cores 6 and 7, the easternmost, revealed a dark brown silty sediment instead of the clay, possibly deltaic sediment in an in-filled relict channel of from Salt Creek. No cultural material or anthropogenic soil was observed in any of the cores, although a small fleck of apparent archaeological shell was detected on the lake bottom near Core 1.

Grimsley Neck (8FL9)

Grimsley Neck on the southeast side of Crescent Lake is a hillock of land 5 ft amsl surrounded by wetlands (Figure 4-10). At only slightly higher water levels, this landform would be completely surrounded by standing water, as it may have been at various times in the past. Conversely, at slightly lower levels it would be connected to dry land to east, although it borders a deep cove (Grimsley Cove) and would thus have been a good location for access to the lake, even at draw downs of 3-5 feet. The point itself, at current water levels, is a mere100 m from water 8 feet deep.

The Florida Master Site File shows one archaeological site on Grimsley Neck, 8FL9 (a.k.a. Crescent Lake 2), the purported locus of an early 19th-century homestead. The record makes no mention of prehistoric components, but snail midden is evident along the shoreline from the south end of the point around into the north end of Grimsley Cove (Figure 4-10). Access to the point was not sought from the landowner, so the interior extent of midden was not determined. Midden along the shore is thin and diffuse, and rests directly on clay. One plain St. Johns sherd was observed and collected from the bank at the east end of the midden exposure. Also observed from the jonboat were historic-era ceramics and components of machinery. Informants indicated that "arrowheads" could be found on the point, which was formerly in orange grove, now in planted pines. The same collectors working the northeast end of Bear Island were observed at Grimsley Neck gigging for artifacts in chest-deep water. In the lake bottom of the cove they found a Bolen Beveled point, two Pinellas points, and a hammerstone.

Coring at Grimsley Neck began at the west end of the exposed shell. In 75-100 cm of water, Cores 1-3 each contained a blue-gray clay at depths of 25-90 cm, overlain by brown sands. Basal clays were more organic in Core 4, towards the cove and in slightly deeper water (112 cm), but no artifacts of midden was observed in the overlying sands. Core 5 produced the first evidence for possible midden, at ca. 58-70 cm below lake bottom in 101 cm of water. This thin stratum consisted of a dark brown sand with charcoal, occasional shell, and bone. No artifacts were observed.

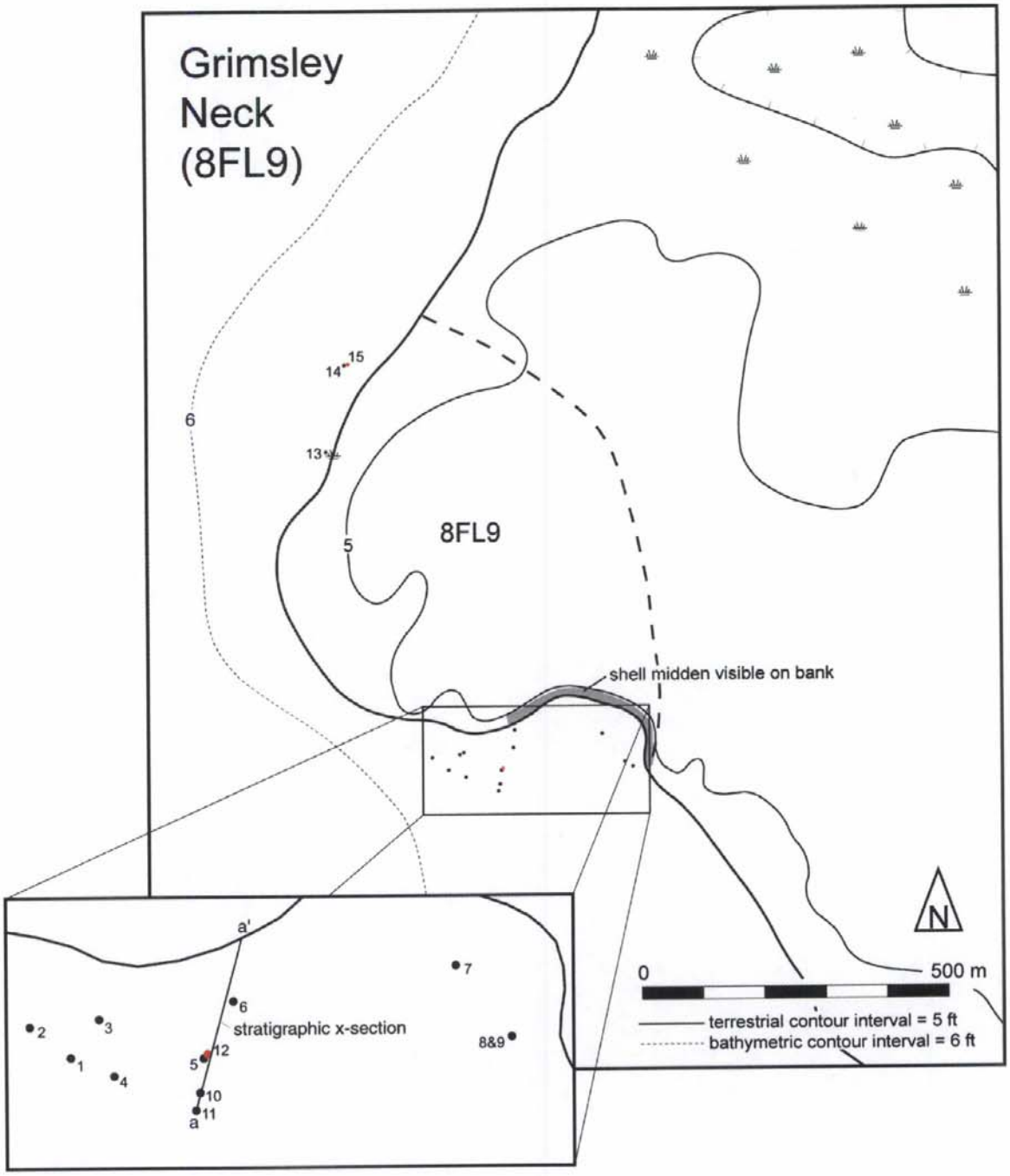

Figure 4-10. Topographic map of vicinity of Grimsley Neck, showing locations of offshore piston cores and location of stratigraphic cross-section shown in Figure 4-11 (note: cores in red are sample cores).

A transect of piston cores north and south of Core 5 provided a good cross-section of the submerged stratigraphy (Figure 4-11). Water depth actually decreased moving south into the cove before dropping off beyond about 100 m. Midden-like soil was observed across the entire transect, although none of the cores exposed dense shell. In

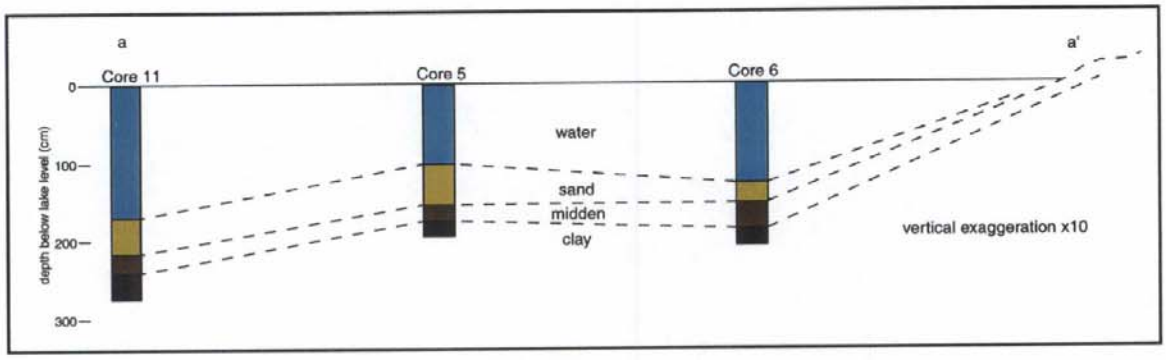

Figure 11. Stratigraphic cross-section of submerged terrain west of Grimsley Neck (see Figure 4-10 for x-sec location).

fact, shell was very sparse and the "midden" was defined largely on the basis of organically enriched sands with charcoal below clean sand and above clay. No artifacts were observed. A sample core (Core 12) retrieved from the vicinity of Core 5 is described and illustrated in Appendix B. It shows a stratum of rooted peat in silty matrix above the usual blue-gray clay. A bulk sample of this stratum was insufficient for radiometric dating, but a sample of charcoal from the midden stratum of Core 5 returned an assay of 1680 ± 40 B.P. (cal AD 250-430). This age estimate should effectively date the midden and is consistent with the St. Johns sherd found on the shoreline and two others found on the lake bottom near Core 9.

The core transect reveals a generally flat terrain at the time of midden accumulation at a distance of ca. 40-80 m south of the present-day shoreline. The subaerial accumulation of this deposit would require water levels at least 3.5 feet lower than present. Moreover, the peat deposit at the base of Core 12 suggests subaqueous accumulation and no subsequent oxidation, thereby indicating that the midden observed along this transect was near-shore and never raised high above the water table. Accordingly, water levels since cal AD 250-430 were never more than 5-6 feet below present levels.

Cores placed in the vicinity of the east side of the exposed midden (Cores 7-9) were in water ranging from 77 to 122 cm deep and contained highly organic silty sediment over a mucky peat, all capped by ca. 40-50 cm of brown sand. No midden or artifacts were observed in any of these cores

Informant Delwood Nelson indicated the lake bottom off the north end of Grimsley Neck has produced Archaic artifacts, including a Bolen point. The crew sunk two cores in this vicinity in ca. 77 cm of water and encountered in the first core (Core 13) light gray clay 21-70 cmbs overlain by medium gray sand (10-21 cmbs) and a thin surface stratum of yellow sand. Core 14, 120 m north of Core 13, revealed the same upper sand unit but was underlain 10-12 cm of silty peat (19-28 cmbs) over light gray

sand to a depth of 76 cm. Despite the lack of cultural material or anthropogenic soil, this location was earmarked for sampling because of the peaty stratum. Core 15, described in Appendix B, reveals a complex sequence of intercalated silty peat and cross-bedded sands.

In sum, the archaeological record of Grimsley Neck has been expanded to include an exposed midden in the cove south of the point and associated submerged midden deposits beneath a mantle of recent sands. One radiocarbon assay of 1680 ± 40 B.P. (cal AD 250-430) is consistent with the few St. Johns plain sherds observed. Although the midden is thin and probably severely eroded by the same processes that capped it with cross-bedded sands, portions no doubt are fully intact and presumably with good organic preservation. The recovery of at least one Bolen point by one collector in the cove and alleged Archaic points elsewhere gives optimism that earlier components are preserved in deeper sediments inundated by Grimsley Cove.

Shell Bluff Landing (8FL159)

Site 8FL159 at Shell Bluff Landing is a purported crescent-shaped shell mound 25 feet long and 1-2 feet high (Historic Property Associates 1988:28). The site was not field checked when it was recorded in 1988. An informant at that time indicated that this snail midden contained St. Johns Plain and Check Stamped pottery, but was mined for fill material. The site was not accessible by land for the present survey, nor was it visible from the lake. Its location as shown in Figure 4-12 has not been verified.

A series of five cores in a transect paralleling the shore in the purported location of 8FL159 revealed yellow-brown sands over a silty, organic stratum and blue-gray clay. A single gastropod shell and a bone fragment was observed in the silty stratum in the eastern most core, under some 95 cm of water. A sample core was retrieved from this location (Core U-2) and is described in Appendix B. This 119-cm core has 30 cm of sand over a dark brown clayey silt with rooted peat to a depth of ca. 90 cm. The core terminates in a blue-gray clay with occasional woody fragments.

A sample of rooted peat at ca. 70 cmbs was submitted for radiocarbon dating and returned an assay of 1550 ± 40 B.P. (cal AD 420-610). This overlaps at two-sigma at the recent end of the date range from the sample dated at Grimsley Neck. It is also stratigraphically equivalent to the Grimsley Neck sample and corroborates a near shore, swampy biome at ca. AD 400 and thus a water level at least 3.5 feet below present levels. The lack of oxidation in this organic stratum confirms too that water levels since that time have not been so low for sustained periods as to decompose its macro-organic constituents.

Site 8FL159 needs to be ground truthed to establish its precise location, current condition, and occupational history. The present survey cannot confirm the cultural ascription given the site by local informants, but it does confirm the lower hydrologic regime observed at other locations on the lake during the first few centuries of the Christian era.

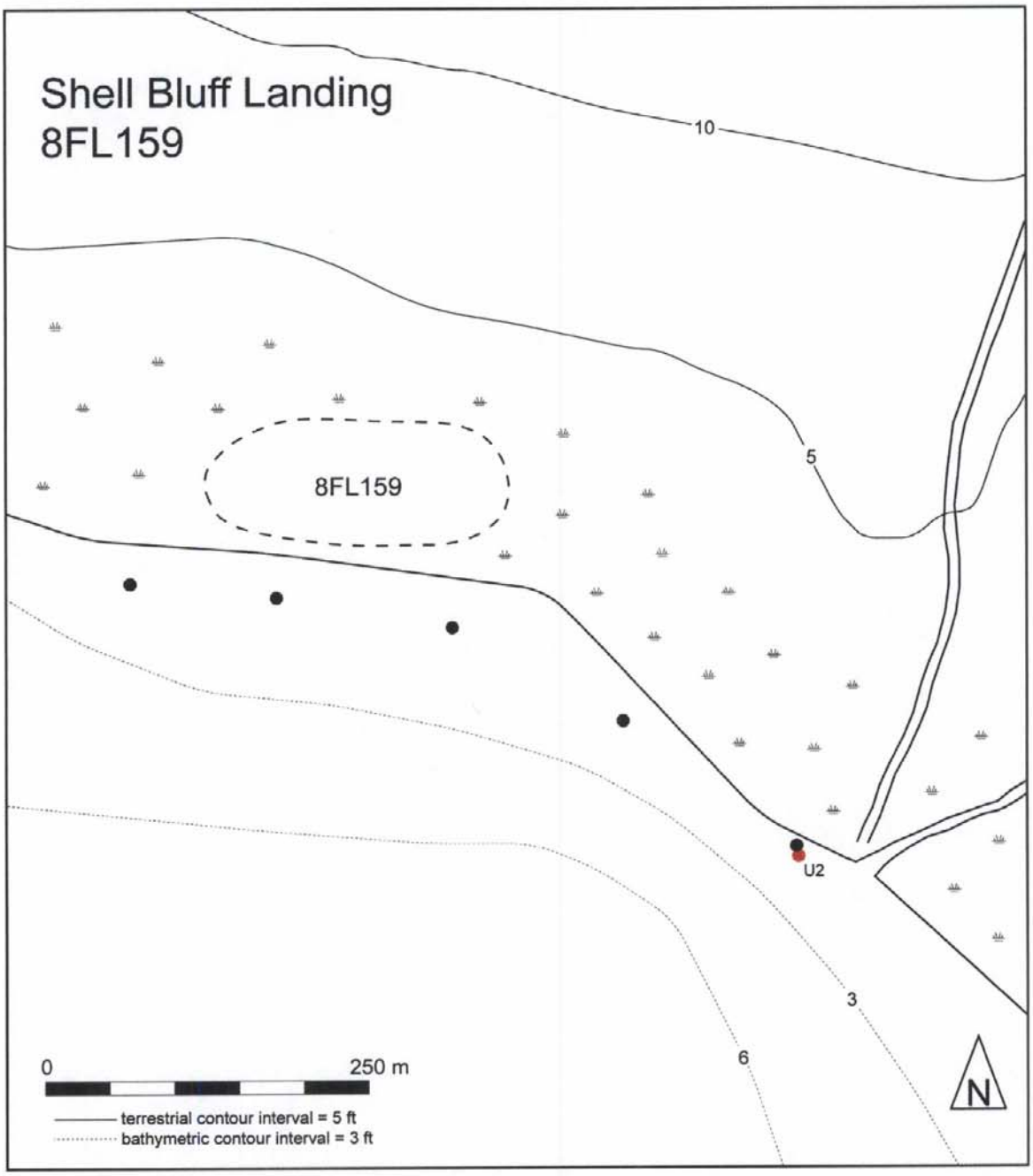

Figure 4-12. Topographic map of vicinity of Shell Bluff Landing and site 8FL159, showing locations of offshore piston cores (note: core in red is sample core).

White Oak Swamp 1-3 (8FL160, 8FL161 & 8FL237)

Two sites in a hardwood swamp along the eastern margin of Crescent Lake were recorded as small shell middens in the 1988 Flagler County Survey (Historic Property Associates 1988:29), although neither was field checked (Figure 4-13). Site 8FL160 is

described as 20-ft-long shell midden about 3 ft high with pottery of unspecified type. An informant for the 1988 survey indicated that the site had been "vandalized." Site 8FL161, ca. 1.5 km southeast of 8FL160, is described as a pair of shell middens only 3 m long each, also with pottery of unspecified type.

Terrestrial access to 8FL160 was infeasible in the present survey. The crew was able to gain pedestrian access to 8FL161 and, in the process, located a new site (Figure 4-14). This new site (8FL237) is situated on the upper rim of the swamp, adjacent to a ditch and road leading to 8FL161 some 500 m to the south. It consists of a light scatter of St. Johns pottery, crushed bivalve shell and minor snail shell in an area some 50 m north-south and 25 m east-west. The area was planted recently in pines, with shell and pottery exposed along furrows. Eleven sherds of St. Johns Plain were collected from the surface. No subsurface tests were made at this location.

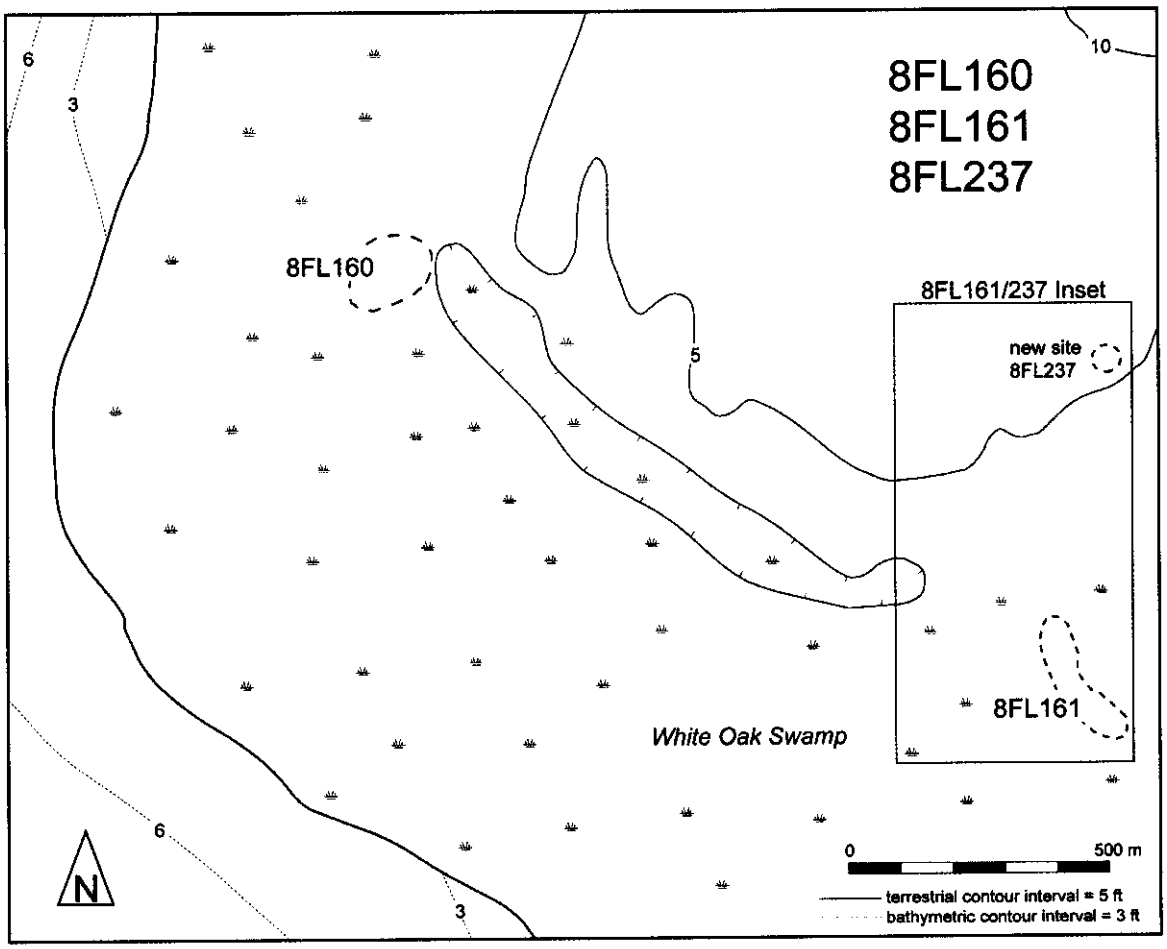

Figure 4-13. Topographic map of vicinity of 8FL160 and 8FL161, showing locations of new site (8FL237) north of 8FL161.

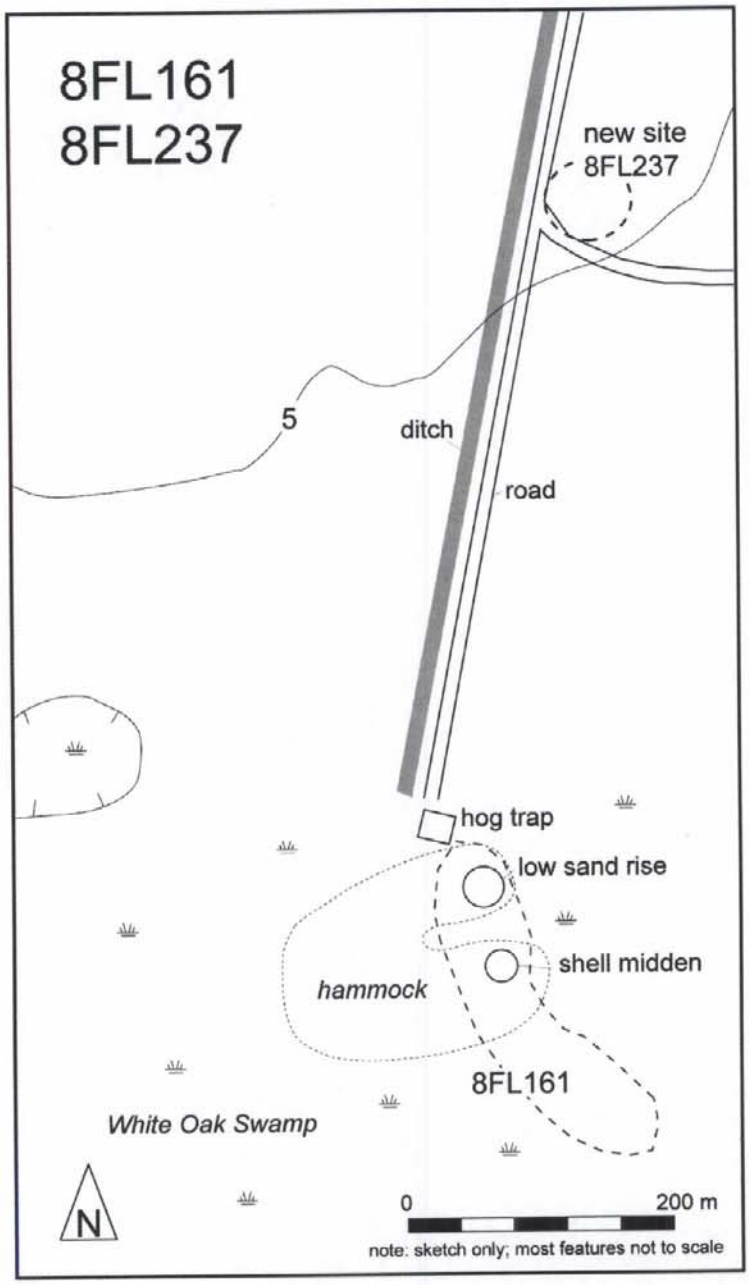

Figure 4-14. Close-up view of terrain and features in vicinity of 8FL161 and new site (8FL237) to the north.

At the south end of the access road paralleling the ditch is a hog trap at the edge of cypress swamp. Some 25 m farther south into the woods and on a low hammock are two features that are believed to be recorded as 8FL161, although they do not match the description given in the 1988 survey report (Historic Property Associates 1988:29). The first of these two features is a low sand rise, ca. 25 m in diameter and only a few tens of centimeters high (Figure 4-14). The second is a shell midden-mound 25-30 m to south of the sand rise and separated from it by low, swampy terrain.

A single shovel tests was placed in the center of the low sand rise to check for shell deposits. The upper 15 consisted of dark gray humus, underlain by 12 cm of light gray sand, 10 cm of dark gray sand, and another 15 cm of light gray sand over light gray clay to a maximum depth of 57 cmbs. No cultural material or midden was observed, but the presence of a buried A horizon (dark gray sand) and/or mounded sand (i.e., alternating sand strata) suggests this feature is indeed cultural.

The shell midden measures roughly 15 m in diameter and is composed mainly of bivalve and minor amounts of freshwater snail. A shovel test in the center of the midden yielded 20 St. Johns Plain sherds and minor amounts of vertebrate fauna, mostly turtle. The sherds were concentrated in the upper 10 cm but were lightly scattered throughout the 55-cm-thick midden. The lower half of the deposit consisted of burned shell, ash, and charcoal overlying mucky silt to a maximum depth of 75 cmbs.

Additional testing is required at 8FL161 and the midden scatter to the north (8FL237), but both appear to contain exclusively St. Johns Plain pottery and thus most likely predate A.D. 750. We cannot estimate with any confidence a *terminus post quem* for this site beyond asserting that it must postdate the timing of the earliest pottery in the region (i.e., postdates 4000 B.P.). Like the other St. Johns sites on Crescent Lake, 8FL161 and presumably its counterpart to the west, 8FL160, are fully within a wetlands biome and suggests lower-than-present lake levels. However, 8FL161 and 8FL237 to the north are both currently on reasonably well-drained soil, and could very well have been occupied with water levels at or even slightly above present levels. In this regard, these sites may actually date early in the ceramic period, when Orange pottery was being made and used locally and lake levels were relatively high. In any event, the midden deposits at 8FL161 are especially promising for providing data on paleoecological and hydrological conditions at the time of occupation. Certainly the potential if great for radiometric dating of the burned shell/charcoal deposit in the lower portion of the shell midden.

McReynolds Island (8FL162)

Site 8FL162 on McReynolds Island is part of a Spanish Land Grant (Sect 38/39) in the southeast corner of Crescent Lake. The site outline as shown in Figure 4-15 encompasses a historic orange grove, as well as docks at the south end of the point, remnants of which still stand today. The site was not field checked when it was recorded in 1988 (Historic Property Associates 1988:29-30). The 1988 survey report makes no mention of prehistoric archaeological remains at this location. Terrestrial access to 8FL162 during the present survey was not sought.

The submerged point of land west of McReynolds Island was cored as part of our bathymetric reconnaissance survey (Locus F, see above). A small bone fragment and piece of bivalve shell at this location offered some promise for submerged midden. Three additional cores (1-3) were driven into the lake bottom in a transect equidistant between Locus F and the 5-ft-contour that defines the terrestrial component of 8FL162. The location of shoreline shown Figure 4-15, taken directly from the USGS quad, is

actually some 50-70 m eastward. All three of the cores along this shore-parallel transect were dropped in about 3 ft of water.

Core 1 penetrated the lake bottom 113 cm and exposed a mantle of medium to light gray sand 70 cm thick over an apparent buried A horizon of dark gray sand 22 cm thick over gray-green sandy clay at the base. No cultural material or midden was observed.

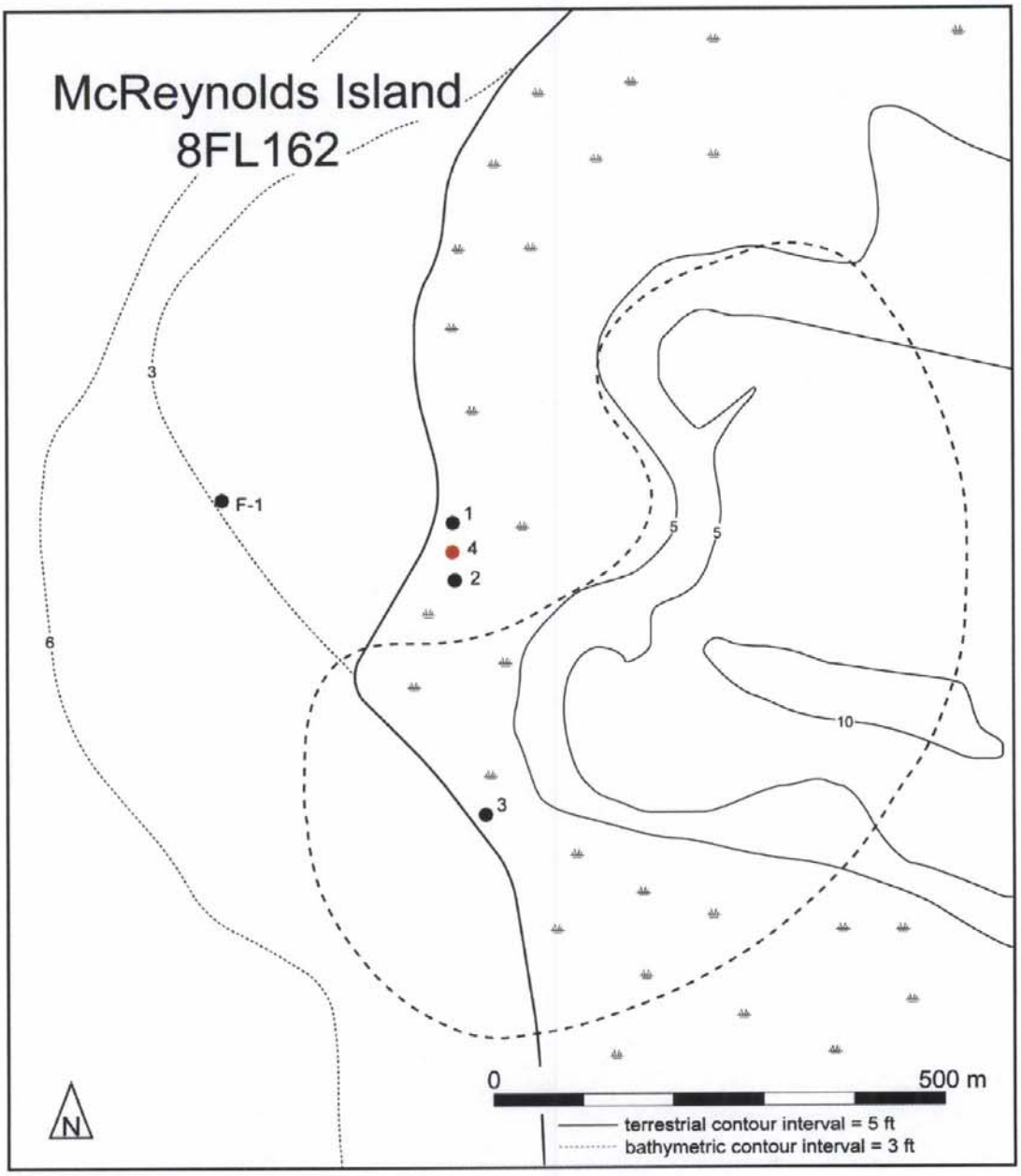

Figure 4-15. Topographic map of vicinity of McReynolds Island, showing locations of offshore piston cores (note: core in red is sample core).

Core 2, south some 50 m from Core 1, consisted of a light brown to medium brown sand 20-cm thick over 19 cm of light gray sand over gray-green clay to a maximum core depth of 89 cmbs.

Core 3, 250 m south of Core 2, contained a light brown sand in the upper 24 cm underlain by light gray clay to 46 cmbs, followed by gray-green clay with bits of marine shell to a core basal depth of 98 cmbs.

Given the evidence for a probable buried A horizon over marine clays in Core 1, a sample core (4) was extracted and returned to the University of Florida for analysis. As shown in Appendix B, Core 4 duplicates nicely the profile observed in Core 1. The basal 30 cm consist of marine clay. Overlying the clay is a thick mantle of sand with soil development and an upper stratigraphic unconformity. A bulk sample of the organically enriched sand immediately overlying the marine clay was submitted for radiocarbon assay and returned an age estimate of 9730 ± 50 B.P. (cal 9260-9150 BC). This age provides the first and only datum point in this project for a stable terrestrial surface that coincides with the earliest evidence of human use of the lake area, that is, during the Early Archaic period. Recall that at least two Early Archaic Bolen points were reported by collectors to have come from the sands off this southeastern part of the lake.

Sands overlying the organically enriched sand are generally light gray to whitish in color with diffuse, dark mottles. Overlying sands include a second horizon of organic accumulation and a substantial zone of leaching beneath, indicative of well drained conditions. The stratigraphic unconformity lies above the organic horizon and refers to recent accumulation of clastics form surface runoff.

Although cores offshore of 8FL162 did not provide conclusive evidence for submerged archaeological materials, the apparent A horizon dating to ca. 9700 B.P. is an important datum for maximum lake levels at the time of first human settlement in the area. At a depth of no less than 5 ft below present lake levels, this horizon would have developed with water levels substantially lower, if, in fact, this horizon is pedogenic. Overlying sands also register data on lower lake levels inasmuch as leaching from the upper organic horizon required levels at least 3 ft below present level.

COLLECTORS' SITES

Hurricane Point (8PU1381; Morris 1 & Nelson 3)

Two independent informants identified Hurricane Point as a location where numerous flaked stone tools were collected. Eddie Morris identified a strip of land immediately south of the a stream that empties into Crescent Lake at Hurricane Point, outlined in Figure 4-16 (Morris 1). A visit to this location shows that the northern three-fourths appears to be in an unmodified state, vegetated with bay, sweetgum, water oak, and palmetto. The southern portion appears to have been graded and filled, and supports a small sea wall. Surface visibility across the entire expanse was extremely poor; no artifacts were observed.

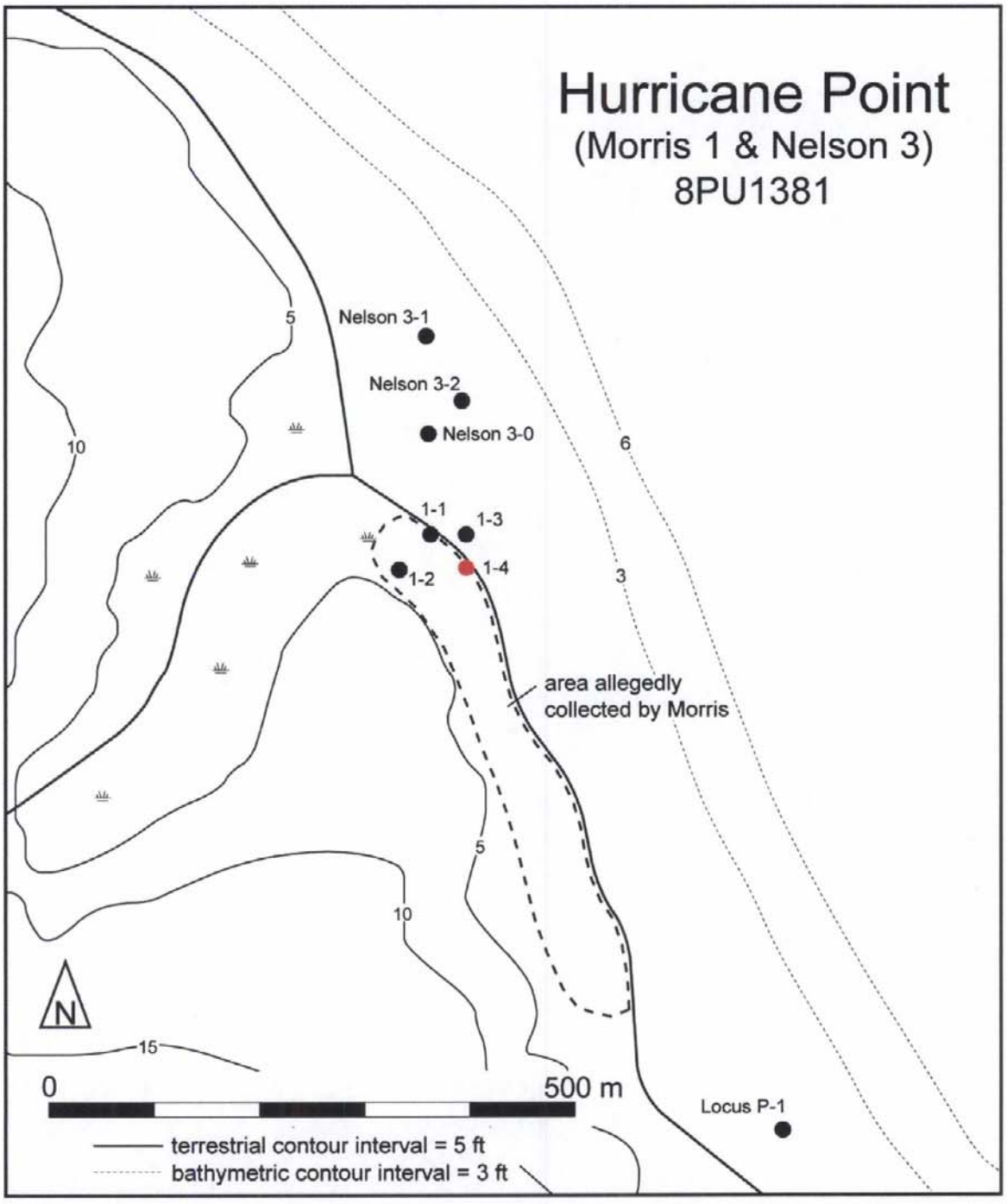

Figure 4-16. Topographic map of vicinity of Hurricane Point (8PU1381), showing locations of offshore piston cores (note: core in red is sample core).

The second location of relict collecting was identified by Delwood Nelson as the near-shore, submerged lake bottom just to the north of the stream mouth. Mr. Nelson indicated that this area produced a number of projectile points. Unfortunately, no more specific information is available.

Locus P to the south of Hurricane Point was among the bathymetric loci cored for reconnaissance survey. The sandy deposits of this core contained a couple of fish bones but no definitive cultural material or midden soil. Additional testing in the vicinity of the stream confluence involved four piston cores at the north end of Morris 1, and three cores in the locus collected by Nelson. The Nelson cores were rather shallow, with Core 3-1 penetrating only 39 cm and Core 3-2 68 cm into the lake bottom under 105-110 cm of water. The deeper core exposed a basal stratum of sandy clay 52-68 cmbs, overlain with dark brown silty sand 46-52 cmbs, and homogenous light brown sand in the upper 46 cmbs. Presumably, the dark brown silty sand houses the Archaic bifaces Nelson collects, for his technique involves probing through the surface sands with a multi-tined fork to reach the more compacted, organic horizon, in which artifacts exist. If so, this buried, artifact-bearing surface signifies a stable land surface that was no less than 5-6 feet below the present lake level.

Coring at the north end of the area collected by Morris involved three test cores (1-1, 1-2, 1-3) and one sample core (1-4) (Figure 4-16). Under 90 cm of water, the 63 cm of sediment in Core 1-1 consisted of 39 cm of light brown to yellow brown sand over an 11-cm stratum of dark brown silty sand with partially decomposed wood. A light gray-brown sand was observed in the basal 17 cm of this core.

Core 1-2 was sunk in 93 cm of water to reveal a similar profile as Core 1-1, with a dark brown silty sand in the range of 50-70 cmbs. In 106 cm of water, Core 1-3 went even deeper and revealed a basal stratum of dark gray sandy clay at a depth of 102-121 cmbs overlain with a medium gray sandy clay, 73-102 cmbs. The overlying sands consisted of a surface stratum of yellow-brown sand (0-27 cmbs) over a medium gray sand (27-73 cmbs).

Hopeful that the dark brown silty sands observed in Cores 1-1 and 1-2 reflect a buried surface, a sample core (Core 1-4) was driven into the lake bottom in the general vicinity of the test cores. A photograph and data on this core are provided in Appendix B. Organically enriched sands in the range of 30-60 cmbs correlate with the buried stratum observed in the other Morris cores, as well as those pulled from Nelson 3. Particulate charcoal throughout this stratum was not sampled for radiometric dating, but it would likely be a good datum point for Archaic landform stability.

Morris 2 (8PU1382)

The area allegedly collected by Eddie Morris labeled at Morris 2 in Figure 4-17 is a small cove when water levels are at or above present levels, and on a narrow shelf of submerged land when water levels drop more than 3 feet below present levels. A visit to this area shows a lawn covered in bahia grass with no surface visibility. No subsurface tests were conducted and no artifacts were observed on the surface.

Three cores offshore produced some interesting results. Whereas no cultural materials or definite anthropogenic soils were observed, the contrast between cores directly offshore and one to the south is potentially meaningful. The southernmost core,

Core 2-1, consisted of 124 cm of homogeneous light brown sands in 110 cm of water. The two cores to the north (Cores 2-2, 2-3) each contained a stratum of dark brown silty sand between about 30-50 cmbs, underlain by a grading medium to light brown sand. It is tempting to conclude that the organically-enriched soil is indeed anthropogenic. If so, the profile mimics the ones described above for Morris 1 and Nelson 3.

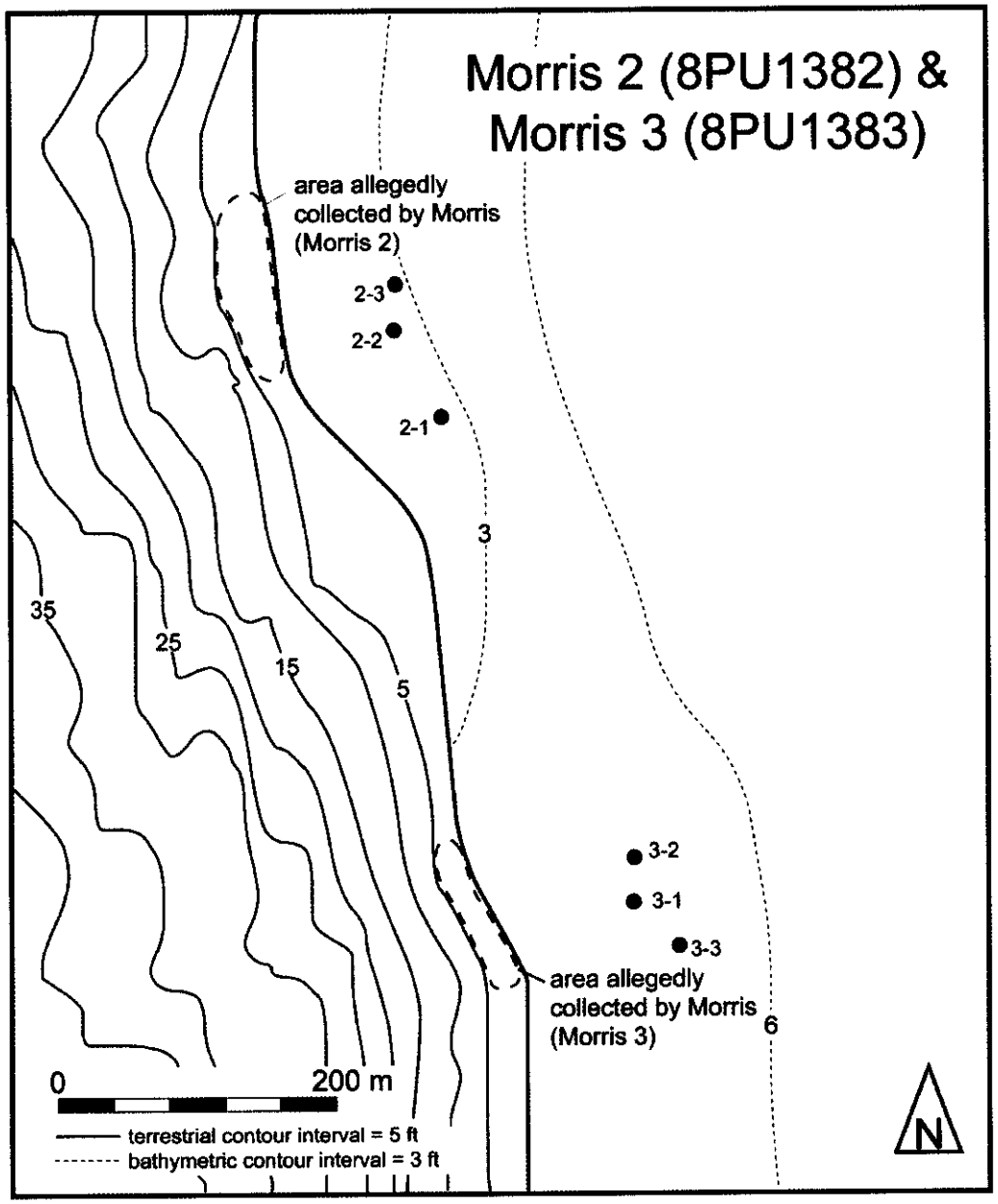

Figure 4-17. Topographic map of vicinity of Morris 2 (8PU1382) and Morris 3 (8PU1383), showing locations of offshore piston cores.

Morris 3 (8PU1383)

About 450 m south of Morris 2 is another alleged location of artifact collecting, shown in Figure 4-17 as Morris 3. A visit to this location shows substantial modification of the shoreline. A makeshift sea wall consisting of concrete chunks, stone, and brick fronts the water and obscures any exposures in the area of collecting. Behind the seawall is a relatively flat lawn of bahia grass with few exposures. Inspection of these few exposures and others along the shore revealed no artifacts or midden.

Three piston cores in the offshore vicinity of Morris 3 were in slightly deeper water (105-130 cm) than those offshore from Morris 2. Interestingly, the same contrast in core profiles was observed. The southernmost core (Core 3-3) held a homogeneous light brown sand in its entire 82 cm depth, while the other two, to the north (Cores 3-1, 3-2) each had a dark brown silty sand below a thin surface stratum of light brown sand. The dark brown silty sand was compacted in various places probed in and around these two northernmost cores. No cultural material or shell midden was observed, but again these contrasting profiles provide promising evidence for detecting anthropogenic soils.

Morris 4 (8PU1384)

The location given as Morris 4 (8PU1384) in Figure 4-18 is situated behind (east of) an elementary school and the public works department in Crescent City. Terrain south of the school appears to have been severely leveled, with fill pushed toward the lake. Access to the shoreline was not feasible from land, so additional investigations on Morris 4 were made by jonboat.

Observed eroding out of the bank of Morris 4 were chunks of concreted *Viviparus* midden. Close inspection of the cutbank revealed several vertebrate faunal remains, occasional shell, and flakes of chert in a medium brown sand matrix. A stratum of shell similar to the concreted chunks was not observed, but in one spot some 40-60 cmbs shell was concentrated with a few artifacts and vertebrate faunal remains in an area 60-70 cm wide, suggesting the presence of discrete pit or hearth features. The observed concreted shell most likely represented entire pit-like features that eroded out of the bank.

Three shovel tests were excavated on land above the cutbank in a line paralleling the lake shore (Figure 4-18). STP1 exposed a thin surface stratum of humus over 50 cm of medium brown sand with sparse snail shell, rare bivalve shell, and occasional vertebrate faunal remains. At 60 cmbs sand became lighter in hue and shell density increased. Recovered from this stratum to a maximum depth of 146 cmbs were two St. Johns Check Stamped sherds, one Orange Incised sherd, one chert flake, and a piece of worked bone. The chert flake and Orange sherd was apparently retrieved from the bottom of the shovel test, ca. 130-146 cmbs.

Observed in STP2 was a similar profile as seen in STP1, with one St. Johns Check Stamped sherd in the upper 10 cm, and two additional St. Johns sherds (one plain,

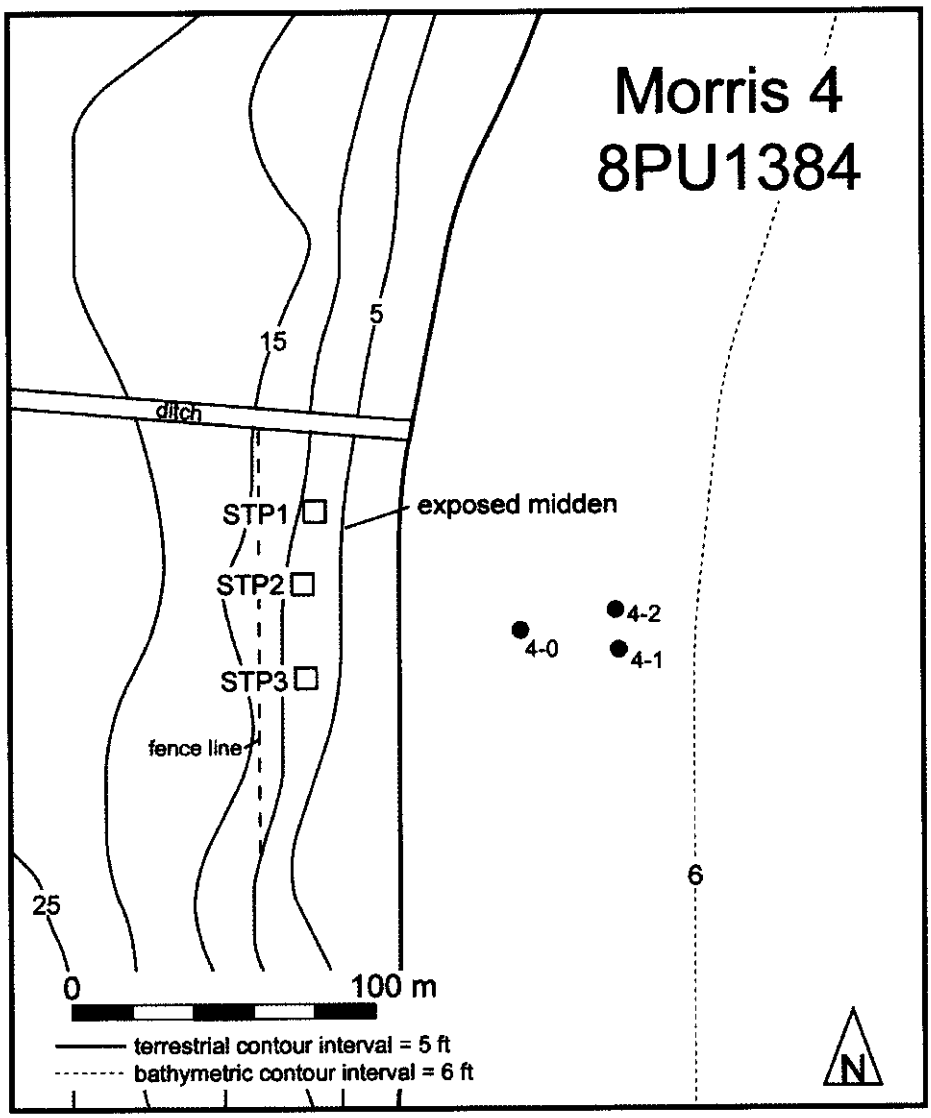

Figure 4-18. Topographic map of vicinity of Morris 4 (8PU1384), showing locations of shovel tests and offshore piston cores.

one eroded) at depths of ca. 50-60 cmbs. The lower 20 cm of the test (ca. 125-145 cmbs) contained four chert flakes but no shell or pottery.

STP3 revealed sherds and chert flakes at 70-75 cmbs, and again at 90-100 cmbs. The sherds included one St. Johns Check Stamped, one St. Johns Plain, and two St. Johns eroded. Associated with the artifacts at both depths were charcoal and iron concretions. No shell was observed in STP3.

The near-shore lake bottom east of Morris 4 was scoured for artifacts and eroded midden. The only item observed was a chert flake at location marked 4-0 in Figure 4-18. Two piston cores were driven into the lake bottom under 88-90 cm of water. Both cores

revealed a thick mantle of light gray to white sand to as much as 127 cmbs, overlain with a thin veneer of gray-brown sand. Other than one chert flake at 26 cmbs in Core 4-2, no other artifacts were encountered, not was intact midden or anthropogenic soil observed.

In sum, Morris 4 is unlike all the other sites investigated on Crescent Lake because it occupies an erosional interface with water that is elevated above current lake levels. The 2-m high cut bank exposes at least 1.5 m of diffuse archaeological deposits, and sufficient data are available to suggest these are well stratified. The presumed source of sediment that buried this site is sand from upslope, to the west. The fenced area to the west of the cutbank, as well as points north and south of the shovel tests, were not accessible for additional testing, so we cannot determine the boundaries of this site. Given the cutbank profile and lack of submerged archaeological deposits, it seems unlikely that Morris 4 was occupied when lake levels were lower. Conversely, lake levels 5-10 feet higher than present would not adversely affect the inhabitability of this location. Testing farther west is needed to determine how far this deposit goes. With its relatively steep but gradual slope westward, Morris 4 may be one of the best locations for monitoring a prograding landform and human use of it with long-term fluctuations in lake levels. For now it is noteworthy that Morris 4 contains the same two components as 8PU90 and similarly represents a location up and out of the water.

Morris 5 (8PU1385) and Morris 6 (8PU1386)

Two shoreline locations collected by Morrow in the southwest corner of Crescent Lake occupy a bend that received drainage from at least three small streams. Pedestrian survey of this entire area showed that the hillslopes have virtually no surface visibility due to heavy vegetative cover. Some cleared agricultural land was observed near a barn located to the southwest of area marked Morris 5 in Figure 4-19. Unfortunately, overgrown ground cover inhibited surface inspection. Lake shore along the entire expanse of Morris 5 and 6 revealed no artifacts or midden deposits.

Inspection of the near-shore lake bottom in the bend area of Morris 5 and 6 was thorough. The crew traversed the entire area by foot in water less than 4 feet deep and sunk dozens of auger tests to search for buried midden. Three piston cores were also made. Core 5-1 was sunk in 76 cm of water to reveal a light brown sand with plant matter over light gray sand to a depth of 67 cmbs. Core 6-1 produced the same sandy profile to a depth of 92 cmbs. At 153 cmbs, Core 6-2 penetrated the farthest into sediment, revealing a brown sand with small bits of charcoal and rootlets from 36-153 cmbs. Overlying sands were consistent with those observed in the other two cores.

Morris 5 and 6 are apparently nonmidden sites with deep sands that no doubt accumulated in part from the deltaic formations of three small streams in the bend area. With lowered water levels, the broad shelves of these sandy deposits may have attracted lake-side settlement, but presumably nothing involving shellfish processing and disposal. Rather, these sites are likely sources for the many Archaic points in the Morris collection. Subsurface testing of the terrestrial components of these sites is warranted to inspect for intact deposits. The offshore potential for preserved organic deposits seems limited.

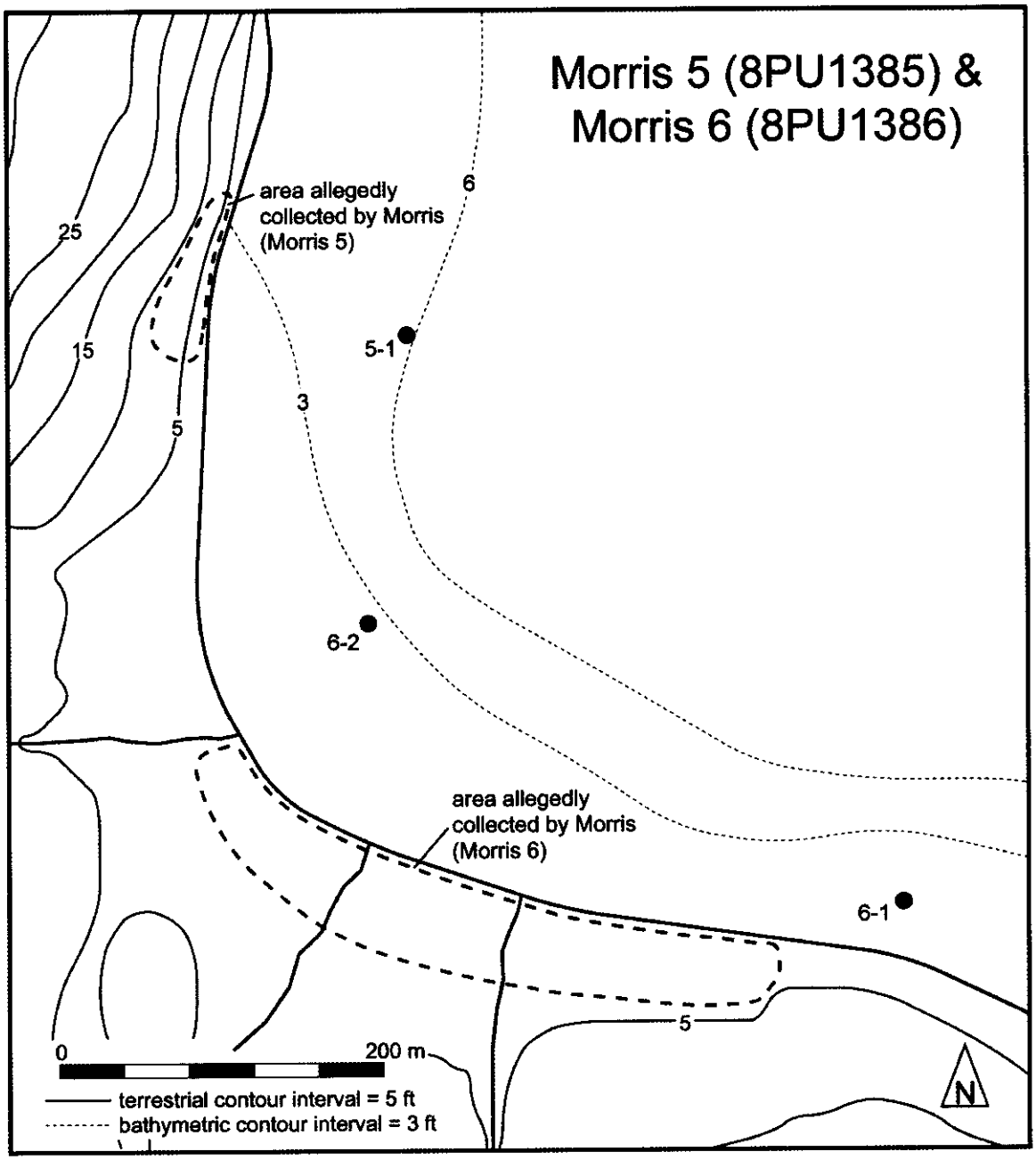

Figure 4-19. Topographic map of vicinity of Morris 5 (8PU1385) and Morris 6 (8PU1385), showing locations of offshore piston cores.

Breezy Point (Morris 7; 8PU1387)

Breezy Point is a prominent landform that juts out into the southwest corner of Crescent Lake in a broad, flat platform with a gentle slope toward the lake. Morris allegedly collected from the lake margin across an expanse of some 700 m (Figure 4-20).

Terrestrial access to this location was not feasible during the project, but an intensive coring effort in near shore waters was conducted to search for submerged deposits.

All piston cores sunk off of Breezy Point were in 3 to 3.5 feet of water and ranged from 68 to 139 cm in sediment depth. Profiles in each of the cores were roughly the same. A surface stratum of light brown sand varied from 11 to 48 cm thick and was underlain by gray sandy clay with occasional wood fragments and fibrous material. No artifacts or anthropogenic soil were observed.

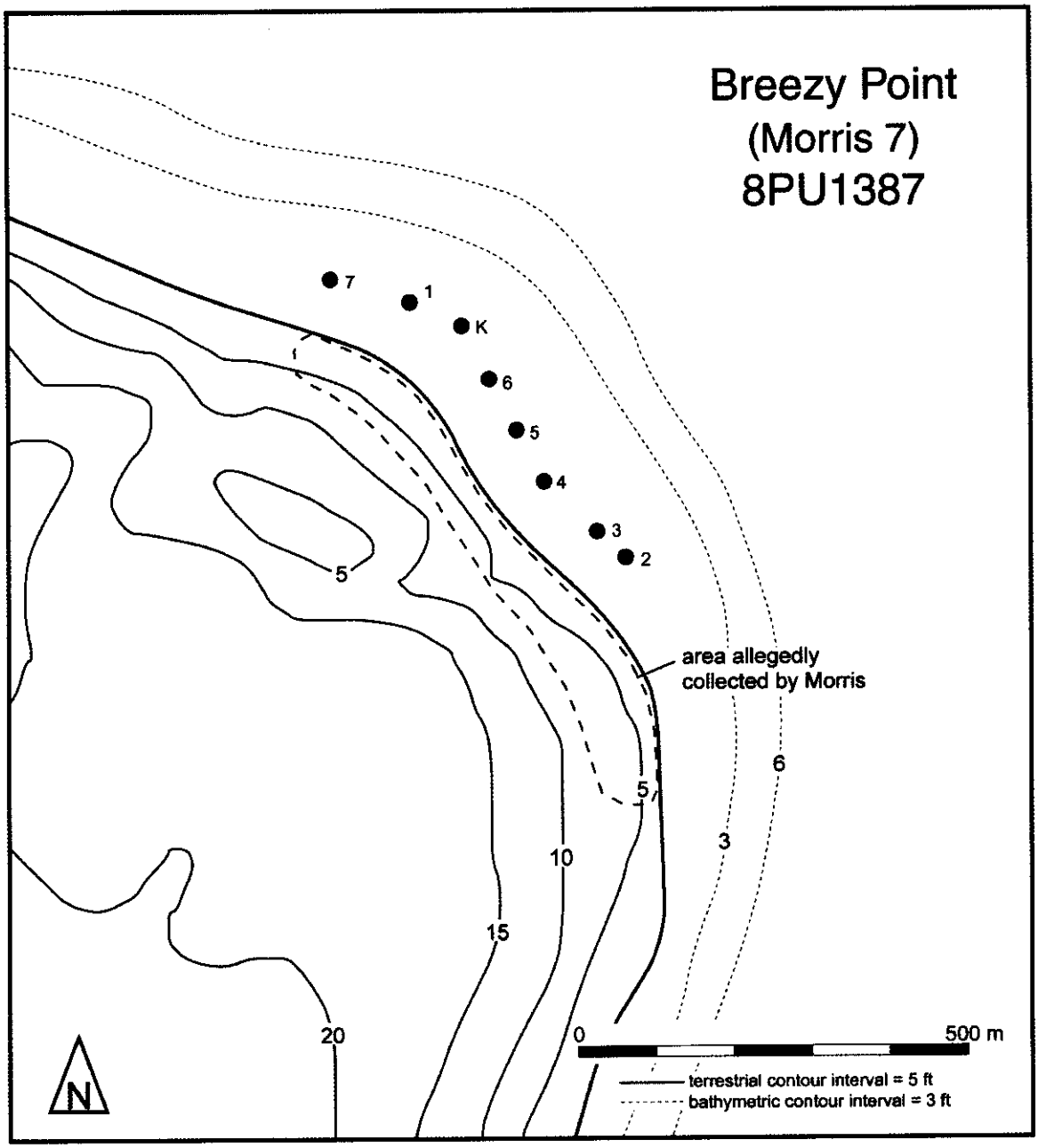

Figure 4-20. Topographic map of vicinity of Breezy Point (Morris 7; 8PU1387), showing locations of offshore piston cores.

Morris 8 (8PU1388)

In a southern bend of the lake margin similar to Morris 6 is a long stretch of shoreline purportedly collected by Eddie Morris and designated in Figure 4-21 as Morris 8 (8PU1388). Access to this area was enabled by a series of residential driveways turning north from Clifton Road (Figure 4-22). The tenant of one of the houses granted permission to the field crew to inspect the surface and shoreline of Morris 8 contained within the boundaries of this property. On the east side of a fence line enclosing cattle pasture pottery was observed and collected from an area near the shoreline. A small bit of shell was also observed at the shoreline although none appeared to be in midden context.

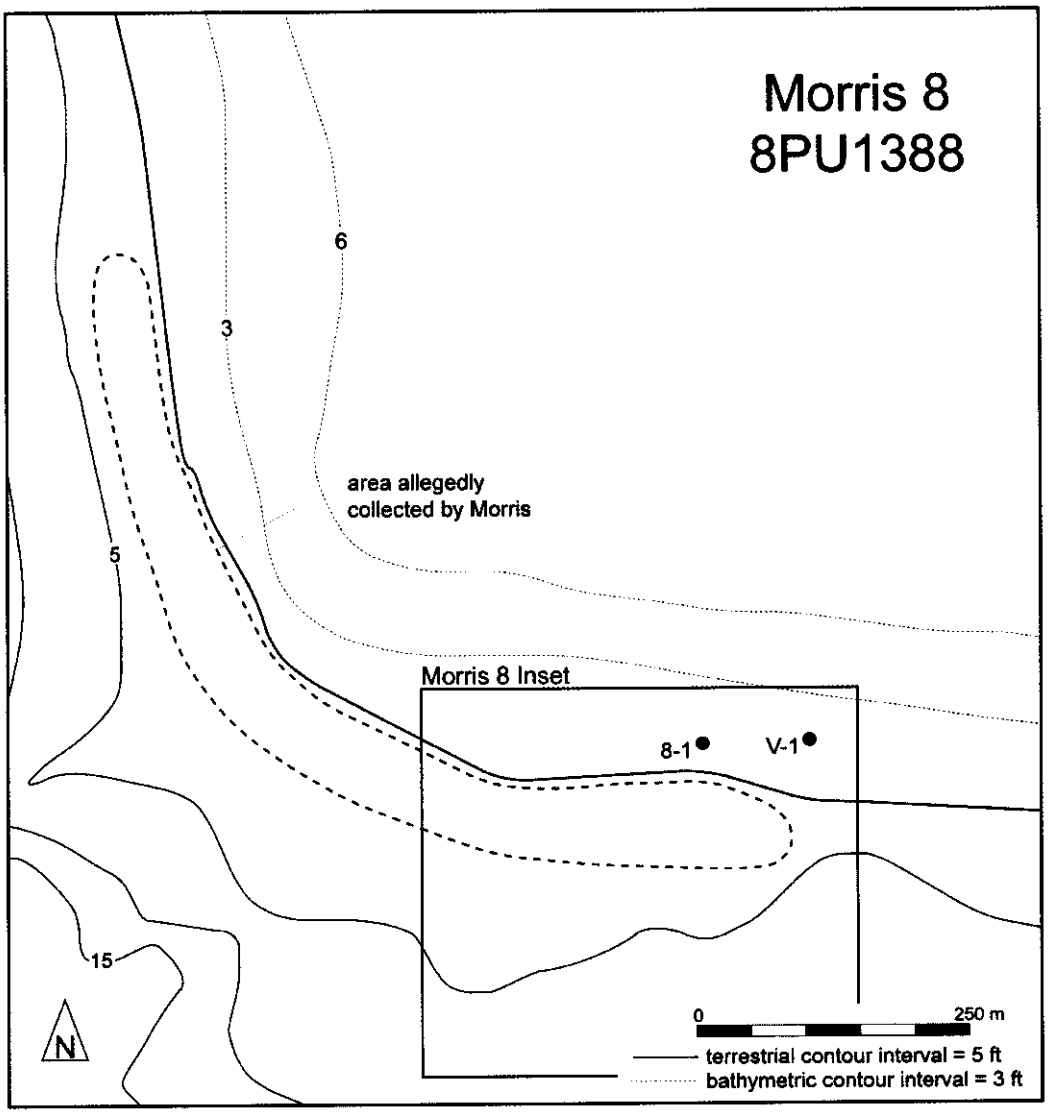

Figure 4-21. Topographic map of vicinity of Morris 8 (8PU1388), showing locations of offshore piston cores.

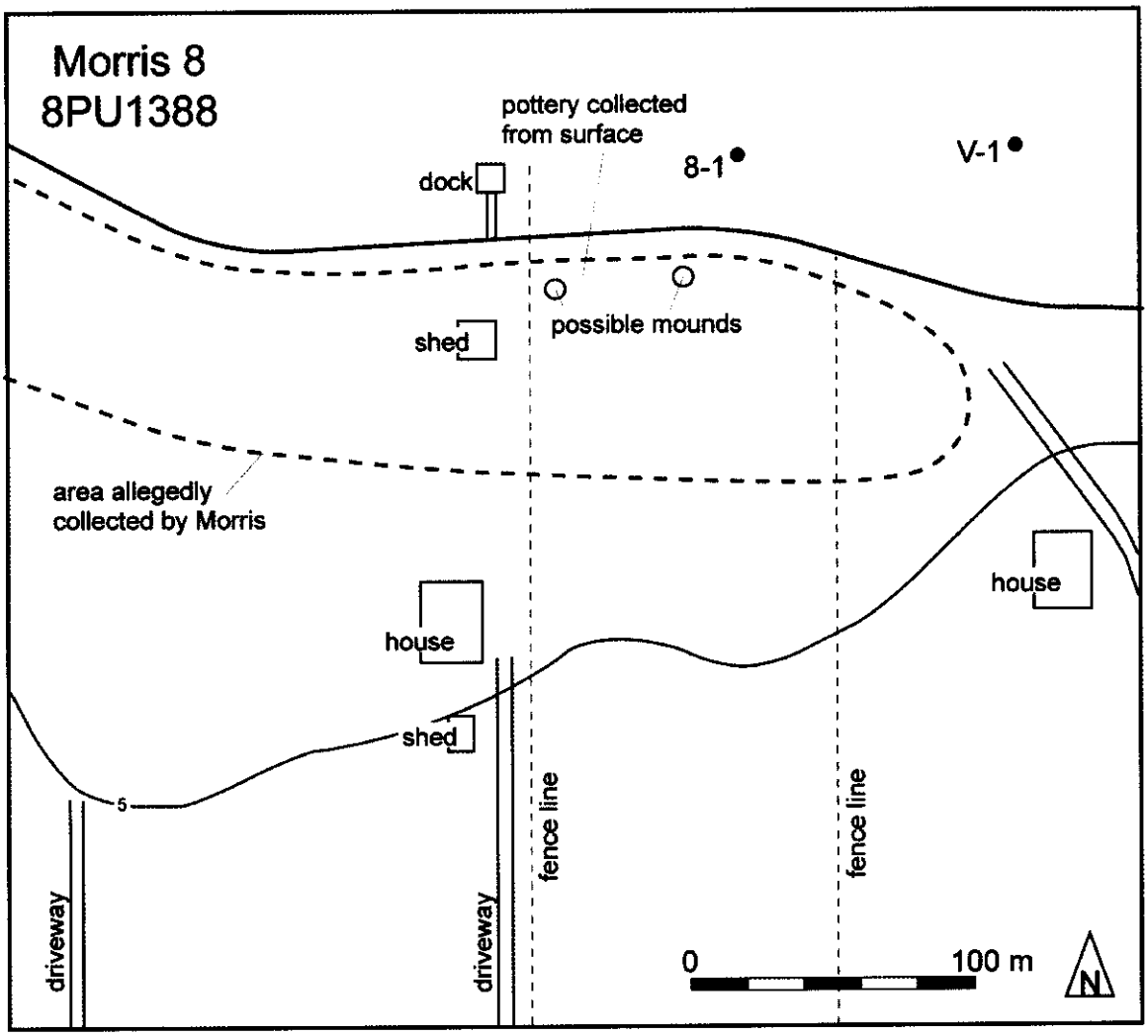

Figure 4-22. Topographic map of the eastern aspect of Morris 8 (8PU1388), showing locations of offshore piston cores, possible mounds, and associated surface features.

The inventory of surface-collected artifacts is as follows: 2 St. Johns Check Stamped sherds; 2 St. Johns Plain sherds; 11 eroded sherds with St. Johns paste, many of which are likely check stamped varieties; 4 sand-tempered plain sherds; 6 sand-tempered eroded sherds; and 5 pieces of vertebrate bone.

Two suspicious low mounds in the vicinity of the pottery were noted. Both are about 10-15 m from the lake shore, less than 0.75 m high, and only 5-7 m in diameter. They are spaced about 40 m apart on the east side of the western fence line.

Access to the western portion of Morris 8 was inhibited by wetlands with bamboo and cypress. By boat the crew did an extensive walkover of the near-shore lake bottom, probing for midden and artifacts. No archaeological remains were detected. Piston coring in the vicinity of the possible mounds and surface finds was limited to two tests.

This same location was earmarked for testing in the bathymetric survey (Locus V). Deep sands over a green-gray (marine) clay were observed. In closer proximity to the mounds and pottery, the second core (8-1) exposed light gray sand in the upper 78 cm underlain by a darker gray sand from 78-100 cm and gray sandy clay to a maximum core depth of 180 cm. Core 8-1 was dropped in 60 cm of water. No artifacts or anthropogenic soil was observe din either core.

Morris 8 requires additional testing on its terrestrial component to determine depth and condition of subsurface remains. The site has already verified that locations with St. Johns Check-stamped pottery are common on terrain below the 5-ft terrestrial contour. The site thus has potential for submerged, offshore deposits and should be cored more intensively.

Nelson 1 (8PU1389)

Local informant Delwood Nelson alerted the crew to a shell deposit eroding from the west bank of Crescent Lake, just south of Breezy Point (Figure 4-23). Initial inspection of the shoreline by boat revealed a thin shell midden on top of an exposed basal clay. The setting is the outlet of an intermittent stream, which, when water levels are up, forms something of a cove. Both *Viviparus* and bivalve shell was observed, and collected from the surface along the shoreline was an assemblage of sherds consisting of 8 sand-tempered plain, 3 St. Johns Plain, 1 St. Johns Check Stamped, 2 St. Johns eroded, and 1 eroded fiber-tempered. Three chert flakes, one quite large, and a fragment of vertebrate bone rounds out the assemblage.

Coring of the near-shore lake bottom revealed no evidence for intact, submerged deposits. Core 1-1, in 40 cm of water, contained a 6-cm veneer of yellow-brown sand over gray clay to a maximum core depth of 54 cm. A small eroded sherd with St. Johns paste was recovered from the upper sand stratum. Cores 1-2 and 1-3 also penetrated shallow clay, but Cores 1-4, 1-5, and 1-6 revealed a deeper sand sequence, with as much as 161 cm of brown to gray-brown sand beneath thinner surface layers of yellow-brown sand. Despite the bathymetric contours shown in Figure 4-23, all cores at Nelson 1 were placed in water 55 cm or less.

Much of Nelson 1 may have eroded into Crescent Lake from wave action and fluctuations in water level. The exposed clay along the bank reflects a basal depth of midden only a few tens of centimeters above present lake levels. Subsurface testing to the west of the shoreline is needed to determine if the site occupies higher terrain. The relatively steep slope in this area could have easily accommodated lakeshore occupations that were invulnerable to minor changes in lake levels.

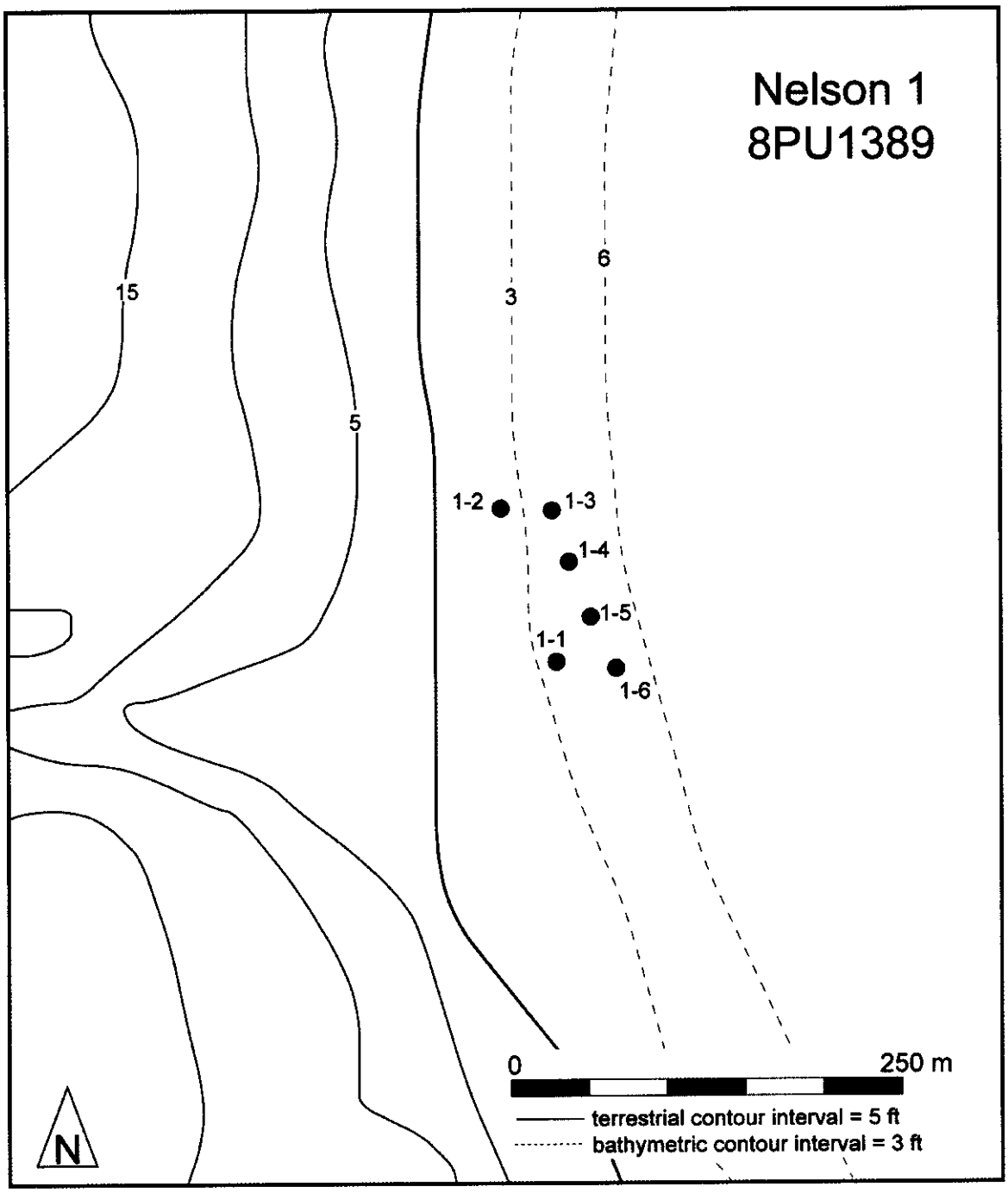

Figure 4-23. Topographic map of vicinity of Nelson 1 (8PU1389), showing locations of offshore piston cores.

Nelson 2

Mr. Nelson pointed out the location of a midden along the northeast margin of Crescent Lake that was recorded in the field as Nelson 2, but later aligned with the presumed location of 8FL157, which was discussed in the section above on previously recorded sites.

Nelson 3

A location collected on the north end of Hurricane Point was designated Nelson 3. This location was discussed earlier in conjunction with the nearby collector location known as Morris 1.

Nelson 4 (8PU1390)

Among the sites Mr. Nelson pointed out were a couple of locations that contained marine shell but not necessarily archaeological material. One such location between Loci O and N on the western shore of the lake was named Nelson 4 and tested with a couple of cores (Figure 4-24). Inspection of the shoreline revealed no evidence of artifacts or midden. An initial auger (4-0) produced a small bit of crushed marine shell in a sandy clay matrix. A piston core (4-1) was dropped in this location under 121 cm of water. The shell was contained in an upper stratum of light brown sand, 10 cm thick, underlain by light gray sandy clay to a maximum core depth of 97 cmbs.

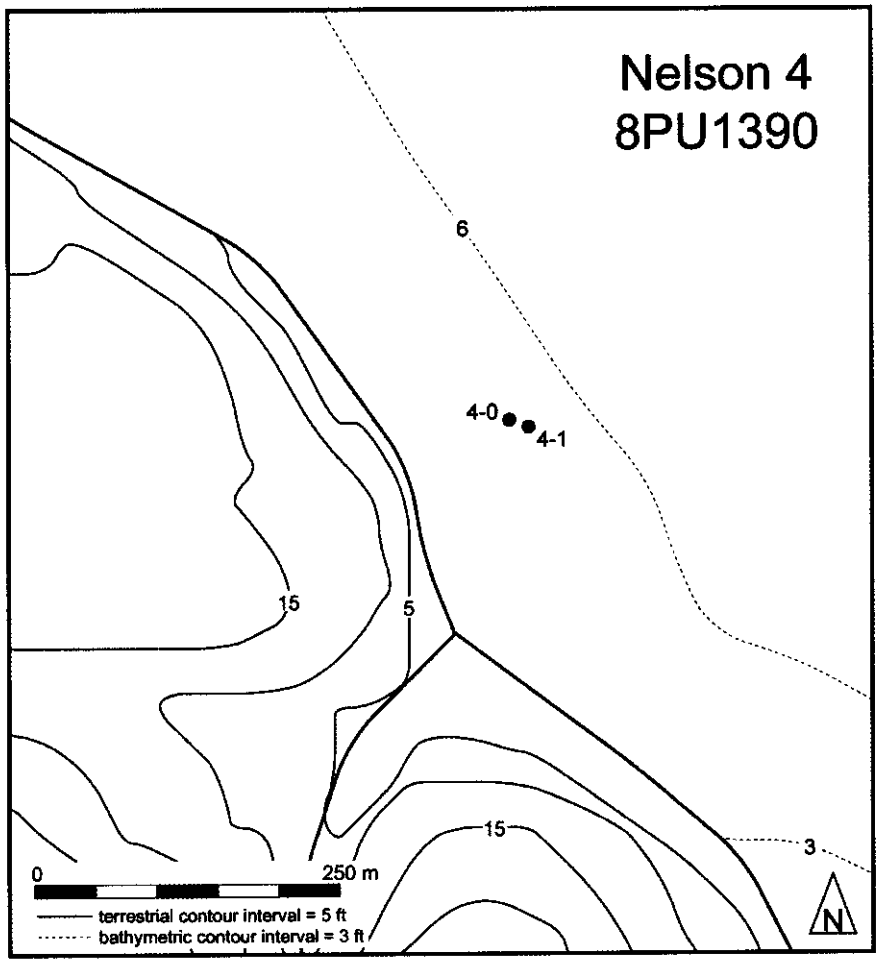

Figure 4-24. Topographic map of vicinity of Nelson 4 (8PU1390), showing locations of offshore piston cores.

Although marine shell could very well signify the presence of archaeological deposits, fragments of shell are not uncommon in the marine clays that form the basal stratum of this locale. The difference between this location and others with marine clay is the presence of marine shell in the sands. Most likely the shell was redeposited from the eroded bank or some such process that exposed deeper strata. Still, additional testing of this area is needed to rule out archaeological deposits as the source of shell.

Nelson 5

Another location of shell reported by Mr. Nelson is situated a few hundred meters north of Locus N and was reported in the section above on bathymetric survey.

North Pomona (Nelson 6; 8PU1391)

Just north of Pomona Landing, on the northwest shore of Crescent Lake, the outlet basin for Dunns Creek begins to widen to create expansive wetlands. The southern edge of this wetland basin was earmarked for bathymetric testing (Locus R) and our local informant, Mr. Nelson, indicated that shell midden was fully submerged in offshore waters in this location. Initial coring in the locus revealed concreted shell and shell in 2.5 to 4 ft of water over an area several tens of meters long and ca. 30 m wide. Three small, waterworn St. Johns sherds were observed on the marshy shoreline. Given these results, the location was intensively tested with piston cores and a walk-over survey.

A total of 18 piston cores were sunk at North Pomona (Figure 4-25). Two returned to the lab for analysis (Cores 17 and 18) are described in Appendix B. The half dozen cores that contained intact shell midden consisted of a thin veneer of yellow-brown to brown sand over 40 to 80 cm of intact *Viviparus* shell midden in a dark brown fine sand matrix. Traces of bivalve shell and *Pomacea* were also observed, along with bone, but no artifacts. Cores outside the projected area of shell, as shown in Figure 4-x, generally consisted of a veneer of yellow-brown sand over black, peaty muck or dark gray sand with rooted peat, followed by gray sandy clay. Apparently the midden lies on a slight topographic rise in the basal clays.

A sample of wood from the upper 20 cm of shell midden in Core 18 was submitted for radiocarbon dating and returned an assay of 1910 ± 40 B.P. (cal AD 20-220). This is close to the age of midden deposits at Grimsley Neck. Like Grimsley Neck, North Pomona yielded no artifacts in midden cores or in extensive walkovers of the submerged terrain in and around the shell midden. The waterworn St. Johns sherds collected from the marsh line are consistent with the radiometric age and duplicates the Grimsley Neck data.

Despite the lack of definitive cultural material, North Pomona is a significant find. This appears to be a fully intact, fully submerged shell midden as much as 80 cm thick and currently under about 3 feet of water. The lack of cultural material is owed, in part, to the extensive collecting of local relict collectors. Nonetheless, the depth and apparent stratigraphic integrity of this site warrant further research and long-term protection.

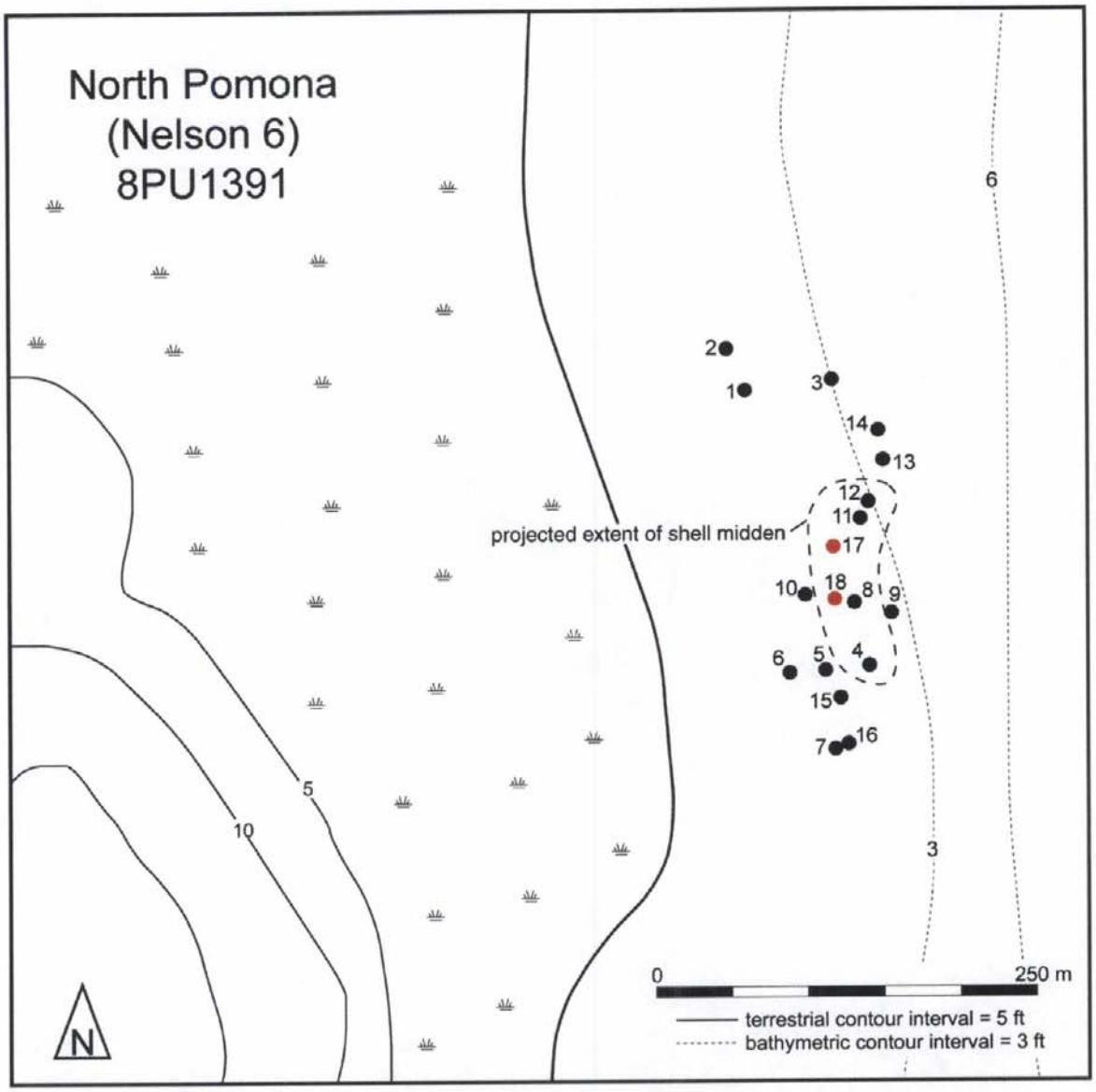

Figure 4-25. Topographic map of vicinity of North Pomona (8PU1391), showing projected extent of submerged shell midden and locations of offshore piston cores (note: cores in red are sample cores).

Hopkins Point (Nelson 7; 8PU1392)

Mr. Nelson alerted the crew to a location of shell midden at the south end of the lake at a location known as Hopkins Point (Figure 4-26). The shoreline at this location contains no evidence of shell midden or artifacts. An initial core some 20 m offshore revealed a gray sandy surface matrix with crushed shell and bone over apparently thin, but intact shell midden in a dark gray sandy clay matrix, over green-gray, marine clay. Several additional cores were dropped to determine the extent of this shell deposit. Midden was located in only two additional tests (Cores 2 and 6), giving the midden a diameter of no more than 50 m.

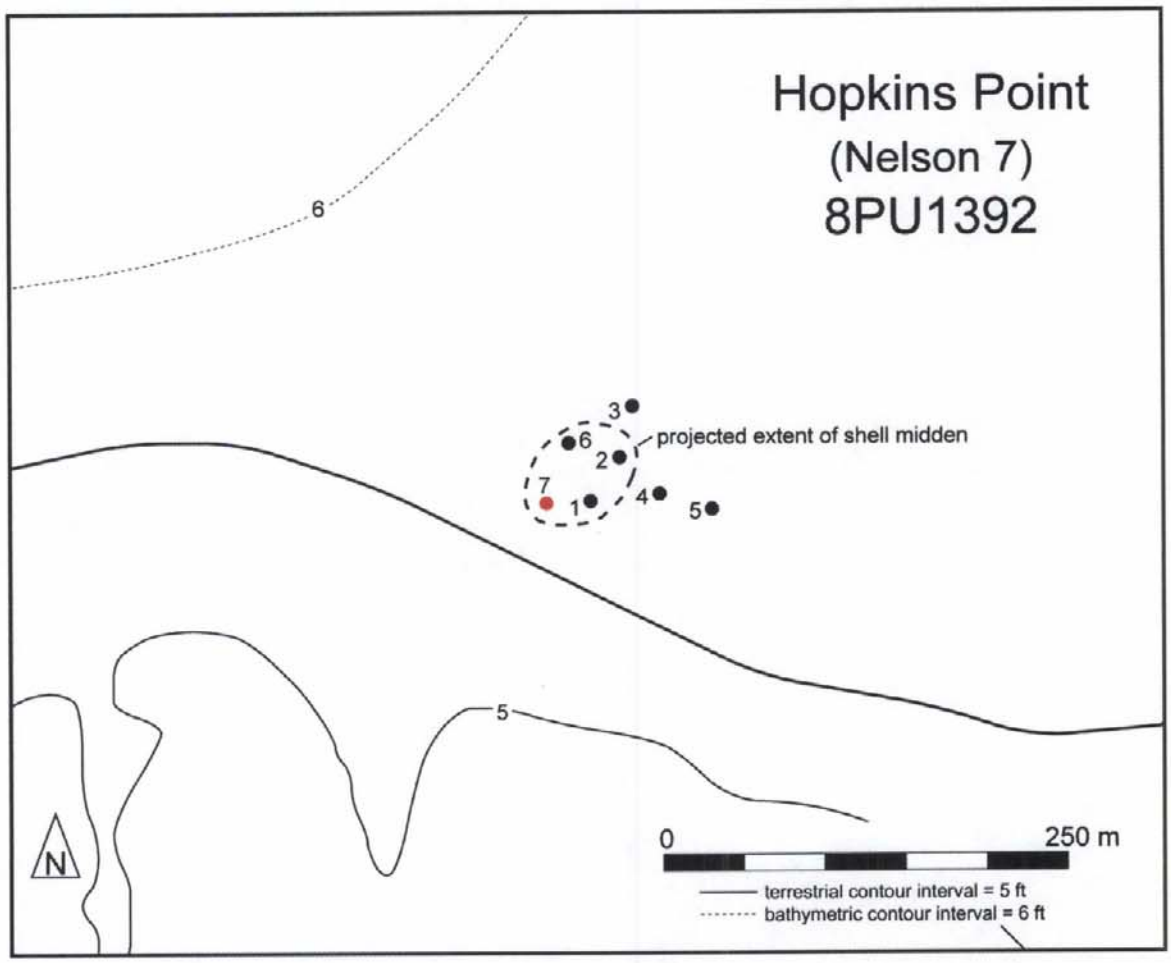

Figure 4-26. Topographic map of vicinity of Hopkins Point (8PU1392) showing projected extent of submerged shell midden and locations of offshore piston cores (note: core in red is sample core).

A sample core retrieved from the shell midden (Core 7) shows an interesting combination of redeposited shell over intact midden (Appendix B). The upper stratum consists of clean yellow-brown sands with occasional root casts to about 15 cmbs. A thin zone of bedded sands over a 12-15-cm stratum of shell that appears to have been winnowed and redeposited, presumably from wave action at the time the midden was flooded. The intact shell midden is a 10-cm remnant of an apparently thicker accumulation, underlain by a thick zone of submidden leaching, all resting on basal clays that start at about 53 cmbs.

The Hopkins Point midden is small and largely eroded, but it contains an intact basal component that is fully submerged under 2.5-3 feet of water. No artifacts were observed, but Mr. Nelson reports finding Pinellas points at this location. Despite the lack of diagnostic artifacts and radiometric dates for this midden, its size, structure, and location relative to current lake levels makes it fully consistent with the midden at North Pomona and somewhat like the midden at Grimsley Neck. Like these others, Hopkins

Points requires more fieldwork work to more fully understand its extent, content, and condition.

CONCLUSION

Archaeological survey at 40 locations along the perimeter of Crescent Lake resulted in the verification of nine of 14 extant sites, and documentation of 13 new sites. Bathymetric reconnaissance survey did not prove effective in this latter effort. Rather, we became aware of most of the new locations from local collectors who work the near-shore lake bottom for artifacts. Two fully submerged shell middens and several other important sites would not have been detected otherwise. The significance of these and other sites on Crescent Lake for improving our understanding of the relationship between changing settlement and lake levels is discussed fully in the closing chapter of this report.

CHAPTER 5
ARTIFACT ASSEMBLAGES

Artifact collection was not a primary objective of the Crescent Lake Archaeological Survey, although objects were retrieved from surface and subsurface contexts whenever encountered. Obviously, diagnostic artifacts from sound context enable age estimates for sites, and any functional information that can be gleaned from the types of artifacts found in particular contexts assist with inferences about site function. Unfortunately, the small sample of artifacts recovered from good contexts is inadequate to draw definitive conclusions about occupational history and site function. Nevertheless, the combination of radiocarbon assays and limited artifactual data provide a preliminary basis for inferring broad patterns in site use that can be tested with additional fieldwork. In addition, information on a private collection of artifacts bolsters the survey assemblage to show that the Crescent Lake area was intensively utilized during periods not otherwise represented at the sites investigated during this project.

This chapter is divided into two sections, the first describing artifact assemblages obtained from specific site contexts in the course of field survey, the second summarizing artifacts in the Eddie Morris collection analyzed by students of Barbara Purdy in 1983. Given the limited size of the field survey sample and the questionable provenience of the Morris collection, detailed analyses and regional comparisons of these assemblages are not warranted. Rather, the intent of this presentation to illustrate the variety and relative proportions of artifacts known from Crescent Lake to support preliminary inferences about changing land-use patterns and lake levels discussed in Chapter 6.

SURVEY ASSEMBLAGES

A total of 307 prehistoric pottery sherds and 16 lithic artifacts were collected during the 2002 survey from 13 sites in and around Crescent Lake. These items constitute all definitive artifacts encountered during the survey, in both subsurface and surface contexts. In addition, small samples of shell and vertebrate bone were collected from several locations.

Prehistoric Pottery Sherds

An inventory of prehistoric pottery sherds by culture-historical type and site is provided in Table 5-1. Dominating the assemblage are sherds of the St. Johns tradition, identified by the prevalence of sponge spicules in the paste. Plain (n = 122) and eroded (n = 67) surface treatments are most common in the assemblage of 242 St. Johns sherds, followed by check stamped (n = 48) and incised (n = 5) sherds. Many of the eroded sherds with St. Johns paste were likely check stamped. A group of 54 sand-tempered sherds, mostly plain, was recovered from three sites. Orange fiber-tempered sherds, the smallest subsample of the pottery assemblage (n = 11), were dispersed across six sites. Aside from two eroded examples, all of the Orange sherds are incised varieties.

Table 5-1. Inventory of Prehistoric Pottery Sherds by Site Provenience and Culture-Historical Type, Crescent Island Survey.

	St. Johns				Sand-Tempered				Orange		
Site	Plain	Check-Stamp.	Incised	Eroded	Plain	Check-Stamp.	Cord-marked	Eroded	Incised	Eroded	Total
8PU15				3							3
8PU90		*							4		4
8PU723				6							6
8PU1380									1		1
8PU1381				3							3
8PU1384	1	3		7					1		12
8PU1388	2	1		12				10			25
8PU1389	3	1		2	8					1	15
8FL9	1	1		1							3
8FL161	9			6	6						21
8FL163	98	42	5	27	26	1	1			1	201
8FL237	8							2			10
Bear Island NW**									3		3
Total	122	48	5	67	40	1	1	12	9	2	307

* St. Johns Check-Stamped sherds in possession of land owner

** Sherds donated to project by Delwood Nelson; exact provenience in northwest area of Bear Island unknown

Orange Sherds. Orange pottery is the considered the oldest in Florida, dating from ca. 4200 B.P. and replaced after ca. 3000 B.P. by pottery of the St. Johns tradition. The Orange sequence was divided by Bullen (1972) into five subperiods (Orange 1-5), with the earliest (Orange 1) dominated by plain wares and later subperiods distinguished by the addition of decorated surfaces and, eventually, spiculate and sandy pastes. Recent refinements in chronology and paste analysis are providing good reason to abandon this sequence (Cordell n.d.; Janus Research 1995; Sassaman 2003b). It is now apparent that plain and incised fiber-tempered pottery appeared at the outset of the Orange tradition, and that spiculate pastes with fiber, as well as pure spiculate pastes of the St. Johns tradition, are nearly as old as the oldest Orange pottery. Thus, presumably early Orange, late Orange, and even later St. Johns pottery are now demonstrably coeval over the period of ca. 4000-3500 B.P. Of course, St. Johns pottery continued to be used and evolved with more elaborate surface treatments and forms over time, but we have little basis for inferring a post 3000 B.P. date for an assemblage of St. Johns Plain pottery in absence of independent dating methods. We are perhaps justified in suggesting that assemblages dominated by Orange fiber-tempered pottery predate ca. 3500 B.P., although additional data are needed before this assertion is accepted as archaeological fact.

Of the 11 Orange sherds recovered during survey, two are very small eroded sherds, and the remainder are incised. Four of the incised sherds came a shovel test at 8PU90 and although they do not crossmend, they likely came from the same vessel. An isolated Orange Incised rim sherd was recovered from the surface at 8PU1380, and a single body sherd of Orange Incised was pulled from a shovel test at 8PU1384. The remaining three Orange Incised sherds were donated to the project by Delwood Nelson. Along with a soapstone vessel sherd, these examples allegedly came from the northwest portion of Bear Island, although it is unclear if they were taken from a terrestrial or submerged portion of the island.

Shown in Figure 5-1, the three Orange sherds from Bear Island typify the entire Orange assemblage from the greater Crescent Lake area. The rim sherd (Figure 5-1b) has a rectilinear incised design, a somewhat carinated rim profile, and vessel wall thickness of 9.3 mm at a point 3 cm below the lip. The two body sherds are likewise thick (9.2-11.5 mm), one with oblique incisions relative to the plane of the orifice, and the other a zoned incised punctate design. As is common to all the sherds classified herein as Orange, fiber is generally abundant in paste that also contain fine aplastics, generally quartz sand. None of the Orange sherds from Bear Island of the other sites bears evidence of carbon residues on either interior or exterior surfaces.

Although the Crescent Lake sample of Orange incised sherds is small, common to all the rim sherds is a rounded exterior lip, and four of the six identifiable vessel lots has incisions running oblique to the orifice. Sherds are also consistently thick.

As noted, the chronology of Orange Incised pottery in the middle St. Johns region has been pushed back roughly 500 years to ca. 4000-3500 B.P. (Sassaman 2003b). Although none of the Crescent Lake specimens could be dated directly from soot, as was

Figure 5-1. Orange Incised sherds (a, b, d) and a soapstone vessel sherd (c) collected by Delwood Nelson from the northwest portion of Bear Island

the case with other middle St. Johns samples, the association of three Orange Incised sherds with a sooted soapstone vessel sherd enables an indirect age estimate of 3500 ± 40 B.P. (see Chapter 4). This falls at the latter end of the revised Orange chronology, overlapping at two-sigma with AMS dates on soot from Orange Incised sherds from three middle St. Johns sites (Sassaman 2003b). This date also falls squarely within the range of dates on soapstone vessels from Florida and elsewhere in the lower Southeast (Sassaman 1997, 1999; unpublished data).

Finally, the subsamples of sherds from Crescent Lake classified as either St. Johns or sand-tempered include several specimens with minor traces of fiber in the paste. Although these technically could be classified as Orange sherds, they are included with the former classes and are described below. The temporal ambiguity between fiber-tempered pottery with or without sponge spicules and/or sand in the paste is becoming patently obvious; it remains to be seen whether variations in these technological attributes of early pottery have functional or ethnic significance.

St. Johns Sherds. The longstanding culture-historical sequence for St. Johns pottery consists of two periods, St. Johns I and II, each divided into several subperiods

(Milanich 1994:247). The division between St. Johns I and II is marked by the appearance of check-stamped surface treatments in St. Johns II at ca. A.D. 750. This chronological benchmark has remained steadfast, but other distinguishing characteristics of the St. Johns sequence remain suspect. Most notable perhaps is uncertainty about the advent of the St. Johns tradition. Sponge spiculate pottery clearly was made and used in northeast Florida as early as 3500 and perhaps as early as 4200 B.P., the time when pottery in general appeared in the region. A transition between Orange and St. Johns has long-been recognized for the region, but now radiocarbon assays suggest the two were largely coeval over the 500-700 years of pottery making. It follows that technological attributes may have crosscut what have been widely regarded as distinct, sequential pottery traditions. That is, early St. Johns pottery ought to be recognized for its similarity to Orange pottery if the two traditions were shared amongst an interacting, regional population.

Some indication of an especially early St. Johns assemblage is seen at site 8FL161. The 15 St. Johns sherds collected from this site include nine plain, and six eroded, but no check-stamped specimens (Figure 5-2). One of the plain sherds (Figure 5-2a) is a rim with an thin, irregular profile and minor traces of fiber. In morphology and technology it resembles closely many of the thin-walled Orange Plain rim sherds from Bluffton in Volusia County (Bullen 1955) and a couple of the Orange Plain rim sherds from Blue Spring (8VO43), also in Volusia County (Sassaman 2003a:112; e.g., vessel 13). Dates from Blue Spring place this Orange Plain ware at ca. 3800-3500 B.P. If this assemblage from 8FL161 also dates to this interval it would be potentially coeval with the Orange Incised assemblage from Bear Island and elsewhere.

Figure 5-2. Plain St. Johns sherds (a-c) and a sand-tempered sherd (d) from 8FL161. Two of the St. Johns sherds (a, b) and the sand-tempered sherd (d) have minor traces of fiber in their pastes.

An assemblage of eight St. Johns plain sherds from 8FL237 duplicates the 8FL161 sample in its lack of check-stamped sherds, although they differ in that none of the 8FL237 sherds bears traces of fiber in the paste. Still, a St. Johns I assignment for 8FL237 is likely.

Three other sites in the survey yielded small assemblages of eroded St. Johns sherds in the absence of definitive check-stamped sherds (8PU15, 8PU723, 8PU1381). The small and generally eroded nature of these sherds precludes a sound assessment of relative age within the St. Johns sequence.

Six sites contained examples of St. Johns Check-Stamped sherds. The largest assemblage comes from 8FL163 on Bear Island, where a sample of 172 St. Johns sherds includes 42 check-stamped specimens, some of which are illustrated in Figure 5-3. Other varieties of St. Johns pottery from 8FL163 include Plain (n = 98), Incised (n = 5), and eroded (n = 27). Instances of St. Johns Check-Stamped at other sites on Crescent Lake likewise include plain and eroded sherds with St. Johns paste, but no other site yielded St. Johns Incised pottery. Examples of plain and incised St. Johns sherds and an additional check-stamped sherd from 8FL163 are shown in Figure 5-4.

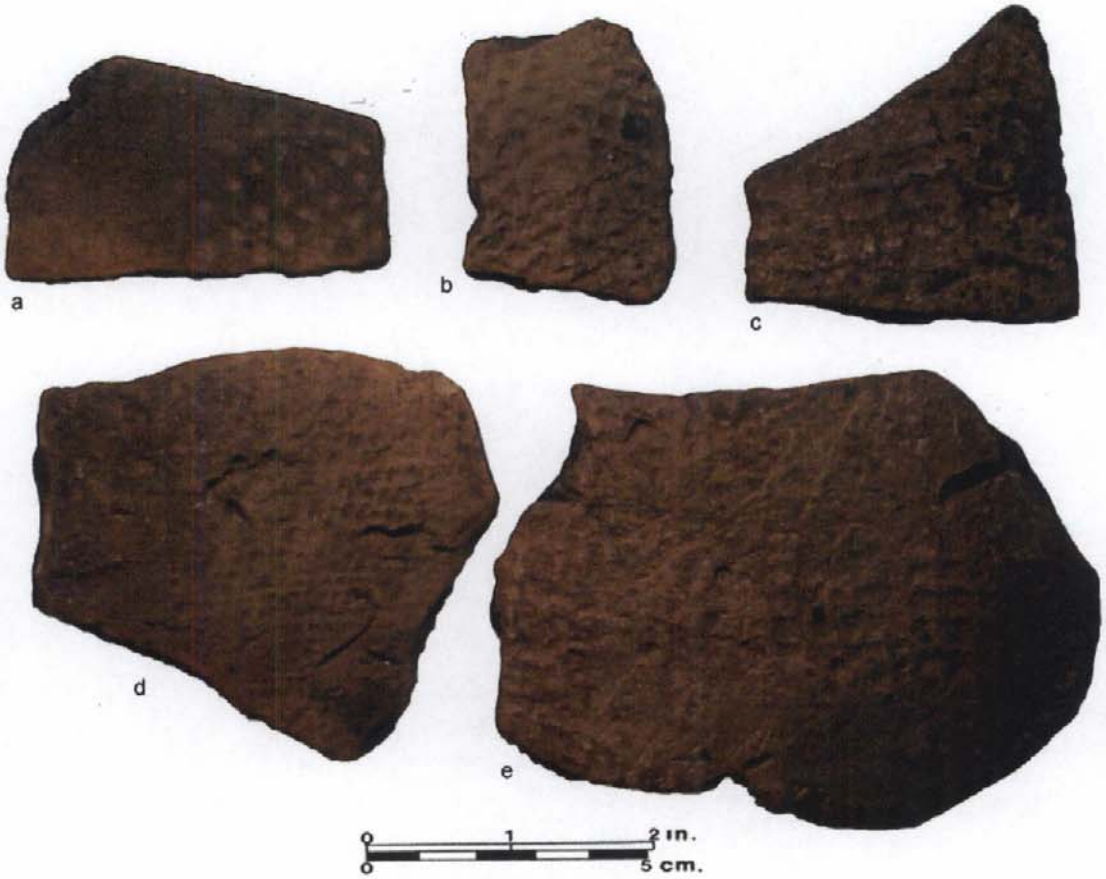

Figure 5-3. St. Johns Check-Stamped sherds from submerged surface near Core 13 at 8FL163.

Figure 5-4. St. Johns Plain (a, d, e), Check-Stamped (b), and Incised (c) sherds from submerged surface near Core 24 at 8FL163. Note: soot from the plain sherd on the bottom row (d) was submitted for AMS dating.

About 20 percent of sherds from 8FL163 with well-preserved surfaces exhibit carbon residue on exterior and/or interior surfaces (Figure 5-5). Soot from one of the St. Johns Plain sherds (Figure 5-4d) on the lake bottom near Core 24 was submitted for AMS dating and return an assay of 640 ± 40 B.P. (cal AD 1280-1410). This falls squarely in the St. Johns IIb period (ca. AD 1050-1513) and is consistent with the age range for the mound at 8PU90, where St. Johns Check Stamped pottery was collected by the landowner.

Variation in the St. Johns pottery from 8FL163 is best illustrated in its sample of 20 rim sherds. Among these vessel lots are eight check-stamped, two incised, and 10 plain specimens. Cross-tabulated by rim profile (Table 5-2), the sample shows a roughly even split between straight and incurvate rims. Vessesl with check-stamped surfaces are more often straight than incurvate, while vessels with plain surfaces show the opposite pattern. Of course, sample size is likely too small to be representative of populational trends.

Rounded lips are the most common lip form (Table 5-3), with all but one of the check-stamped vessels sporting this form. Tapered lips are exclusive to vessels with plain surfaces, comprising nearly half of the lip forms in that subsample.

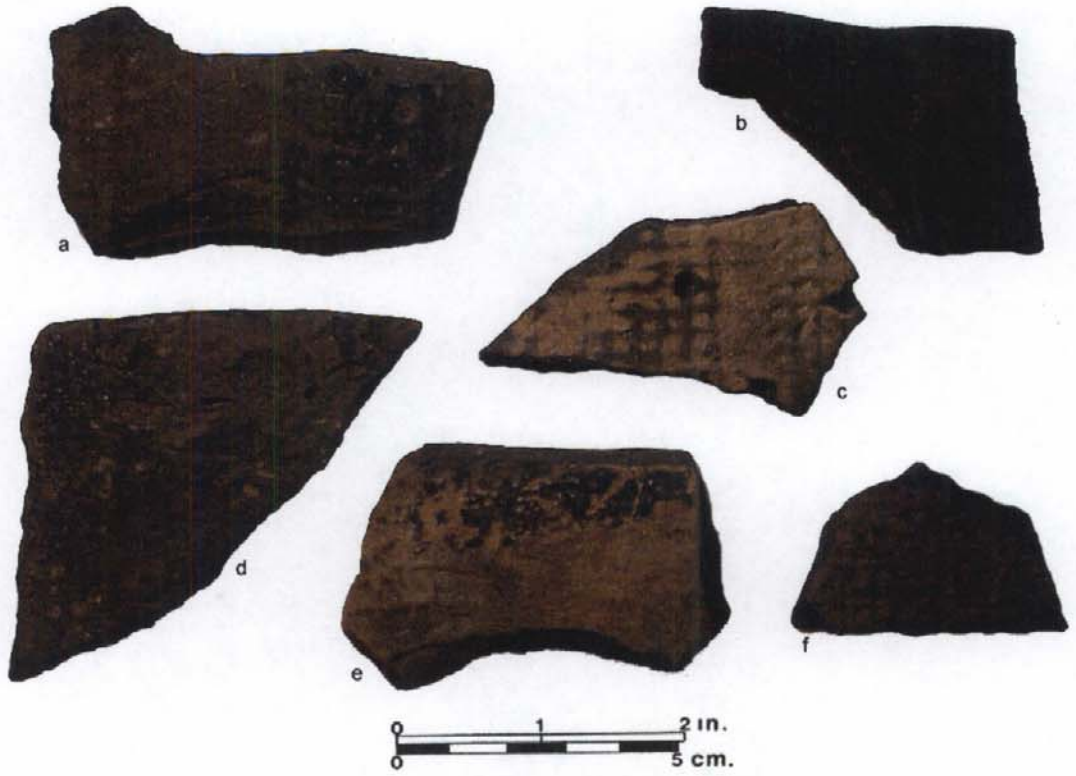

Figure 5-5. Examples of sooted St. Johns sherds from submerged surface near Core 13 at 8FL163.

Table 5-2. Absolute Frequency of Vessel Lots by Rim Profile Type for St. Johns Rim Sherds from 8FL163.

	Straight	Incurvate	Unidentifiable	Total
Check-Stamped	5	2	1	8
Incised	1	1		2
Plain	3	5	2	10
Total	9	8	3	20

Table 5-3. Absolute Frequency of Vessel Lots by Lip Type for St. Johns Rim Sherds from 8FL163.

	Round	Flat	Round Int.	Tapered	Irregular	Total
Check-Stamped	7	1				8
Incised	1				1	2
Plain	4		2	4		10
Total	12	1	2	4	1	20

Table 5-4. Descriptive Statistics on Vessel Wall Thickness (mm) of St. Johns Rim Sherds from 8FL163.

	n	mean	st. dev.	minimum	maximum
Check-Stamped	8	5.50	0.94	4.3	7.6
Incised	2	7.95	1.34	7.0	8.9
Plain	10	6.57	1.64	4.0	9.3
Total	20	6.28	1.52	4.0	9.3

As is typical of St. Johns pottery in general, the walls of vessels from 8FL163 are thin (Table 5-4). Measured 3 cm below the lip, wall thickness for the entire sample of rim sherds averages 6.28 mm and ranges from a low of 4.0 mm to a high of 9.3 mm. Rim sherds with check-stamped surfaces are the thinnest on average. Rims with plain surfaces are on average 1 mm thicker than check-stamped sherds. Despite this seemingly patterned variation, the incidence of soot on rim sherds does not covary with thickness or other variables. The five rim sherds with soot average 6.32 mm in wall thickness; the remaining 15 rim sherds have walls averaging 6.27 mm. The incidence of soot crosscuts surface treatment, rim form, and lip form.

Other Crescent Lake sites with St. Johns Check Stamped include one on the eastern lake shore (8FL9) and four on the western lake shore (8PU90, 8PU1384, 8PU1388, 8PU1389). The number of such sherds from these five sites is small, with only 8PU1384 producing more than one (Figure 5-6); the incidence of check-stamped sherds at 8PU90 is hearsay. Still, many of the eroded St. Johns sherds at these and other sites may very well be check-stamped varieties. One example of check-stamping from 8PU1384 (Figure 5-6a) shows how subtle this surface treatment can be when obliterated (i.e., smeared) surfaces are even only slightly eroded.

Sand-Tempered Sherds. Fifty-four sherds from five sites on Crescent Lake have sandy pastes with no apparent spiculate or fiber additive. All but two of these sand-tempered sherds are either plain or eroded. Generally they co-occur with both St. Johns Check-Stamped and Plain sherds, as at 8FL163, 8PU1388 and 8PU1389 (Figure 5-7). In no context was sand-tempered pottery found in the absence of St. Johns sherds. Despite their co-occurrence, sand-tempered and spiculate-paste sherds have little in common. The sand-tempered sherds are consistently thicker than St. Johns sherds (mean = 8.7 mm), with exclusively straight rim profiles, rounded lips, and a complete lack of carbon residues. If these sand-tempered wares are fully coeval with the St. Johns pottery at sites across the study area, then they likely assumed differing functions in vessel technology. Direct-heat cooking may have been precluded by the thick walls and direct rims.

Particle size among the sand-tempered sherds is consistently fine with one exception. The exception is a single cordmarked sherd from 8FL163 (Figure 5-8). This body sherd has a cross-cord design, a coarse, gritty paste, and wall thickness of 8.6 mm. It compares stylistically and technologically with cordmarked from the mouth of the St. Johns River dated ca. AD 900-1250. This is just slightly older than the age range estimated from AMS dating of St. Johns soot from 8FL163 cited above.

Figure 5-6. St. Johns Check-Stamped (a, d) and Orange Incised (c) sherds, and the stem of an Archaic biface (b) from 8PU1384.

Figure 5-7. Plain sand-tempered sherds (a, d), along with single examples of St. Johns Plain (b) and St. Johns Check-Stamped (c), and a cortical flake (e) from 8PU1389.

Figure 5-8. Cordmarked sand-tempered sherd from submerged context at 8FL163.

Lithic Artifacts

Only 16 artifacts of stone were collected from all aspects of the Crescent Lake Archaeological Survey. Aside from the soapstone vessel sherds mentioned earlier (Figure 5-1c), the small collection includes 12 chert flakes, two biface fragments, and a sandstone abrader. Neither of the bifaces is terribly diagnostic, although both bear resemblance to the Marion type, a preceramic Archaic stemmed form. The example from 8PU1384 is simply the haft element of a stemmed biface (Figure 5-6b), the second, from 8PU723, is a midsection whose tip and base were truncated by an impact flute (Figure 5-9). Both were made from marine chert, the latter thermally altered.

All but one of the 12 flakes from Crescent Lake sites are small retouch flakes, almost all thermally altered. Eight came from 8PU1384 alone, the locus of the fractured haft element. The exceptionally large flake from 8PU1389 (Figure 5-7e) is a caramel-colored flake with cortex. The lack of more and larger flakes is not all that unusual for a study area so far removed from quarry sources of chert. Still, the bounty of lithic tools recovered by local collectors is testimony to the geographic scale of lithic procurement among the Paleoindian and Archaic occupants of the region, as the next section shows.

Figure 5-9. Midsection of a Marion-like point from 8PU723, with an impact flute that truncated both the tip and part of the stem.

COLLECTOR ASSEMBLAGE

Artifact collecting in the shallows and shoreline of Crescent Lake is something of a cottage industry in the Crescent City area. As noted in Chapter 4, the survey crew encountered two parties of collectors in the summer 2002 field work. The activities of these particular collectors follows decades of earlier efforts by several individuals, most notably Eddie Morris. Collecting both the St. Johns River and Crescent Lake, Eddie Morris and his brother Artie amassed a large collection of bifaces and other lithic tools spanning all periods of Florida prehistory. In late 1983, two students of Barbara Purdy made the trip to Crescent City 13 times to photograph, measure, and describe the Morris collections. What follows below is a summary of their findings and thumbnail copies of photographs they made, all provided courtesy of Barbara Purdy.

Eddie Morris Collecting Patterns

Artie Morris collected from various near-shore locations along the St. Johns River, especially in Little lake George. Eddie, on the other hand, concentrated his efforts along the western shore of Crescent Lake. The eight locations described in Chapter 4 (Morris 1-8) were marked on a USGS topo map by Eddie as locations of collecting. All such locations are terrestrial; according to Eddie, none of his material from Crescent Lake came from underwater context. He did, however, collect from underwater contexts along the St. Johns. These underwater items are typically stained black by the tanic waters of the St. Johns. Lithic artifacts in Artie's collection, largely, if not exclusively from submerged contexts, is 95 percent black.

Eddie did not maintain site-specific provenience information on his artifacts from Crescent Lake, so the assemblage must be treated as a locality-specific collection with sources stretching over 8 miles of western lake front. Several of the locations marked by Eddie are currently in fallow fields, suggesting he benefited from active plowing and related agricultural practices before the 1980s.

Eddie collected mostly whole bifaces, but also unifaces, bifacial preforms, and broken bifaces. He did not collect debitage and retrieved few pottery sherds. A total of 613 lithic artifacts in the Eddie Morris collection are attributed to locations along Crescent Lake.

Data Collection

Students of Barbara Purdy examined each of Eddie Morris's artifacts and recorded cultural-historical type when possible, as well as thickness and weight. They traced the outline of each item on graph paper and photographed most in lots of like type. They likewise recorded observations about raw material color and weathering, fracture type, cross-sectional shape, and instances of serrations and beveling. All such data waere recorded systematically on spreadsheets, the originals of which remain in possession of Dr. Purdy.

Frequencies of Types

Table 5-5 provides a breakdown of diagnostic hafted bifaces in the Eddie Morris collection by culture-historical type and locality provenience. The types given here are those assigned by Purdy's students; no doubt modern analysts would reassign certain specimens based on recent refinement sin typology and chronology. This is beyond the scope of the present study.

Table 5-5. Absolute Frequency of Diagnostic Hafted Bifaces in the Eddie Morris Collection by Type and Locality Provenience.

Period Type	Crescent Lake	St. Johns River	Other	Total
Paleoindian				
Suwannee		1		1
Tallahassee	5			5
Santa Fe	1			1
Late Paleo/Early Archaic				
Greenbriar	2			2
Nuckall's Dalton	4			4
Bolen	21	4	3	28
Preceramic Archaic				
Marion	51	7	16	74
Putnam	8	2	2	12
Levy	26	3	6	35
Newnan	18	3		21
Hillsborough	6			6
Wacissa	4			4
Arredondo	1			1
Kirk Stemmed/Serrated	14	1	4	19
Thonotosassa	1			1
Sumter	1			1
Early Ceramic				
Culbreath	1			1
Clay	1		2	3
Lafayette	10	2	7	19
Hernando	5	3		8
Late Ceramic				
Pinellas	6			6
Duval	5			5
Tampa	1			1
O'Leno		2		2
Ichtucknee	1			1
Bradford	7	1		8
Taylor	1			1
Leon	1			1
Total	202	29	40	271

Only those confidently given to the Crescent Lake locality are relevant for the present study. These 202 specimens consist largely of preceramic Archaic types (Table 5-6), most notably Marion, Levy, Newnan, and Kirk Serrated. Late Paleoindian/Early Archaic types are a distant second at about 13 percent of the collection, with Bolen points dominating this subset. Early and Late Ceramic types are equally represented at about 9-10 percent each, with Lafayette, Hernando, Pinellas, Duval, and Bradford specimens comprising the bulk of these subsamples.

Given the dominance of pottery sherds over lithic tools in the field survey assemblages, the vast number of preceramic bifaces in the Morris collection is indeed surprising. However, I hasten to add that among the bifaces found by local collectors during the present survey were two Bolen points, one off of Bear Island, the other at Grimsley Neck. It is also noteworthy that the two biface fragments found by the survey crew appear to be fragments of Marion points, one each from 8PU723 and 8PU1384. Each of these cases of certain site-specific provenience involve two of the three highest-frequency types in the Eddie Morris collection.

Aside from diagnostic hafted bifaces, the Morris collection of other bifaces and unifaces bolsters the presence of late Pleistocene and early Holocene occupations along the western margin of the lake (Table 5-7). A variety of scrapers and specialty bifaces attest to Paleoindian and/or Early Archaic site use involving multiple functions or tasks. Both the incidence of a variety of functionally-specific tool forms and the sheer volume of chert delivered to the locality from points far to the west suggest that land use during the early millennia of human history was rather intense, prolonged, and repeated. The large number of preceramic Archaic points shows that land use continued to be relatively intense through the middle Holocene. In fact, there are no major lacunae in land use given the temporal span of the lithic and ceramic assemblages combined. Without the Morris collection, the first seven millennia of human occupation would have been largely overlooked.

In the pages that follow many of the photographs of the Eddie Morris collection are printed in thumbnail fashion with captions true to the typological ascription of Purdy's students. These are provided for illustrative purposes only.

Table 5-6. Absolute and Relative Frequencies of Diagnostic Hafted Bifaces in the Eddie Morris Collection by Period.

Period	Ct.	%
Paleoindian	6	3.0
Late Paleoindian/Early Archaic	27	13.4
Preceramic Archaic	130	64.3
Early Ceramic	17	8.4
Late Ceramic	22	10.9
Total	202	100.0

Table 5-7. Absolute Frequency of Specialized Tools and Nondiagnostic Lithic Artifacts in the Eddie Morris Collection by Type and Locality Provenience.

Class Type	Ct.	Period
Biface		
Fragment	51	unidentifiable
Tip	126	unidentifiable
Midsection	25	unidentifiable
Stem	35	unidentifiable
Knife/Scraper	4	Paleoindian/Early Archaic
Knife/Blade	9	Paleoindian/Early Archaic
Drill/Perforator	13	Paleoindian/Early Archaic
Uniface		
Thumbnail Scraper	10	Paleoindian/Early Archaic
Snub-Nosed Scraper	5	Paleoindian/Early Archaic
Side and End Scraper	59	Paleoindian/Early Archaic
Humped-Back Scraper	3	Paleoindian/Early Archaic
Edgefield Scraper	1	Late Paleoindian/Early Archaic
Flake Cores	8	unidentifiable
Cobble tool		
Hammerstone	9	unidentifiable
Hammerstone-Chopper	3	unidentifiable
Celt	2	Late Ceramic
Adz	4	unidentifiable
Other/Not Typed	43	unidentifiable
Total	410	

Figure 5-10. Various late Paleoindian, Early Archaic and preceramic Archaic points and an Edgefield scraper (top, 2nd from left) (photo courtesy of Barbara Purdy; E18).

Figure 5-11. Bolen points from the Eddie Morris collection (photo courtesy of Barbara Purdy; E20).

Figure 5-12. Various unifacial and untyped bifacial tools from the Eddie Morris collection (photo courtesy of Barbara Purdy; E2).

Figure 5-13. Various unifacial tools from the Eddie Morris collection (photo courtesy of Barbara Purdy; E31).

Figure 5-14. Various unifacial and untyped bifacial tools from the Eddie Morris collection (photo courtesy of Barbara Purdy; E3).

Figure 5-15. Various unifacial tools from the Eddie Morris collection (photo courtesy of Barbara Purdy; E32).

Figure 5-16. Various unifacial tools from the Eddie Morris collection (photo courtesy of Barbara Purdy; E33, E49).

Figure 5-17. Various unifacial tools from the Eddie Morris collection (photo courtesy of Barbara Purdy; E50).

Figure 5-18. Bifacial implements/preforms from the Eddie Morris collection (photo courtesy of Barbara Purdy; E36, E37).

Figure 5-19. Bifacial and unifacial implements/blanks from the Eddie Morris collection (photo courtesy of Barbara Purdy; E38).

Figure 5-20. Bifacial implements/blanks from the Eddie Morris collection (photo courtesy of Barbara Purdy; E39).

Figure 5-21. Bifacial and unifacial implements/blanks from the Eddie Morris collection (photo courtesy of Barbara Purdy; E41).

Figure 5-22. Adz from the Eddie Morris collection (photo courtesy of Barbara Purdy; E34).

Figure 5-23. Bifacial implements/preforms from the Eddie Morris collection (photo courtesy of Barbara Purdy; E42).

Figure 5-24. Bifacial implements/preforms from the Eddie Morris collection (photo courtesy of Barbara Purdy; E43).

Figure 5-25. Kirk Stemmed/Serrated points from the Eddie Morris collection (photo courtesy of Barbara Purdy; E21).

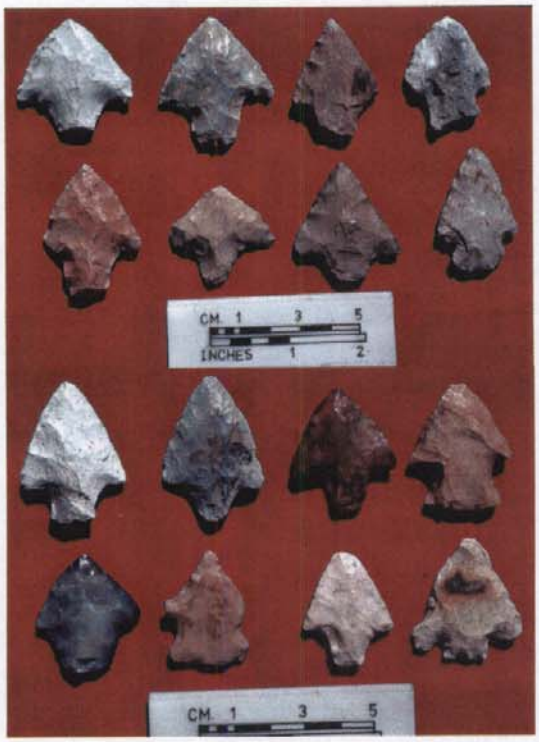

Figure 5-26. Marion and Newnan points from the Eddie Morris collection (photo courtesy of Barbara Purdy; E5).

Figure 5-27. Marion points from the Eddie Morris collection (photo courtesy of Barbara Purdy; E26-E26b).

Figure 5-28. Putnam points from the Eddie Morris collection (photo courtesy of Barbara Purdy; E19).

Figure 5-29. Hillsborough points from the Eddie Morris collection (photo courtesy of Barbara Purdy; E7).

Figure 5-30. Sumter points from the Eddie Morris collection (photo courtesy of Barbara Purdy; E27).

Figure 5-31. Levy points and unidentifiable points from the Eddie Morris collection (photo courtesy of Barbara Purdy; E9).

Figure 5-32. Putnam points, Hernando point (top right) Pinellas point (center), and unidentifiable bifaces from the Eddie Morris collection (photo courtesy of Barbara Purdy; E11).

Figure 5-33. Newnan points from the Eddie Morris collection (photo courtesy of Barbara Purdy; E13-E15).

Figure 5-34. Stemmed scrapers and drills from the Eddie Morris collection (photo courtesy of Barbara Purdy; E10).

Figure 5-35. Levy points from the Eddie Morris collection (photo courtesy of Barbara Purdy; E16, E17).

Figure 5-36. Lafayette and Clay points from the Eddie Morris collection (photo courtesy of Barbara Purdy; E6).

Figure 5-37. Hernando points from the Eddie Morris collection (photo courtesy of Barbara Purdy; E22).

Figure 5-38. Various late ceramic period points, possible Bolens (top row, 1-5), and drills from the Eddie Morris collection (photo courtesy of Barbara Purdy; E8).

Figure 5-39. Various points including Wacissa, Levy, O'Leno, Duval, Culbreath, Putnam, Hernando, Bolen, Greenbrier, and Nuckals Dalton from the Eddie Morris collection (photo courtesy of Barbara Purdy; E12).

CHAPTER 6
CONCLUSIONS AND RECOMMENDATIONS

The Crescent Lake Archaeological Survey succeeded in its primary goal of locating submerged prehistoric archaeological sites in the near-shore waters of Crescent Lake. It did so primarily through leads provided by local collectors. The survey also succeeded in documenting several sites on the terrestrial margins of the lake. All told, 151 piston cores were extracted from the lake bottom at 25 locations of known or suspected archaeological sites. Surface survey and limited subsurface testing was conducted at 12 locations of known or suspected archaeological sites. The combined effort resulted in verification and further documentation of 11 of 14 previously recorded sites and preliminary testing and documentation of 14 new sites.

In this final chapter, the results of this survey are used to generalize about changes in land use as lake levels rose and fell over the course of the Holocene. The overall pattern is one of generally rising lake levels since the late Pleistocene, with a downturn after ca. 3500 B.P. that accounts for submerged sites of St. Johns age. Survey data also confirm that landform stability on the western, upland margin of the lake enabled longer periods of use and re-use, whereas low-gradient slopes of the eastern, northern, and southern margins of the lake were vulnerable to fluctuations in lake levels and thus were not conducive to long-term land use.

Also provided in this chapter is some discussion about the similarities and difference of prehistoric occupations around Crescent Lake and the adjacent St. Johns Basin. Clearly, sites along Crescent Lake pale in comparison to the massive shell mounds and middens of the St. Johns. To some extent, the limited size and density of shell-bearing sites along Crescent Lake is due to its limited capacity for shellfish, as well as relatively greater vulnerability to localized drought and flooding. Still, the western margin of Crescent Lake afforded ample opportunity for stable settlement predicated on aquatic resources other than shellfish, and thus differences between the two areas does not simply turn on relative resource potential.

Finally, this chapter closes with recommendations for further work in the Crescent Lake area, including an assessment of alternative methods for locating and testing submerged sites. Also considered is the need for full-scale survey of the terrestrial margins of the lake, including raised terrace escarpments of formerly high-water lake margins. An argument is made that the combined paleoenvironmental and cultural-historical significance of the collective sites in the study area warrants a nomination for a National Register District.

LAND USE AND LAKE LEVELS

Water levels in Crescent Lake have fluctuated over the past century as they have over the entire span of human settlement. The magnitude of recent fluctuations is uncertain, although local informants report remarkable drops in lake levels since the mid-twentieth century. Given the low gradient of terrain around most of the lake, water levels

in excess of 5 feet above current levels would have flooded enormous tracts of otherwise inhabitable land (Figure 6-1). Only the Crescent City Ridge is spared flooding under such circumstances. In fact, most land fronting the western margin of Crescent Lake—where the ridge is located—is invulnerable to water levels as much as 15 ft above the current elevation. Thus, the potential for human land use differs sharply on either side of Crescent Lake, with settlement on all but the west side highly vulnerable to changes in water levels (Figure 6-2).

If changes in water levels in Crescent Lake followed the overall regional trend in Florida for rising surface water, then Crescent Lake has generally grown in depth and size since the late Pleistocene. However, survey results provide circumstantial evidence that lake levels rose over the Holocene, reaching elevations above the modern level at about 4000 B.P., then dropped to levels at least 5 feet below present elevations until after A.D. 1400, when water levels assumed the modern regime. Evidence for this reversal in trend in found in the distribution of sites with temporally diagnostic artifacts (Table 6-1).

Early Holocene

The oldest diagnostic artifacts from good context in the present survey are merely 6000-5000 years of age, but several informants shared information on the submerged locations of bifaces dating to as much as 10,000 B.P. In addition, the Eddie Morris collection, summarized in Chapter 5, includes an abundance of early Holocene artifacts, as well as late Pleistocene forms, from the western lakeshore of the Crescent City Ridge. Clearly, the Crescent Lake area figured prominently in the land-use practices of early populations. Sound data on lake levels during this time are limited, but we can suppose that they were substantially lower than at present. Crescent Lake is not fed by springs of the deep Floridan aquifer, so it is recharged exclusively by local precipitation and seepage from near-surface aquifers and sinks of the Crescent City Ridge. With sea level well below present elevations during the late Pleistocene and early Holocene, near-surface aquifers would have been suppressed and, in turn, water levels in Crescent Lake would have been down. Actual water depth and lake extent is difficult to estimate for lack of better data, but suffice to say that water levels at 10,000 B.P. were at least 5 feet and perhaps as much as 10 feet below modern elevations. The extent of the lake at a hypothetical 6 feet below modern levels shows how much of the currently submerged lake margin would have been available for human occupation (Figure 6-3). Vast stretches of land would have been exposed along the north, east, and south margins of the lake. The extensive wetland known today as White Oak Swamp would have been dry, as would the large point of land at Buzzard Roost (east of Bear Island) and the entire lake bottom southeast of McReynolds Island.

Bolen points were retrieved from the lake bottom by local collectors at two locations during the Crescent Lake Survey. One location was the cove off the northeast end of Bear Island, the other just north of Grimsley Neck. Both locations currently hold 4-5 feet of water and the collectors dug through a foot or two of sand to recover the points. Assuming these points came from the surfaces of locations that were dry during

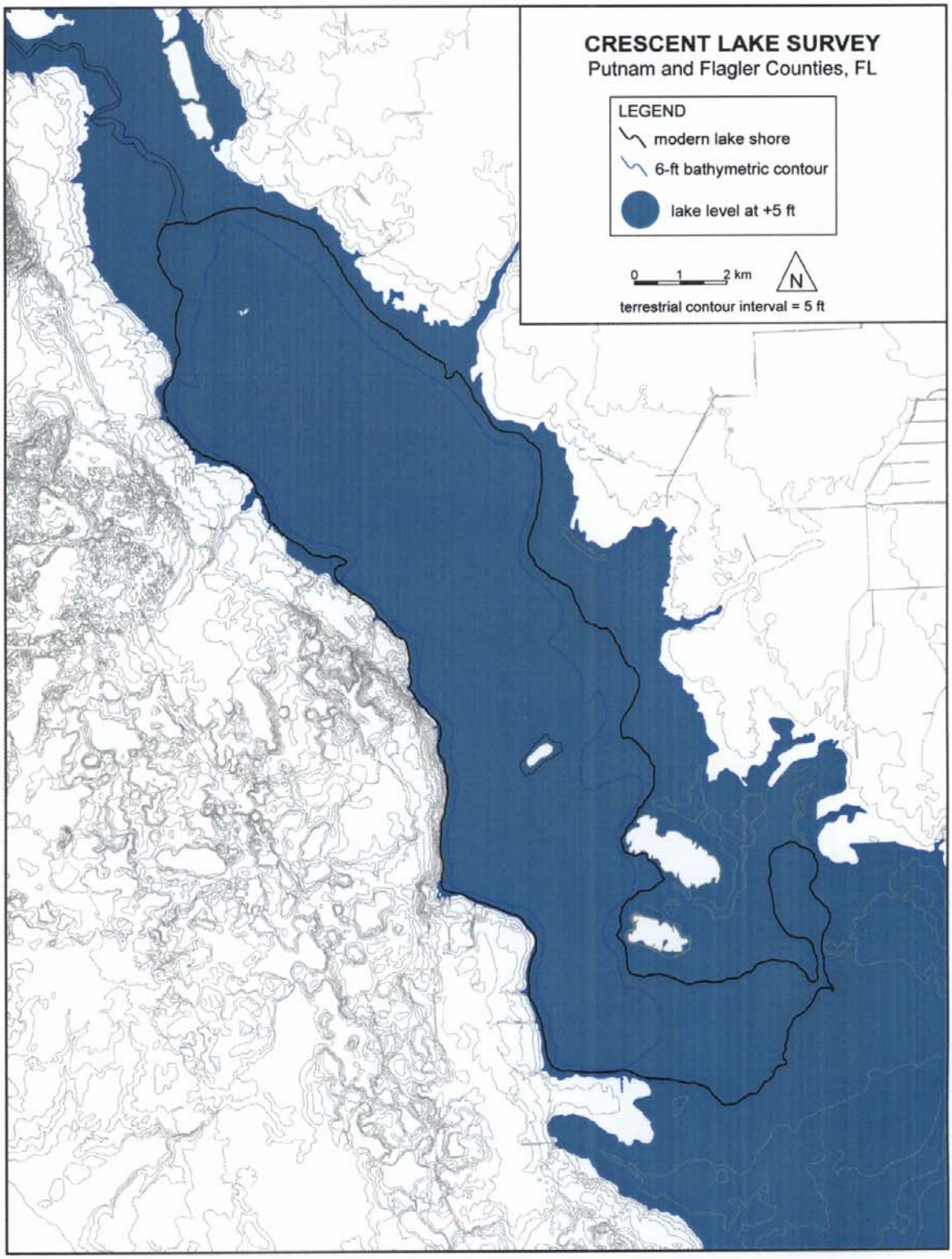

Figure 6-1. Projection of surface water with lake levels 5 feet above current elevation. Note the contrast in flooded area on the west side of the lake with areas to the north, east, and west.

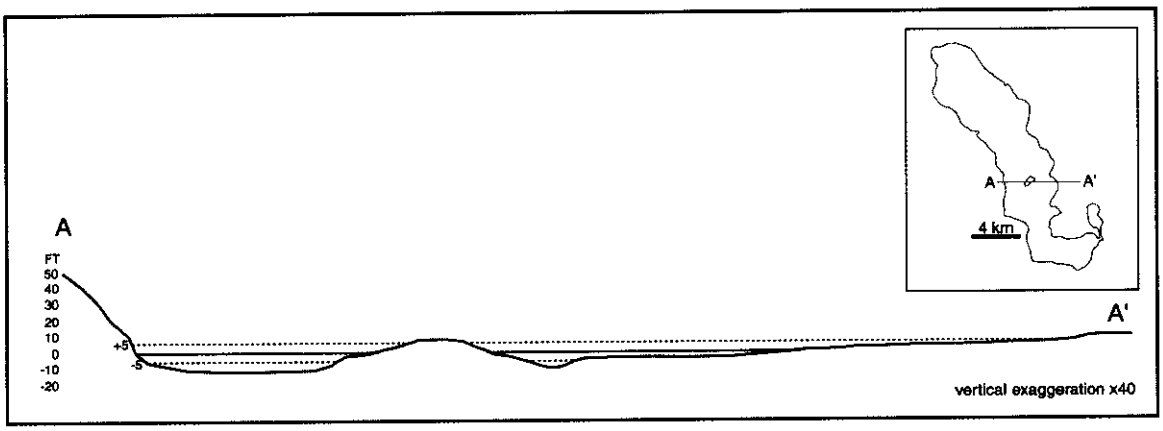

Figure 6-2. Schematic cross section of Crescent Lake showing the difference in flooded and exposed land on either side of the lake with water levels 5 ft above and below current elevation.

Table 6-1. Inventory of Crescent Lake Sites with Diagnostic Artifacts by Component and Location Relative to Modern Lake Levels (sites emboldened are located on the Crescent City Ridge).

	Preceramic Archaic	Orange	St. Johns Plain/Eroded	St. Johns C-S	Sand-Tempered
LOCATIONS <5 FT AMSL					
Bear Island East (8FL163)	x	t	x	x	x
Grimsley Neck (8FL9)	x		x	x	
Morris 8 (8PU1388)			x	x	x
Nelson 1 (8PU1389)		t	x	x	x
North Pomona (8PU1391)			x		
LOCATIONS ≥5 FT AMSL					
Pomona Landing (8PU15)			x		
Crescent City Mound (8PU90)		x		x	
Morris 4 (8PU1384)	x	x	x	x	
Piney Bluff Landing (8PU723)	x		x		
Crescent Lake Northeast (8PU1380)		x			
White Oak Swamp 2 (8FL161)			x		x
White Oak Swamp 3 (8FL237)			x		x

t = trace

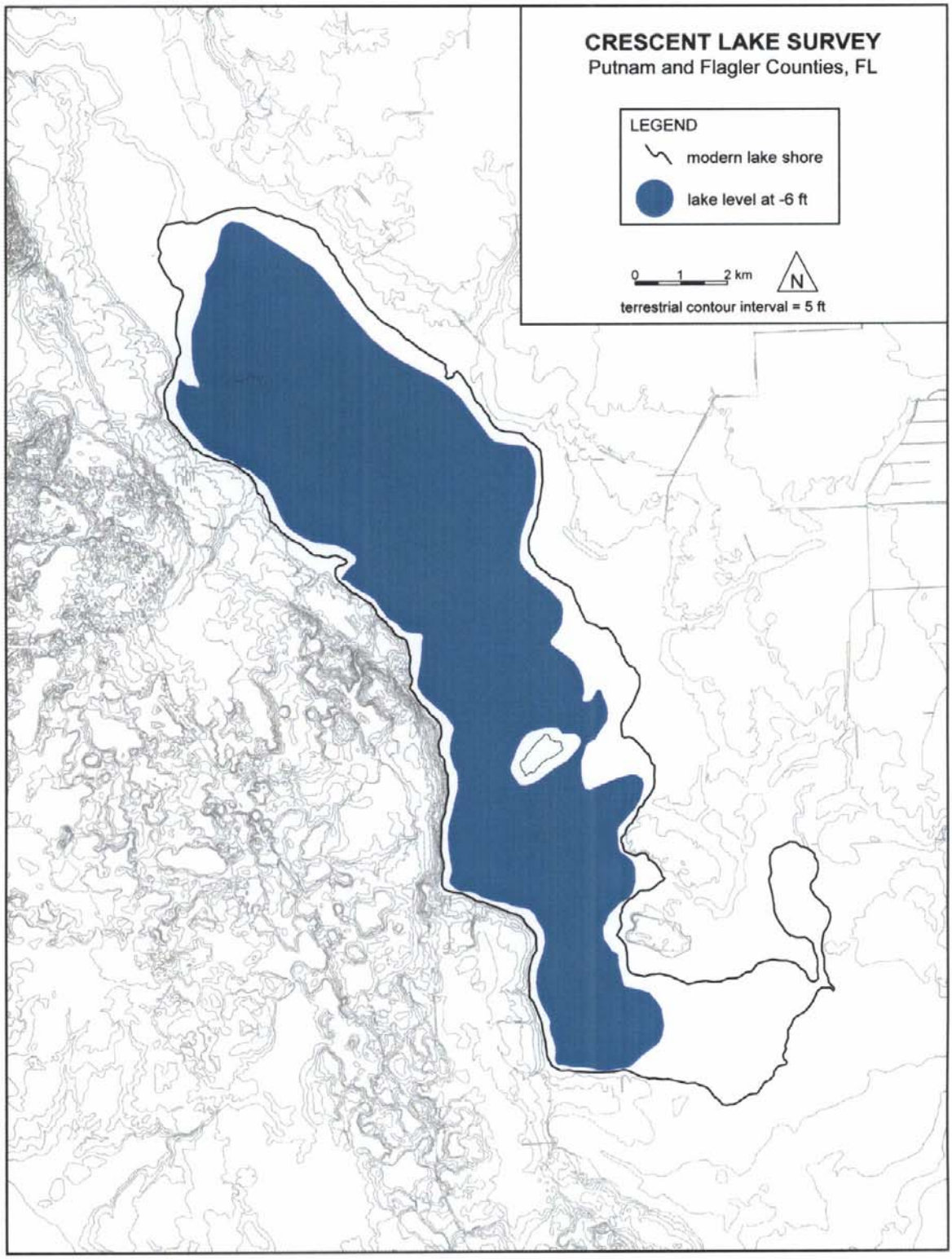

Figure 6-3. Projection of surface water with lake levels 5 feet below current elevation. Note the contrast in exposed area on the west side of the lake with areas to the north, east, and west.

the early Holocene, water levels must have been at least 5 feet below present elevation. This is confirmed too by a radiocarbon date (9730 ± 50 B.P.) on organic sediment near McReynolds Island. Capped by 3.2 feet of sand and 2.5 feet of water, this organic stratum is the upper component (A horizon?) of a buried soil with a fine sandy clay substrate. Given apparent pedogenic developments in this column, water levels must have been substantially below 5 feet to enable downward drainage and illuviation. This gives a minimum estimate of roughly -7.5 feet for lake levels during the early Holocene. Accordingly, Bear Island would have been separated from the western shore of the lake by only a narrow but apparently deep channel. A similar sequence of soil development off the northeast end of Bear Island has a upper organic stratum (A horizon?) that was dated to the late Pleistocene (20,480 ± 160 B.P.). Given the depth of this stratum, a minimum draw down of 11-12 feet would have been required for this column to form. This corresponds chronologically with the basal peats observed by Adams (1976) some 20-25 feet below current lake levels. Dates for this peat range from ca. 21,000-26,000 B.P.

As noted earlier, a draw down of water levels 5-15 feet would have had only minor effects of the inhabitability of near-shore landforms along the Crescent City Ridge. Many of the sinks that pock this upland unit were likely dry or at least substantially reduced from present levels. However, current near-shore locations would have been no more than 200 m removed from the edge of the lake. Human settlement toward the water's edge may have been desirable, although the shelf of land currently under less than 6 feet of water was perhaps swampy seasonally, if not year-round. Positions on the edge of the upland unit would have offered the double advantage of dry land and surveillance of the shore line. If winds during that time were predominately northeasterly, as they are today, then positions along the edge of the Crescent City Ridge would have been downwind of would-be game.

Middle Holocene

Water levels in Crescent Lake rose over the course of the Middle Holocene, apparently reaching elevations exceeding the modern level by ca. 4000 B.P. The cores pulled by Adams (1976) consistently show silt muds, calcitic muds, and shell marl over late Pleistocene peats. He concludes that these sediments formed during a period of decreased carbonate solubility. He suggests further than these conditions were due to either aridity related to higher temperatures and/or decreased precipitation, or to low productivity (Adams 1976:57). The latter might be expected under conditions of rapidly rising water levels and attendant instability of the near-shore environment.

A major transition in the stratigraphic sequence documented by Adams is seen in the deposition of gyttja over shell marl and calcitic muds. Dated to ca. 7000 B.P., the base of this gyttja anticipates the onset of sea level within the modern range. Contained within this deposit are several species of molluscs, including layers of *Viviparus georgianus,* which formed a major component of shell middens dating from 6000 B.P. throughout northeast Florida. Adams notes that the abundance of *Viviparus* in Crescent Lake has waned over the past few millennia as the lake transitioned into its present

eutrophic state. Adams' data on carbonate levels and organic matter are ambiguous, but he concludes that Crescent Lake entered its modern eutrophic condition at ca. 3500 B.P.

The record of mid-Holocene occupation along Crescent Lake provides an important clue for understanding the transition to the modern eutrophic condition. Too few data are available on human settlement before ca. 4000 B.P., although the large volume of mid-Holocene bifaces in the Morris and Nelson collections shows that populations took good advantage of the locale during a period of lowered water levels and enhanced habitat for shellfish (although shell middens of this age have not been documented). A more definitive record of human settlement is found in the distribution of Orange-period sites and locations with St. Johns Plain pottery, but lacking in the later St. Johns Check Stamped varieties. Notably, three sites at or slightly above the 5-ft contour along the eastern margin of the lake show that lake levels at ca. 4000 B.P. were several feet above modern levels (Table 6-1). Crescent Lake Northeast (8PU1380), White Oak Swamp 2 (8FL161), and White Oak Swamp 3 (8FL237) are landward of the present shoreline, the latter two by more than 1200 meters. Orange incised pottery was found in the shell deposits at Crescent Lake Northeast, while the other two sites lacked Orange sherds but contained varieties of St. Johns wares that are arguably as old as Orange pottery.

With lake levels up some 5 ft at ca. 4000 B.P., Crescent Lake would be substantially larger than it is today, with vast tracts of presently dry land submerged along the north, east, south margins of the lake (Figure 6-1). Subsequent drops in lake levels would have exposed subaqueous organic accumulations (peat) to oxidation and degradation, thereby enabling erosion and redeposition of organics in near-shore waters. This would have been a continuous process on a moving front, delivering abundant organic sediment into the lake. Presumably, this was a major source of organic deposition that contributed to Crescent Lake's current eutrophic state.

Throughout this period of higher-than-present water levels, the Crescent City Ridge would have been invulnerable to flooding. Given the Morris collection, mid-Holocene artifacts are abundant at sites on the lake edge of the ridge. Delwood Nelson also reported collecting Kirk (Stemmed?) points (ca. 8500 B.P.) from an underwater location at the northwest end of the lake. Two sites on the ridge—Morris 4 (8PU1384) and Crescent City Mound (8PU90)—produced in situ evidence for Orange-period components. Only two small crumb sherds with fiber-tempered paste came from sites less than 5 ft amsl, one each from Bear Island East (8FL163), and Nelson I (8PU1389). On balance, a trend for rising lake levels continuing from the early Holocene into the middle Holocene reached a maximum elevation of +5 ft amsl at ca. 4000 B.P. Sites with Orange pottery and contemporaneous early St. Johns wares along the east side of the lake are currently landward and higher than current lake levels. Although more data are needed to substantiate this higher-than-present lake stand, it may indeed help to explain the transition to a hyper-eutrophic environment for Crescent Lake at ca. 3500 B.P., as posited by Adams (1976).

Late Holocene

Several submerged sites in Crescent Lake provide conclusive evidence for lake levels ca. 5 ft below current elevations throughout much of the late Holocene. Three have been dated radiometrically: the fully submerged shell midden at North Pomona (8PU1892), cal A.D. 20-220; the partially submerged midden at Grimsley Neck (8FL9), cal. A.D. 250-430; and the partially submerged midden at Bear Island East (8FL163), cal A.D. 1280-1410. Missing from the late Holocene record are sites in the range of ca. A.D. 500 to 1200, although two other sites with elevations below 5 ft amsl (Morris 8 [8PU1388] and Nelson 1 [8PU1389]) each contain St. Johns Check Stamped pottery and could very well date to any time after ca. A.D. 750.

After a presumed higher-than-present lake level at ca. 4000 B.P., water levels dropped below current elevations, although we have too few data to estimate the rate and magnitude of change. The layer of *Viviparus* in Adam's (1976) Core 4 dated to 3480 ± 75 B.P. Currently at 15 ft below the surface of the lake (2.5 ft BS in 12.5 ft of water) and 1 km from the lakeshore, this shellfish lens would have likely been beyond the economically-viable reach of human utility (assuming the shell is in situ). Lake levels down 5 ft cuts the distance to lakeshore nearly in half; at 10 ft below current levels the shellfish would be proximate to shore in neck-deep water. Gyttja overlying the *Viviparus* layer in Core 4 was dated to 3235 ± 85 B.P. suggesting relatively rapid accumulation of organics from near-shore sources and thus progressively dropping lake levels over this interval. It is noteworthy, too, that Adams observed gyttja directly over basal clay along the eastern margin of the lake, suggesting that water levels went down, then back up. Again, while water levels were down, sediments and organic matter entered lake in large quantities, eroding down to estuarine deposits in places.

Subsequent rise in water is apparent after ca. A.D. 1, but apparently never exceeding -5 ft from current elevations over the ensuing few centuries. A relatively short-term reversal at ca. A.D. 500 may mirror elevations less than -5 ft in the centuries prior to A.D. 1. Gaps in the archaeological record at Crescent Lake during both of these intervals (i.e., ca. 3000-2000 B.P. and A.D. 500-750) may well be due to lake levels lower than -5 ft and thus sites would currently be out of the range of near-shore survey.

Lake levels were still below current elevations at ca. A.D. 1300-1400, but probably by a little less than -5 ft. Data on lake levels over the ensuing centuries are not available.

Like that of the middle Holocene, the late Holocene pattern of fluctuating lake levels had apparently little effect on occupational sequence of the Crescent Lake Ridge. Sites fully contemporaneous with submerged sites of late Holocene age are found at several locations on the ridge, including at least two and possibly three mound sites. Importantly, the two temporal gaps noted above may likewise occur on the ridge, although better samples are needed to substantiate this assertion.

Discussion

Many more data are needed before a definitive reconstruction of changing water levels at Crescent Lake will be possible, but these preliminary findings indicate that such a goal is feasible. Changes in water level affected all land except the western margin of the lake, which abuts the Crescent City Ridge. An overall trend for rising water levels can be inferred from the combined data sets of archaeological site distributions, radiometric assays, and stratigraphic correlations of both terrestrial and subaqueous sediments. The magnitude and rate of rising water over the early Holocene is uncertain, but we can postulate that it mirrored sea level trends for rapid increases until about 6000 B.P., when sea levels approached modern levels (Figure 6-4).

The distributions of sites with artifacts dating to ca. 4000 B.P. suggest that water level at Crescent Lake exceeded modern elevations for a relatively brief period and was followed by a drop well below modern elevations over the ensuing millennia. This higher-than-present stand at ca. 4000 B.P. has not before been documented for the region and needs to be rigorously tested with additional survey and paleoenvironmental data sets (see below).

Fluctuations in lake levels in the range of -5 to -10 ft characterized the past 3500 years, with definitive stands of -5 to -6 ft at ca. A.D. 1 and -3 to -5 at ca. A.D. 1200. How well these fluctuations correspond with reconstructed sea level curves is a subject worthy of detailed investigation. A variety of curves for the lower Southeast (e.g., Colquhoun et al. 1995; DePratter and Howard 1980; Tanner 1992b; Stapor et al. 1991; Walker et al. 1995) posit 1-2 m fluctuations in sea level over the past four millennia. Curves for Florida show two low stands centered on ca. 2200 B.P. and A.D. 600 that mirror postulated low stands in Crescent Lake (Figure 6-4). The intervening period marks a postulated higher-than-present sea level dating to ca. A.D. 1-400 that may correspond to a slight rise in lake levels at Crescent Lake. However, lake levels could not have been higher than present because two and possible three submerged sites dating to this interval attest to water levels at least 5 ft below present. Whereas fluctuations in water levels at Crescent Lake may be a general proxy for timing in sea level change (as it affects near-surface freshwater aquifers), they do not match sea level change in magnitude. The most likely reason these data sets do not correlate better is because Crescent Lake is directly affected by precipitation in the recharge area of the Crescent Ridge, which operates more-or-less independently of sea level change.

REGIONAL COMPARISONS

Crescent Lake archaeology and paleoecology adds important new insight on the regional context of Native American history because it deviates in significant ways from the archaeology and paleoecology of the better documented St. Johns River. Two areas of comparison are considered in the short sections that follow: (1) the Late Pleistocene/Early Holocene model of a poorly watered landscape that has dominated interpretations of early land-use patterns for the past few decades, and (2) the contrast in intensity of settlement between Crescent Lake and the St. Johns since ca. 6000 B.P.

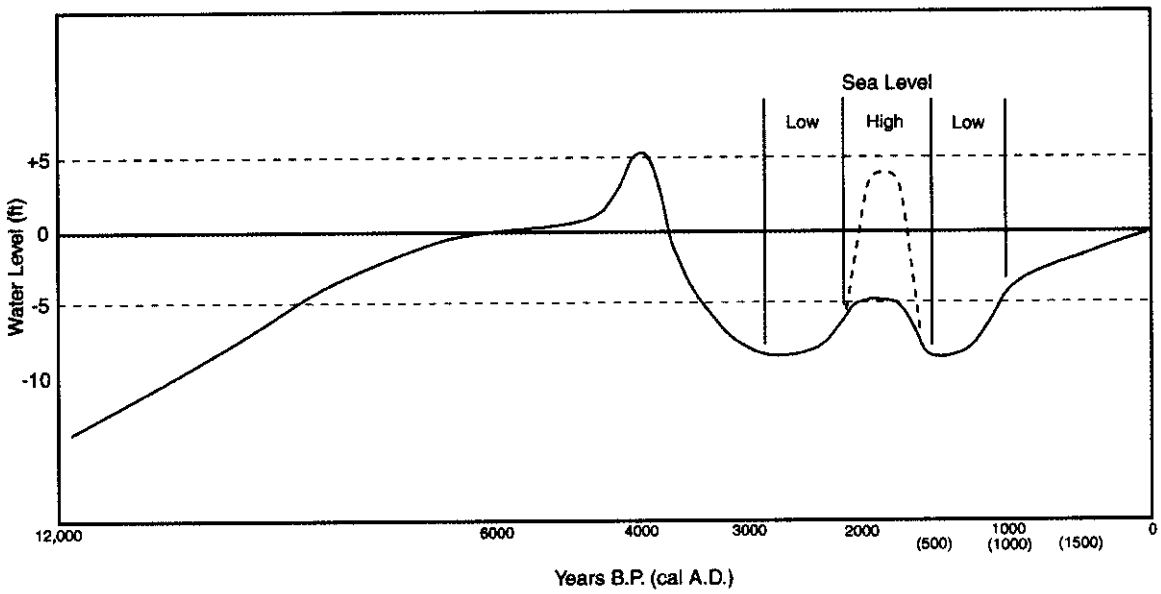

Figure 6-4. Model of lake levels over the Holocene and comparison with sea levels during the late Holocene (note: dashed line of curve at ca. A.D. 1-500 reflects postulated sea level high stand that is poorly registered in archaeological site distributions at Crescent Lake).

Late Pleistocene/Early Holocene Settlement

The dominant model for early human settlement across Florida emphasizes the limited availability of surface water during the late Pleistocene, when cool and dry climate, coupled with lower sea levels, suppressed near-surface aquifers. The so-called "oasis hypothesis" suggests that Paleoindian groups were tethered to locations with reliable water, such as the karst areas of the north-central and gulf coast regions, where numerous sinks penetrated into deep aquifers. Particularly attractive to early settlers were karst locations that also provided access to marine chert. Indeed the distribution of Paleoindian points in Florida covaries strongly with karst locations and quarry clusters in the northwestern part of the peninsula (Dunbar and Waller 1983).

In contrast, northeast Florida is not known as a hotbed of activity during the late Pleistocene, nor are there many recorded sites dating to the ensuing Early Archaic period. The comparative lack of sites suggests that occupation of the region was sporadic, possibly reflecting an environment not suitable for prolonged habitation (Miller 1998:51-53). The few Paleoindian sites known for the region tend to cluster at sinkholes that penetrated deep into the Floridan aquifer (e.g., Silver Springs, Silver Glen Springs, Juniper Springs, Fern Hammock Springs, Green Cove Springs, Beecher Springs, and Blue Springs). However, all such locations are far removed from sources of toolstone, and thus may have had limited potential for long-term habitation, if direct access to chert or a suitable replacement material was requisite.

The Eddie Morris collection and those of other relict seekers working Crescent Lake show that early human occupation in northeast Florida was more intensive than ever

imagined. As the easternmost area of karst topographic in Florida, the Crescent City Ridge may have attracted early populations for reliable sources of water. Equally important perhaps was access to the lake basin itself. With lake levels lower than -10 ft from modern elevations, the basin must have been an extensive wetlands biome that attracted game, waterfowl, and other economically important resources. Occupations on the edge of the ridge, overlooking the lake basin, would have been ideal surveillance points for hunting if prevailing winds came from the northeast, as they do today. The large number of Early Archaic points in the Morris collection supports this inference and suggest it also characterizes the ensuing millennia of the middle Holocene. Throughout this entire time, chert had to be delivered to the Crescent Lake area from sources 40 or more kilometers to the west. Apparently, the lack of local outcrops did not deter sustained and repeated use of Crescent Lake.

Whereas intensive occupation of the Crescent City Ridge is evident in the sheer volume of early and middle Holocene points in the Morris collection, other collectors have recovered similar artifacts from submerged contexts. These underwater finds provide encouragement for locating preserved contexts for lake-side activities and/or habitation, although given the projection for lake levels at least 10 ft below current elevations, near-shore, shallow-water survey methods will be insufficient to locate such sites.

In sum, evidence for intensive use of the Crescent Lake area during the early Holocene gives pause to the generalization that early settlement of Florida was biased toward locations at which chert and surface water coincided. Although rising surface water since the late Pleistocene has inundated many early sites and thus contributed to sample bias, the Morris collection shows that certain terrestrial locations occupied during the late Pleistocene and early Holocene have remained accessible to archaeologists and collectors. Such locations on the Crescent City Ridge are perhaps unusual but hardly unique in northeast Florida. A revised settlement model that includes the eastern escarpments of upland units overlooking wetlands will improve our ability to locate early sites. Whereas much of the early record of human settlement is indeed underwater in northeast Florida, the potential for such sites is likely to be reflected in the distributions of sites and artifacts along the upland ridges that front bodies of water and wetlands. The lack of local chert may not have been a factor, although it would be interesting to compare the biface assemblages of Crescent Lake with counterparts from locations of chert to see if economizing behavior is manifested in patterns of tool maintenance and discard.

St. Johns Settlement Patterns

Crescent Lake is merely 15 km east of Lake George and the St. Johns Offset and only another 15 km distant from the stretch of middle St. Johns that supported intensive shellfishing, mound building, and human settlement since about 6000 B.P. Crescent Lake has its share of sites dating to this era, but they pale in comparison to the size and density of sites in the middle St. Johns. Why is that? Part of the answer clearly turns on ecological difference between the two locales. The St. Johns River includes several first-

magnitude springs that emanate from limestone substrate and deliver to the channel flow an abundance of carbonates in solution. Shellfish require calcium carbonate for shell production, and generally speaking, shellfish production is directly correlated with concentrations of calcium carbonate. According to Adams (1976), Crescent Lake had relatively high levels of carbonate solution early in its history, presumably from the shell marls of its ancient estuarine substrate. But as organic matter accumulated and the lake approached its present eutrophic state, carbonate levels waned and, in turn, shellfish production diminished. Granted, other aquatic resources, such as fish, thrive under present eutrophic conditions, but shellfish production in Crescent Lake today is well below that of the middle St. Johns, and may never have approached the levels seen in the latter locale over the past 6000 years.

The instability of the most of Crescent Lake's shoreline is a second factor that may have curtailed more intensive settlement. The postulated higher-than-present lake level at ca. 4000 B.P. may have signaled the end to substantial shellfishing in the area as the subsequent drop in water presumably released large quantities of organic matter into the lake, thus accelerating its transition to a eutrophic state. From a regional perspective, the postulated higher-than-present lake level at ca. 4000 B.P. runs counter to data from the St. Johns that suggest lower lake levels at this time. At Lake Monroe, for instance, water levels were down several feet when early Orange-period occupations occurred (Purdy 1994). Perhaps overall drops in surface water in northeast Florida during episodes of lowered sea level were offset by situations where artesian flow and other runoff sources were enabled by locally abundant precipitation. In any event, most of Crescent Lake is especially vulnerable to changes in water levels and thus incapable of sustaining long-term settlement. For this same reason, the archaeology of Crescent Lake offers an particularly sensitive barometer for environmental change.

Contrasted with the vulnerability of most of Crescent Lake's shoreline to changes in water levels is the stability of the Crescent City Ridge. The lake margin of this upland unit sustained human settlement over the entire sweep of prehistory and history. Most of the archaeological components observed at sites along the ridge have counterparts in submerged contexts. It is tempting to posit a settlement model involving a functional dichotomy between ridge locations and lower-elevation, lake-front sites, perhaps the latter dominated by short-term, extractive activities and the former by more permanent settlements. Too few data are currently available to evaluate such a scenario, although it is apparent at this point that the only deliberate mound constructions known for the area occur along the ridge. Other possible sand mounds at the south end of the lake (8PU1388) may alter this perspective.

Aside from the seemingly limited ecological potential of Crescent Lake relative to the St. Johns, differences in relative intensity of human settlement cannot be explained apart from regional demographics and sociopolitics. Evidence is growing for deliberate mound construction along the middle St. Johns, as well as the Atlantic coast, as early as 6000 years ago (Russo 1996a). Such monuments are more than simply the de facto result of an intensive pattern of human settlement; rather, they signify a connection to place that no doubt had an strong centripetal pull on choices for settlement and was the basis for

making claims to privilege and status. As they always do, cultural practices involving claims of privilege and the exercise of will over others engender actions of resistance, notably group fissioning. The extent to which Crescent Lake figured into the sociopolitical dynamics of an increasingly complex history of group formations in the middle St. Johns, or on the coast, is indeed a subject worthy of study. Perhaps small St. Johns II mounds along the Crescent City Ridge fit into a hierarchy of settlement centered on mound centers like Mount Royal. Possibly the lesser shell middens and mounds of Crescent Lake dating to Orange and St. Johns I times reflect the outcome of fissioning of larger bands in the middle St. Johns. While such scenarios assume larger and more powerful social formations in the St. Johns—a reasonable assumption given current data—we must be reminded that the evidence for human settlement of Crescent Lake prior to the ceramic period (i.e., >4000 B.P.) is at least equal to or greater than that known for the middle St. Johns or the coast. Thus, lack of huge monuments notwithstanding, Crescent Lake carried its own weight of human history and cannot be regarded simply as a fluctuating source of aquatic resources.

RECOMMENDATIONS FOR ADDITIONAL WORK

The 2002 Crescent Lake Archaeological Survey is a small step in the direction of improving knowledge about one of northeast Florida's least-known areas. In this closing section I offer some suggestions for further work in the areas of underwater and terrestrial site discovery, collectors' surveys, and National Register nominations.

Methods for Locating and Testing Submerged Sites

The sampling scheme for locating submerged sites based on landform configuration failed largely due to inaccurate bathymetric data. Bathymetry on USGS topographic maps is woefully inadequate for estimating landform configuration, and this is not simply a matter of changing water levels. Navigation maps used by local boaters are much more accurate and could possibly be used to great effect for locating submerged landforms with archaeological potential. Ideally, Crescent Lake ought to be mapped with side-scan sonar or other remote sensing equipment to achieve a high-resolution image of the lake bottom. This is especially critical to the deeper water of Crescent Lake, which holds some potential for early sites. Sonar or similar technology may also prove effective at detecting submerged shell deposits.

Testing known sites with piston cores is an effective means of recovering continuous records of sediment, and it works as a reconnaissance tool for locating anthropogenic soil (i.e., midden). Piston coring is not, however, an effective reconnaissance tool for artifact discovery. Artifacts were only rarely found in cores, even at sites with numerous sherds and other artifacts (e.g., 8FL163). In all cases of near-shore survey, the crew found it better to remove their shoes and traverse the submerged landform barefoot, feeling for sherds and other artifacts. Of course, when covered by more than a few tens of centimeters of sand or mud, archaeological finds will not be detected at the surface. Collectors use long-tined forks to "gig" for buried artifacts, which they then remove by hand excavation. An equivalent effort of underwater

excavation is required to locate sites in deep water and/or situations of deep burial. And yet, even scuba diving and typical underwater excavation techniques are ill-advised for reconnaissance purposes unless the probability for site discovery is enhanced by precise bathymetric data or informant knowledge. Technology of boat-mounted coring must be developed to mimic the terrestrial methods of shovel testing. A hydraulic rig that drives a large-bore core (e.g., 50-cm in diameter) into the lake bottom and extrudes sediment into a screen is recommended. Obviously, the costs of such an operation are enormous and environmental impacts may outweigh the value of improved site discovery.

Once sites are documented at given depths, underwater reconnaissance should proceed along similar elevations to locate additional sites. Given the enormous size of Crescent Lake, this informed approach to site discovery is practical, but it ought to be supplemented with random searches to ensure adequate, unbiased coverage. Full-coverage survey of Crescent Lake may not be possible, nor desirable, given the elevated costs of underwater reconnaissance.

Ultimately, the present survey would not have succeeded in locating submerged sites had we not questioned local collectors. What is more, the collections of locals provided our best information on long-term patterns of prehistoric human settlement for the area. Additional consultations with these individuals, outlined below, are highly recommended.

Additional Terrestrial Survey

The tantalizing evidence for a higher-than-present lake level at ca. 4000 B.P. needs to be bolstered with a directed survey of the terraces paralleling Crescent Lake along its eastern, northern, and southern margins. This can begin with transects following the 5-ft contour along the eastern margin of the lake. Land owners and managers of timber property in this area are willing to grant permission for additional survey, and some have hinted at several unrecorded sites on their property. The names and contact numbers of these individuals are included with the Florida Master Site File forms.

Additional terrestrial survey of higher elevations (i.e., >5 ft amsl) along the lake margins may provide evidence for even higher lake levels. Systematic survey along the Crescent City Ridge is needed to supplement the extant record. In addition, survey around the margins and in near-shore submerged contexts of some of the larger sinks on the Crescent City Ridge (e.g., Lake Stella, Dream Pond) may provide data on environmental changes attending lake fluctuations.

Collectors Survey

The inventory of Eddie Morris's collection by students of Barbara Purdy was particularly valuable to the present survey effort. Additional collections await study. Notable among them is the large inventory of artifacts amassed by Delwood Nelson. Mr. Nelson expressed willingness to avail his collection for analysis. Unlike the Morris

collection, Nelson's artifacts came largely from submerged contexts. Any provenience data on his collection will be extremely valuable in estimating age ranges for the sites he collected. In addition, metric data and digital images must be captured as the ultimate disposition of this collection is uncertain. Two other collectors of artifacts from sites in Crescent Lake also expressed a willingness to have their collection inventoried and photographed.

Collectors surveys in South Carolina have proven extremely valuable in providing data on a variety of archaeological problems. These were occasionally funded by Survey and Planning grants to offset the costs of travel, photography, and labor. Some professionals questioned the wisdom of funding research that has the potential to validate what many consider to be illegal or unethical behavior. Ignoring collectors' data is absolutely foolish. Not only do collectors have more information about site locations and better samples of diagnostic artifacts that archaeologists could acquire on their own, but in working with collectors, one has the opportunity to impress upon them the value of provenience information and the perils of uncontrolled digging. Many irresponsible collectors in South Carolina became effective stewards of archaeological preservation after working with archaeologists through the collectors survey. The Florida Department of State should consider annual funding for such an effort.

National Register District

Few if any of the extant sites in and around Crescent Lake have the integrity and hold the research potential to warrant their *individual* nomination to the National Register of Historic Places at the national level of significance. I hasten to add, however, that information on most of the sites is inadequate to dismiss this possibility. Additional subsurface testing is required at most of the sites to determine site content, vertical and horizontal extent, and integrity.

Given the collective significance of Crescent Lake sites to our understanding of regional culture-history and paleoenvironment, a National Register District nomination may be warranted. Much more information is needed before such an initiative can be taken, but currently the Crescent Lake record stands apart from other locality site assemblages in its potential to inform on local and regional climate change, settlement, and anthropogenic impacts to lacustrine habitat. It clearer adds a body of information on prehistoric land use that is not duplicated in the rich archaeological records of either the coast or the St. Johns Basin. Before such a nomination proceeds, additional underwater and terrestrial survey is needed to identify all contributing components and to realize the research potential of its paleoenvironmental data. Such a nomination ought to include the historic components of Crescent City and surrounding settlements, as well as the navigational history of the lake. These subjects fell outside the purview of the present survey and will require archival research to locate and characterize contributing components.

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APPENDIX A: CORE LOCATIONS, DEPTH, AND CONTENT

Locus	Type	Northing (m)	Easting (m)	Acc. (m)	Water Depth (cm)	Core Depth (cm)	Notes
Locus A	bathym	3256341	453647	4	170	20	too deep
Locus B	bathym	3257420	453340		>190		too deep
Locus C	bathym	3257750	453650		>190		too deep
Locus D	bathym	3258800	453130		>190		too deep
Locus E	bathym	3253474	453466	4	190	30	
Locus F	bathym	3253283	453937	5	190	100	bone, shell
Locus G	bathym	3252144	457109		200	110	
Locus H	bathym	3251144	456075	4	>220		
Locus I	bathym	3251665	456441	4	>220		
Locus J	bathym	3251551	452677		120	60	
Locus K	bathym	3253493	452324		100		flake; Morris 7
Locus L	bathym	3256266	450998		90		charcoal; Morris 3
Locus M	bathym	3257283	450876	5	136	91	
Locus N	bathym	3258839	450256	5	75	162	
Locus O-1	bathym	3260499	449039	5	122	84	
Locus O-2	bathym	3260474	449087	5	123	99	
Locus P	bathym	3261189	447719	6	80		fish bone
Locus Q	bathym	3263510	446470				too deep
Locus R	bathym	3264000	446160				see N. Pomona
Locus S	bathym	3266600	445850				too deep
Locus T-1	bathym	3252132	455478	6	100	100	bone
Locus T-2	bathym	3252123	455459	4	140	95	
Locus U	bathym	3262598	452657	6	90	70	shell, bone
Locus V	bathym	3250554	453158				pottery on shore; Morris 8
Locus W-1	bathym	3266054	449093	5		30	8PU827/8FL158
Locus W-2	bathym	3266053	449089	5	115	115	8PU827/8FL158
Locus W-3	bathym	3266027	449110	4	120	33	8PU827/8FL158
Locus W-4	bathym	3266028	449103	5	115	43	peaty; 8PU827/8FL158
Morris 3-1	test/site	3256319	450956	5	130	110	(Morris 3)
Morris 3-2	test/site	3256344	450944	6	125	116	
Morris 3-3	test/site	3256264	450980	5	105	82	
Shell Bluff L.-2	test/site	3262596	452653	5	95	67	
Shell Bluff L.-1	sample	3262591	452658	5	82	119	
PU827/FL158-1	test/site	3266054	449093	5		30	
PU827/FL158-2	test/site	3266053	449089	5	115	115	
PU827/FL158-3	test/site	3266027	449110	4	120	33	
PU827/FL158-4	test/site	3266028	449103	5	115	43	peaty
	test/site	3262881	451976	5	102	93	
8FL8/8FL157-8	test/site	3264518	450460	6	110	65	
8FL162-1	test/site	3253251	454159	4	90	113	
8FL162-2	test/site	3253205	454147	5	79	89	
8FL162-3	test/site	3252961	454191		110	98	marine shell
8FL162-4	sample	3253208	454151	5	77	148	
Bear Island 1	test/site	3256864	452912	6			midden w/ no artifacts
Bear Island 2	test/site	3256882	452927	6	63		midden soil
Bear Island 3	test/site	3256905	452953	5	100	125	pottery near surface of core

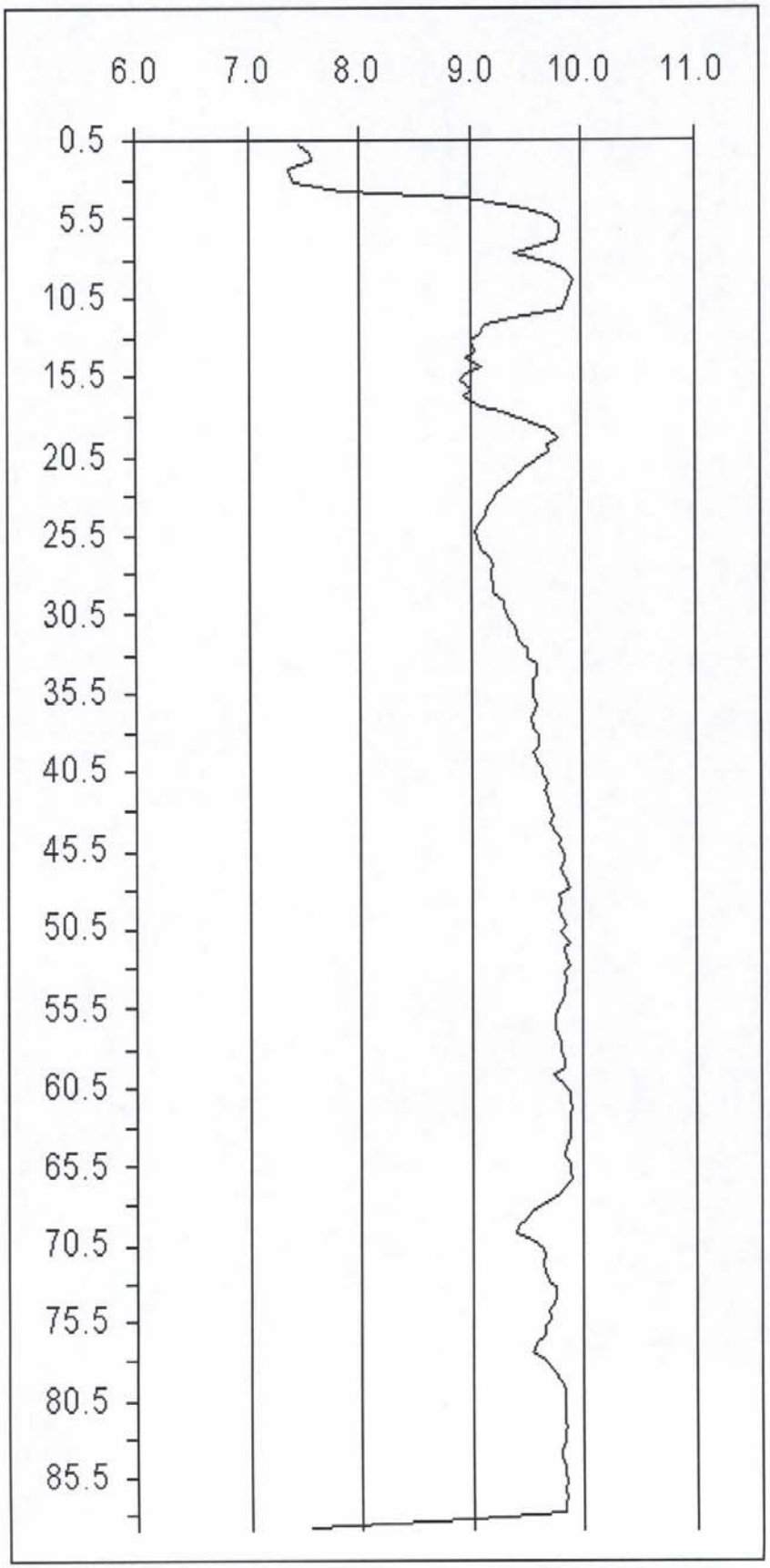
Locus	Type	Northing (m)	Easting (m)	Acc. (m)	Water Depth (cm)	Core Depth (cm)	Notes
Bear Island 4	test/site	3256926	452963	5			
Bear Island 5	test/site	3256938	452932	5	100	125	midden sand?
Bear Island 6	test/site	3256960	452907	5	110	125	small sherds & chert
Bear Island 7	test/site	3256999	452858	5	110	120	pottery recovered near core
Bear Island 8	test/site	3256851	453038	4	110	134	unlikely midden
Bear Island 9	test/site	3256871	453007	4	105	120	unlikely midden
Bear Island 10	test/site	3256893	452990	4	110	124	chert flake in core
Bear Island 11	test/site	3256944	452969		110	200	
Bear Island 12	test/site	3257014	452815	5	110	200	abundant pottery near core
Bear Island 13	test/site	3256998	452785	4	115	194	abundant pottery near core
Bear Island 14	test/site	3257004	452770	5	145	180	1 sherd found near core
Bear Island 15	test/site	3256950	452769	5			sterile sand
Bear Island 16	test/site	3256813	452634	5	124	79	turtle bone found near core
Bear Island 17	test/site	3256624	452469	5	121	157	
Bear Island 18	test/site	3256447	452312	6	140	94	peaty
Bear Island 19	test/site	3256190	452377	6	130	105	turtle bone found near core
Bear Island 20	test/site	3256360	452748	5	136	40	
Bear Island 21	test/site	3256778	453146	6	125	81	
Bear Island 22	sample	3256872	452920	4	60	84	
Bear Island 23	sample	3256877	452915	6	64	104	
Bear Island 24	sample	3257014	452787	5	141	112	abundant surface pottery
Bear Island 25	sample	3256187	452373	5	122	150	
8PU15-1	test/site	3263965	445878	5	93	90	
8PU15-2	test/site	3263991	445907	5	105	124	
Morris 1-1	test/site	3261714	447436	5	90	67	
Morris 1-2	test/site	3261692	447415	8	93	134	
Morris 1-3	test/site	3261719	447477	5	106	121	
Morris 1-4	sample	3261697	447473	7	78	100	
Morris 2-1	test/site	3256639	450834	5	110	124	
Morris 2-2	test/site	3256672	450825	5	91	52	
Morris 2-3	test/site	3256715	450823	5	96	70	
Morris 4-0	reconn	3255257	450785	7			chert flake
Morris 4-1	test/site	3255254	450808	7	88	118	
Morris 4-2	test/site	3255262	450809	7	90	127	chert flake
Morris 5-1	test/site	3254323	450826	6	76	67	
Morris 6-1	test/site	3254022	451099	5	100	92	
Morris 6-2	test/site	3254175	450823	8	81	153	small amount of charcoal
Morris 7-1	test/site	3253561	452232	4	95	85	
Morris 7-2	test/site	3253281	452470	5	74	68	
Morris 7-3	test/site	3253321	452433	7	90	95	
Morris 7-4	test/site	3253370	452390	6	87	93	
Morris 7-5	test/site	3253422	452358	5	96	84	
Morris 7-6	test/site	3253480	452329	5	105	102	
Morris 7-7	test/site	3253545	452287	5	110	126	
Morris 7-8	test/site	3253602	452164	5	110	139	

Locus	Type	Northing (m)	Easting (m)	Acc. (m)	Water Depth (cm)	Core Depth (cm)	Notes
Morris 8-1	test/site	3250554	453087	6	60	180	
Nelson 1-1	test/site	3252098	452399	6	40	54	1 piece pottery in core
Nelson 1-2	test/site	3252175	452391	6			bone frag
Nelson 1-3	test/site	3252183	452412	7	55	44	
Nelson 1-4	test/site	3252148	452422	6	55	40	
Nelson 1-5	test/site	3252119	452432	4	50	84	unlikely midden
Nelson 1-6	test/site	3252079	452440	4	55	161	1 fleck of charcoal
8FL8/8FL157-1	test/site	3264347	450698	5	96	31	shell found in probe near core
8FL8/8FL157-2	test/site	3264287	450737		113	43	
8FL8/8FL157-3	test/site	3264260	450791	4	120	53	
8FL8/8FL157-4	test/site	3264231	450840	4	120	37	
8FL8/8FL157-5	test/site	3264204	450879	5	115	45	
8FL8/8FL157-6	test/site	3264163	450933	5	113	61	
8FL8/8FL157-7	test/site	3264111	451026	4	95	69	
Nelson 3-0	reconn	3261818	447445				
Nelson 3-1	test/site	3261886	447441	6	110	39	
Nelson 3-2	test/site	3261824	447453	6	105	68	
Nelson 4-0	reconn	3259480	449648	5			marine shell
Nelson 4-1	test/site	3259478	449656	5	121	97	crushed marine shell
Nelson 5/L. N	reconn	3259164	449884	5			
Hopkins Pt.-1	test/site	3250471	454341	7	80	40	crushed shell and bone
Hopkins Pt.-2	test/site	3250493	454352	4	100	74	crushed shell and bone
Hopkins Pt.-3	test/site	3250518	454354	4	118	100	
Hopkins Pt.-4	test/site	3250475	454374	6	120	44	modern bone
Hopkins Pt.-5	test/site	3250469	454404	7	114	54	
Hopkins Pt.-6	test/site	3250500	454319	5	80	84	possible midden, bone in core
Hopkins Pt. -7	sample	3250470	454328	6	83	76	
N. Pomona-1	test/site	3264718	446025	9	70	25	crushed shell
N. Pomona-2	test/site	3264738	446013	4	83	70	
N. Pomona-3	test/site	3264730	446061	4	90	100	some black mucky peat
N. Pomona-4	test/site	3264606	446098	5			shell midden
N. Pomona-5	test/site	3264600	446081	4	102	116	mucky peat soil
N. Pomona-6	test/site	3264597	446064		96	113	mucky peat, 2 bone frags
N. Pomona-7	test/site	3264566	446090	5	102	52	
N. Pomona-8	test/site	3264632	446087	4	110	68	shell midden
N. Pomona-9	test/site	3264629	446105	4	126	51	
N. Pomona-10	test/site	3264634	446063	4	102	63	some bone
N. Pomona-11	test/site	3264671	446084	4	111	83	shell midden
N. Pomona-12	test/site	3264679	446086	5	110	110	shell midden
N. Pomona-13	test/site	3264697	446091	5	109	70	
N. Pomona-14	test/site	3264712	446087	4	113	58	preserved wood
N. Pomona-15	test/site	3264589	446087	5	113	40	peat
N. Pomona-16	test/site	3264568	446093	5	98	35	
N. Pomona-17	sample	3264658	446074	4	108	136	shell midden
N. Pomona-18	sample	3264634	446079	4	107	126	shell midden

Locus	Type	Northing (m)	Easting (m)	Acc. (m)	Water Depth (cm)	Core Depth (cm)	Notes
Grim-1	test/site	3254582	454458	4	100	121	dense bone fragments
Grim-2	test/site	3254598	454434	5	93	75	
Grim-3	test/site	3254604	454474	5	74	22	
Grim-4	test/site	3254571	454484	5	112	104	
Grim-5	test/site	3254586	454535	4	101	92	midden
Grim-6	test/site	3254618	454550		128	80	midden
Grim-7	test/site	3254642	454677		122	60	
Grim-8	test/site	3254603	454710		75	38	core slipped
Grim-9	test/site	3254602	454710	5	75	105	Bolen found by collector
Grim-10	test/site	3254565	454533	5	100	115	midden
Grim-11	test/site	3254555	454530	4	170	104	
Grim-12	sample	3254587	454535	5	98	142	
Grim-13	test/site	3255032	454267	5	77	70	
Grim-14	test/site	3255158	454289	4		76	
Grim-15	sample	3255159	454294	4	89	46	

APPENDIX B: SAMPLE CORES, BULK DENSITY, AND CORE DESCRIPTIONS

Bulk Density (vertical axis = Depth Below Surface [cm]) – Bear Island 8FL163-22



BEAR ISLAND - 8FL163-22

----------top of core @ 60 cm below water surface----------

10YR7/1 medium sand

10YR2/2 organically enriched medium sand

Partially decomposed wood in 10YR4/1 medium sand matrix

5YR2/2 organically enriched medium sand

---

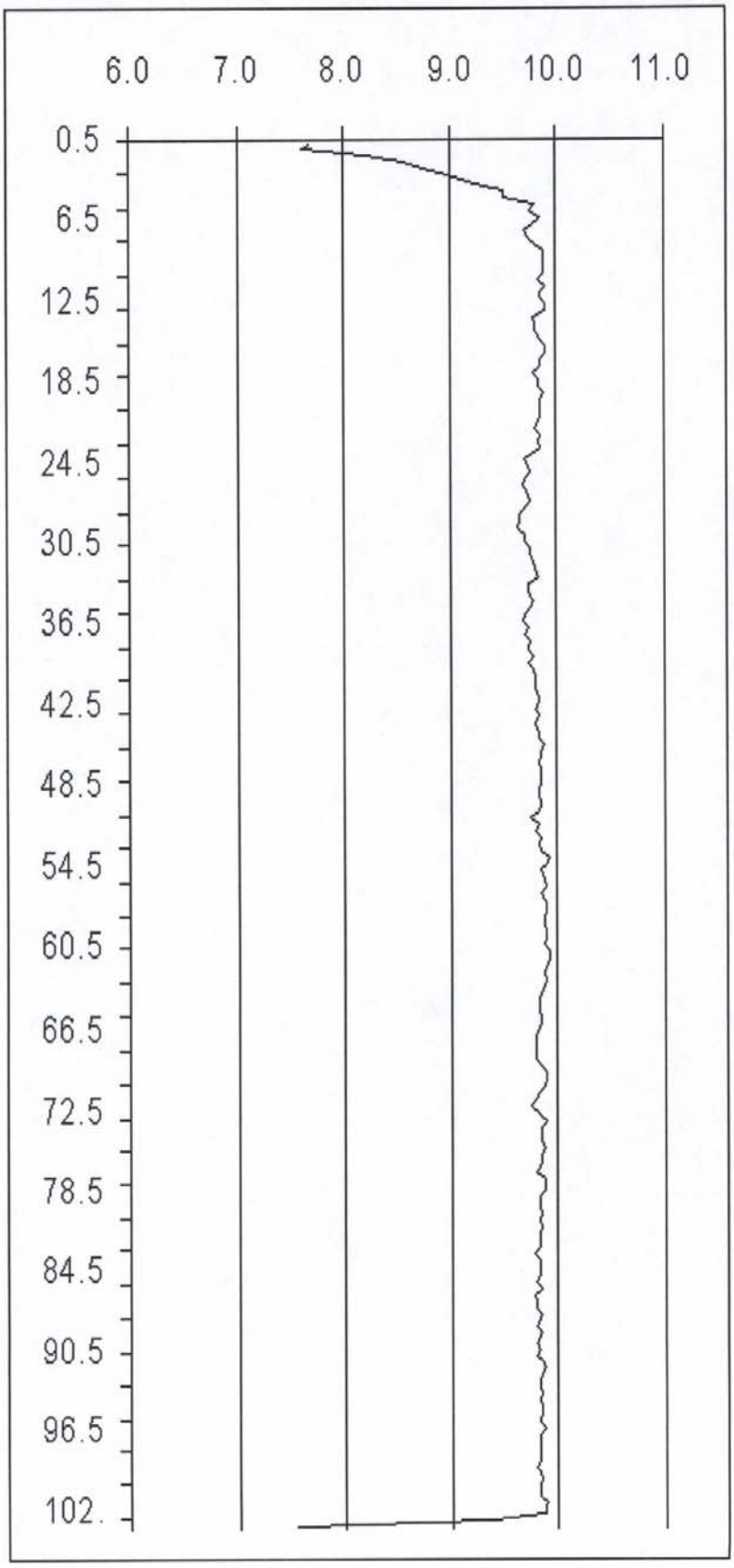
grades to 5YR3/1 medium-fine sand

---

grades to 5YR3/3 medium-fine sand

----------Terminus----------

Bulk Density (vertical axis = Depth Below Surface [cm]) – Bear Island 8FL163-23



BEAR ISLAND - 8FL163-23

----------top of core @ 64 cm below water surface----------

2.5YR6/4 medium sand

10YR2/1 organically enriched medium sand

---

grades to 10YR3/1 medium sand

---

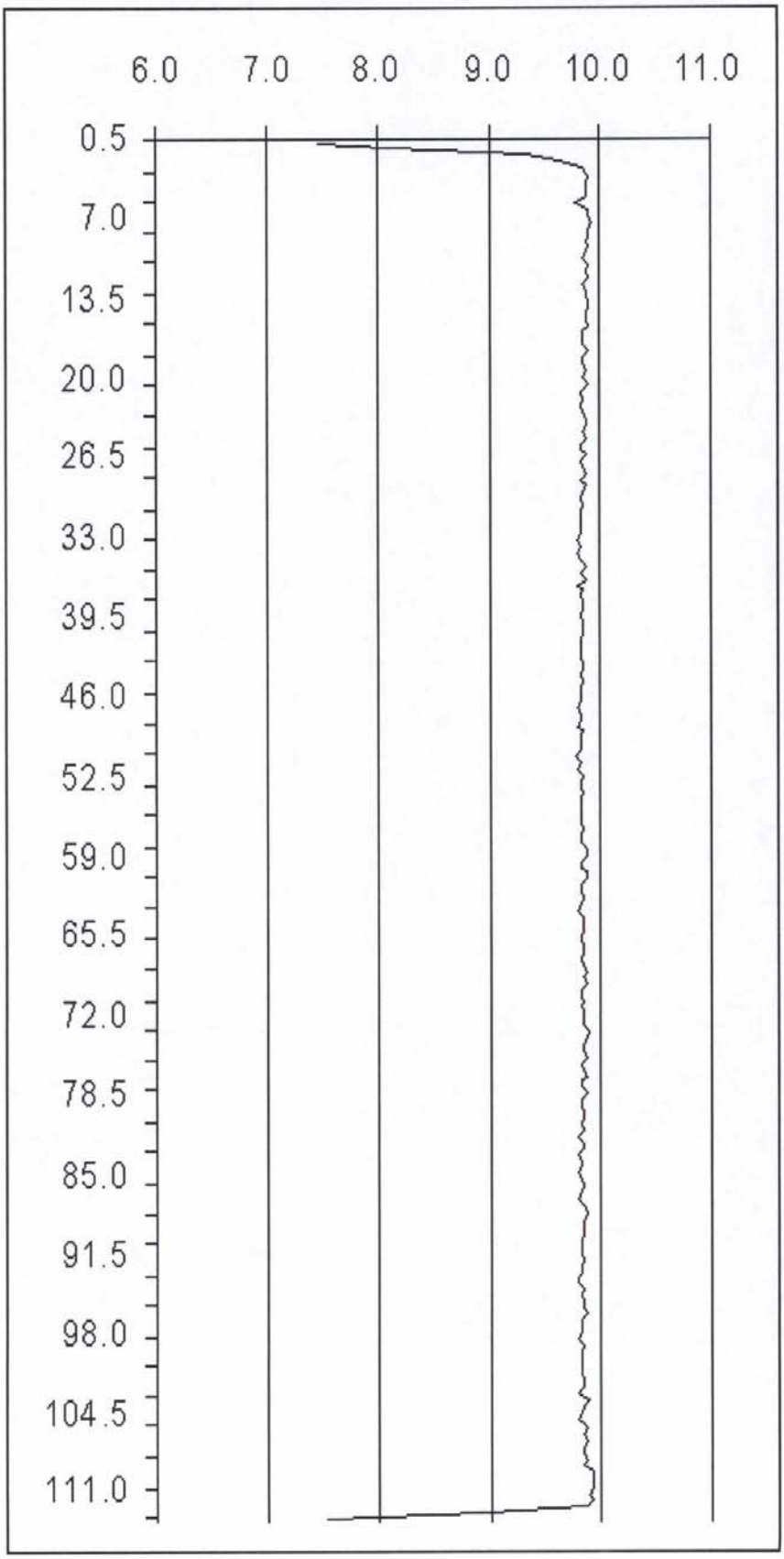
grades to 7.5YR3/2 medium sand

---

grades to 5YR3/2 medium-fine sand

----------Terminus----------

Bulk Density (vertical axis = Depth Below Surface [cm]) – Bear Island 8FL163-24



BEAR ISLAND - 8FL163-24

---------top of core @ 141 cm below water surface----------

10YR5/4 medium-fine sand

grades to 10YR4/3 medium-fine sand

grades to 10YR4/2 medium-fine sand

grades to 10YR3/2 fine sand

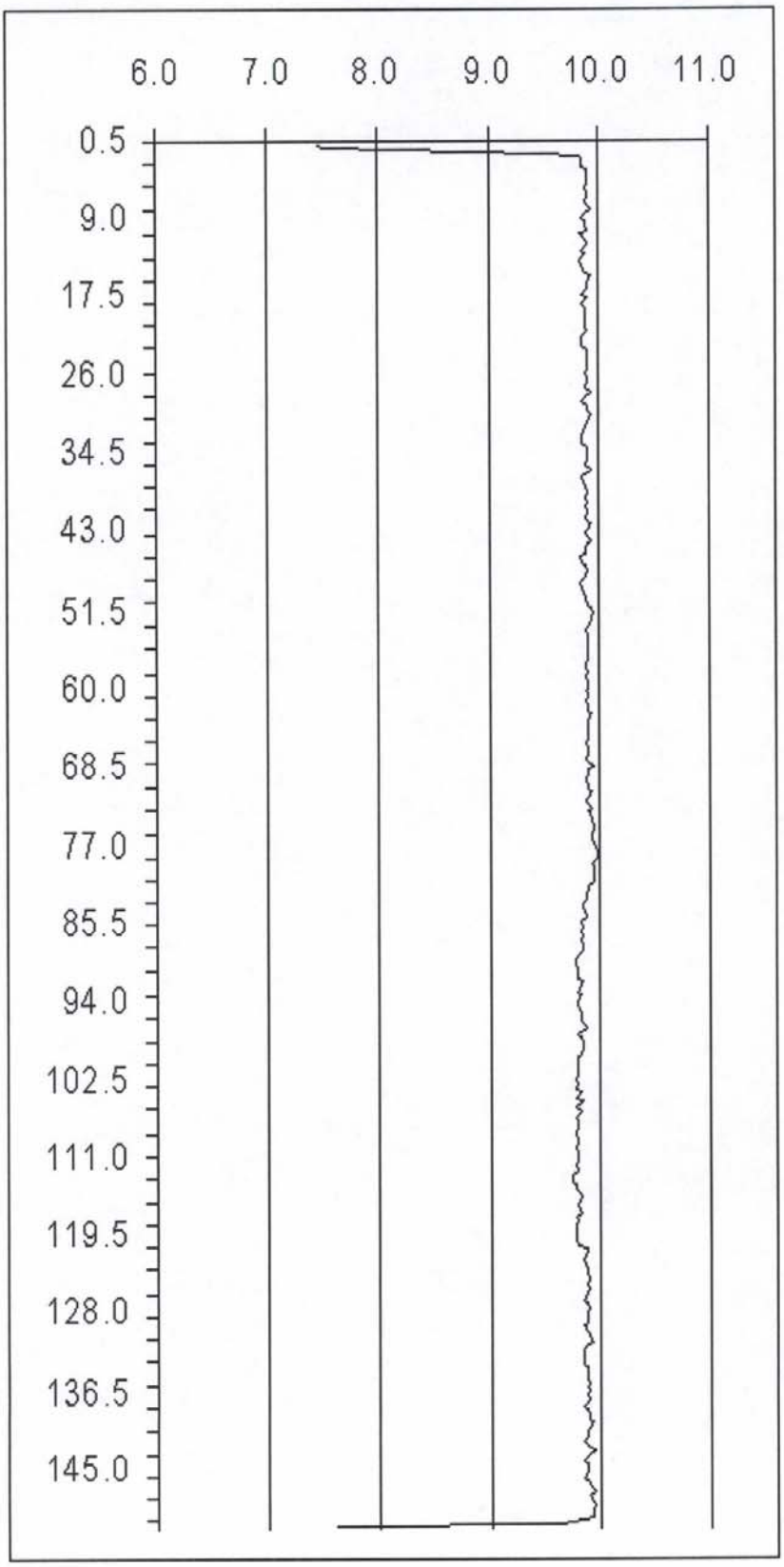
20,480 ± 160 rcybp

grades to 10YR2/1 fine sand

10YR4/2 fine sand

----------Terminus----------

Bulk Density (vertical axis = Depth Below Surface [cm]) – Bear Island 8FL163-25



BEAR ISLAND - 8FL163-25

---------top of core @ 122 cm below water surface----------

10YR6/2 medium-fine sand

10YR5/2 medium-fine sand

10YR2/2 medium-fine sand (buried A horizon?)

---

grades to 10YR3/2 medium-fine sand

---

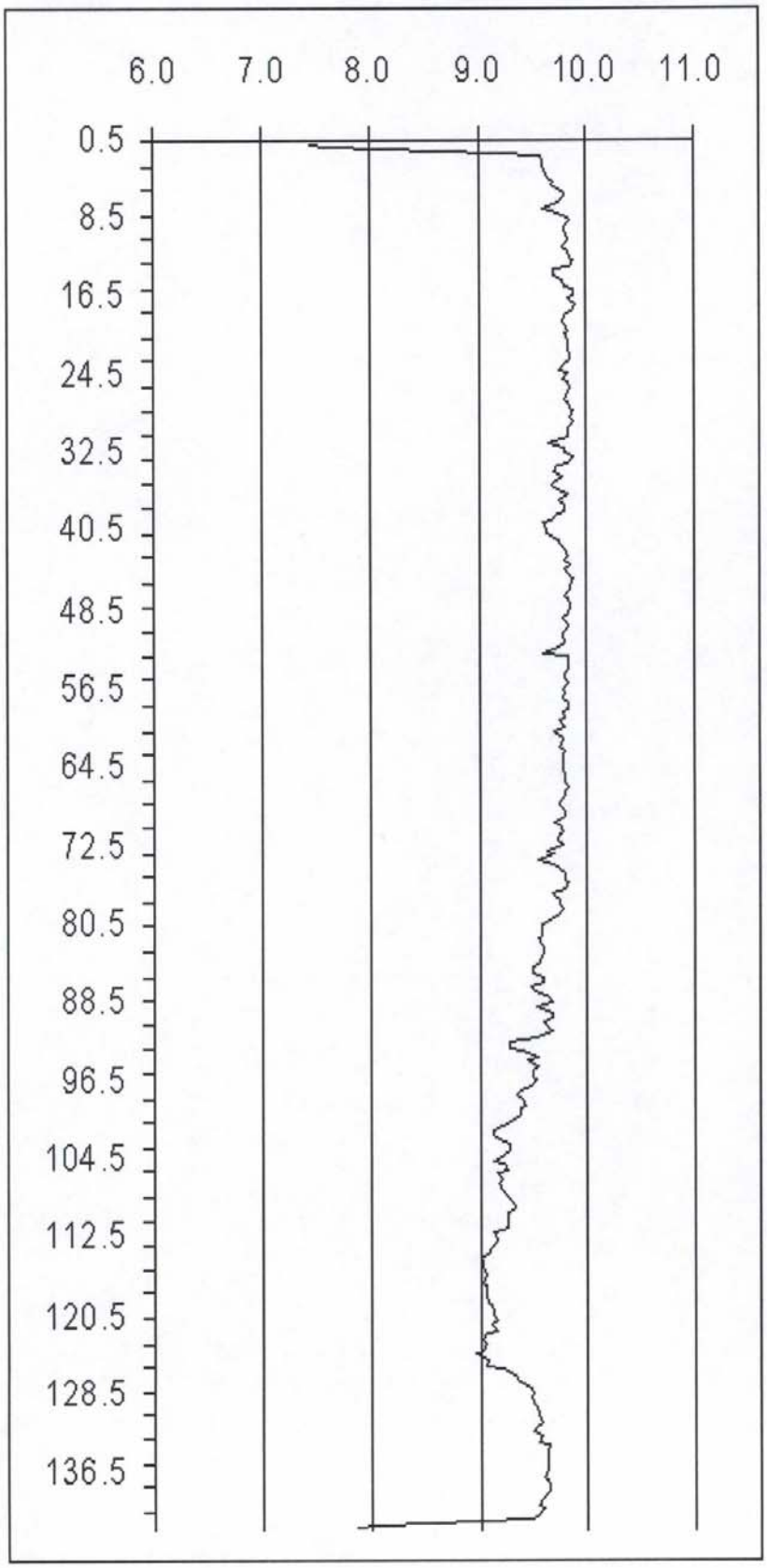
grades to 10YR2/2 fine sand (B horizon?)

---

grades to 10YR3/2 medium-fine sand

----------Terminus----------

Bulk Density (vertical axis = Depth Below Surface [cm]) – Grimsley Neck – Grim12



GRIMSLEY NECK - GRIM-12

----------top of core @ 98 cm below water surface----------

10YR5/4-3/2 medium banded sand with occasional rooted peat

10YR4/2-4/3 medium bioturbated banded sands with occasional particulate charcoal and other organic matter

---

10YR2/2 organically enriched medium-fine sands with occasional small, discontinuous stringers of 10YR4/2 sand

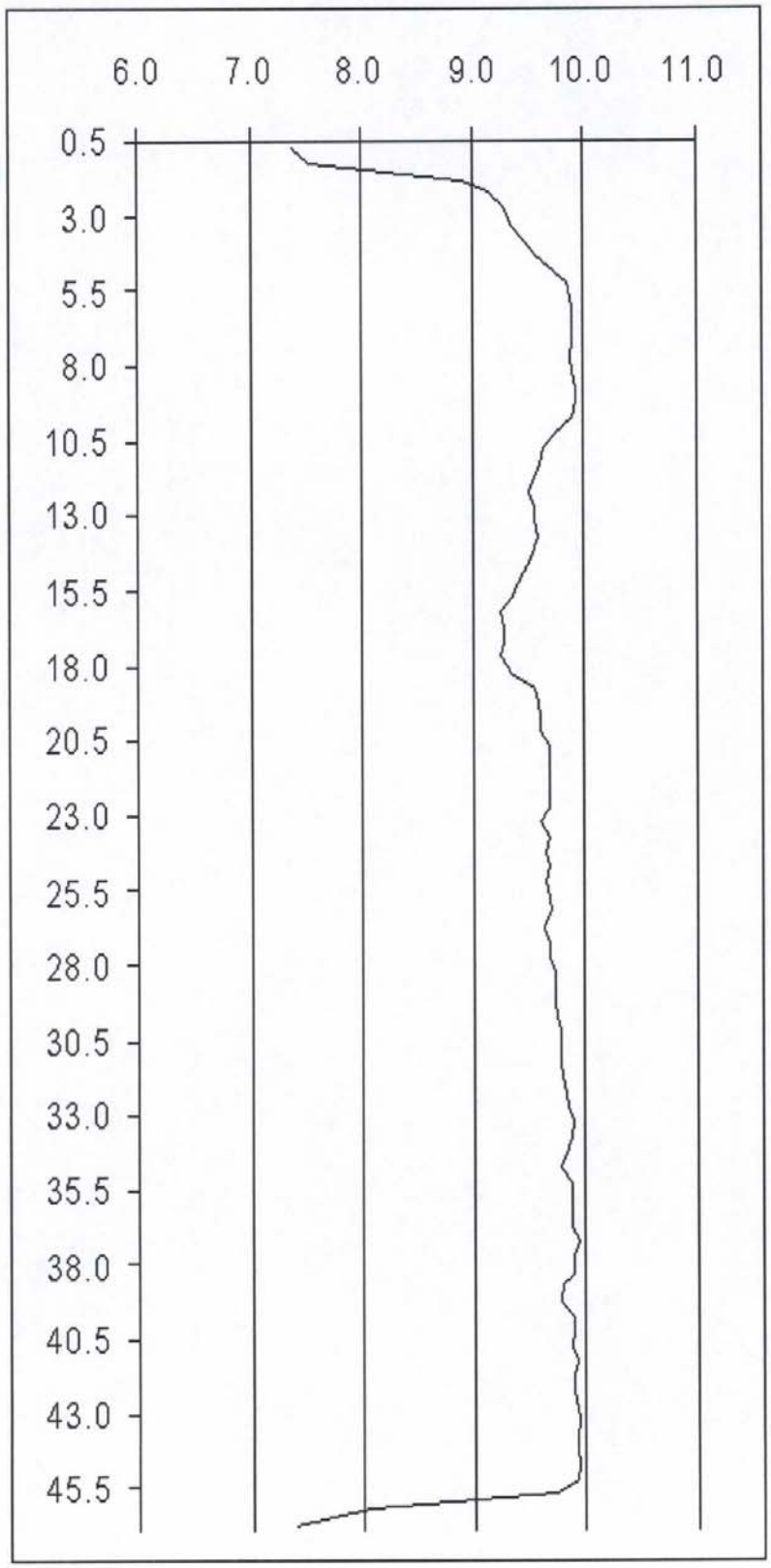
---

7.5YR2/0 rooted peat in silty matrix

7.5YR2/0 silty clay grading to 7.5YR4/0 clay

----------Terminus----------

Bulk Density (vertical axis = Depth Below Surface [cm]) – Grimsley Neck – Grim15



GRIMSLEY NECK - GRIM-15

----------top of core @ 89 cm below water surface----------

10YR5/4 medium-fine sand

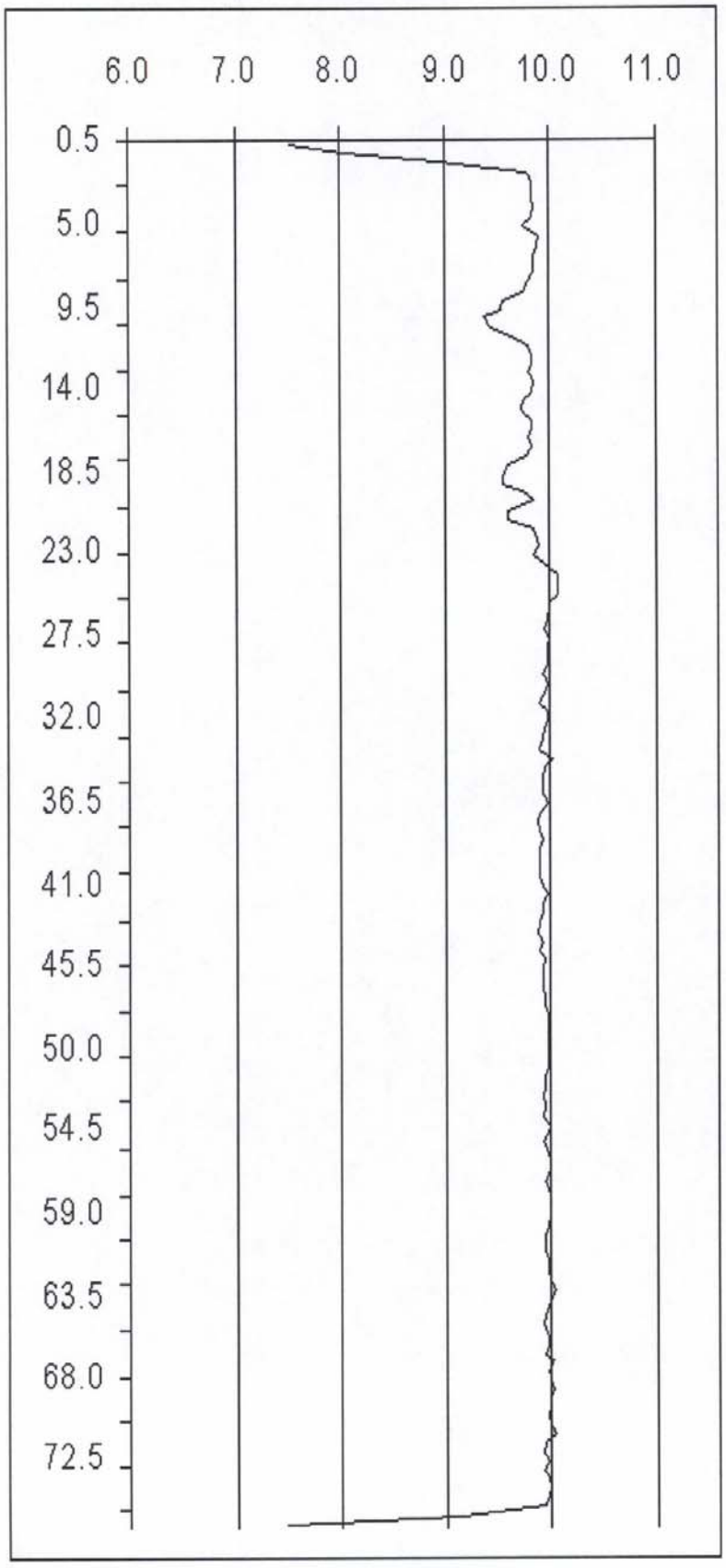
10YR2/1 silty fine sand with peat

10YR6/1 fine sand stringers in 10YR3/2 fine sand matrix

10YR5/2 medium sand with large and diffuse 10YR6/1 medium sand mottles

----------Terminus----------

Bulk Density (vertical axis = Depth Below Surface [cm]) – Hopkins Point – Hopkins 7



HOPKINS POINT - HOPKINS-7

----------top of core @ 83 cm below water surface----------

2.5YR5/6 medium sand with root casts

---

reworked and redeposited, winnowed shell midden in 10YR4/2-6/2 medium sand matrix

---

intact *Viviparus* shell midden in 10YR3/1 medium sand matrix

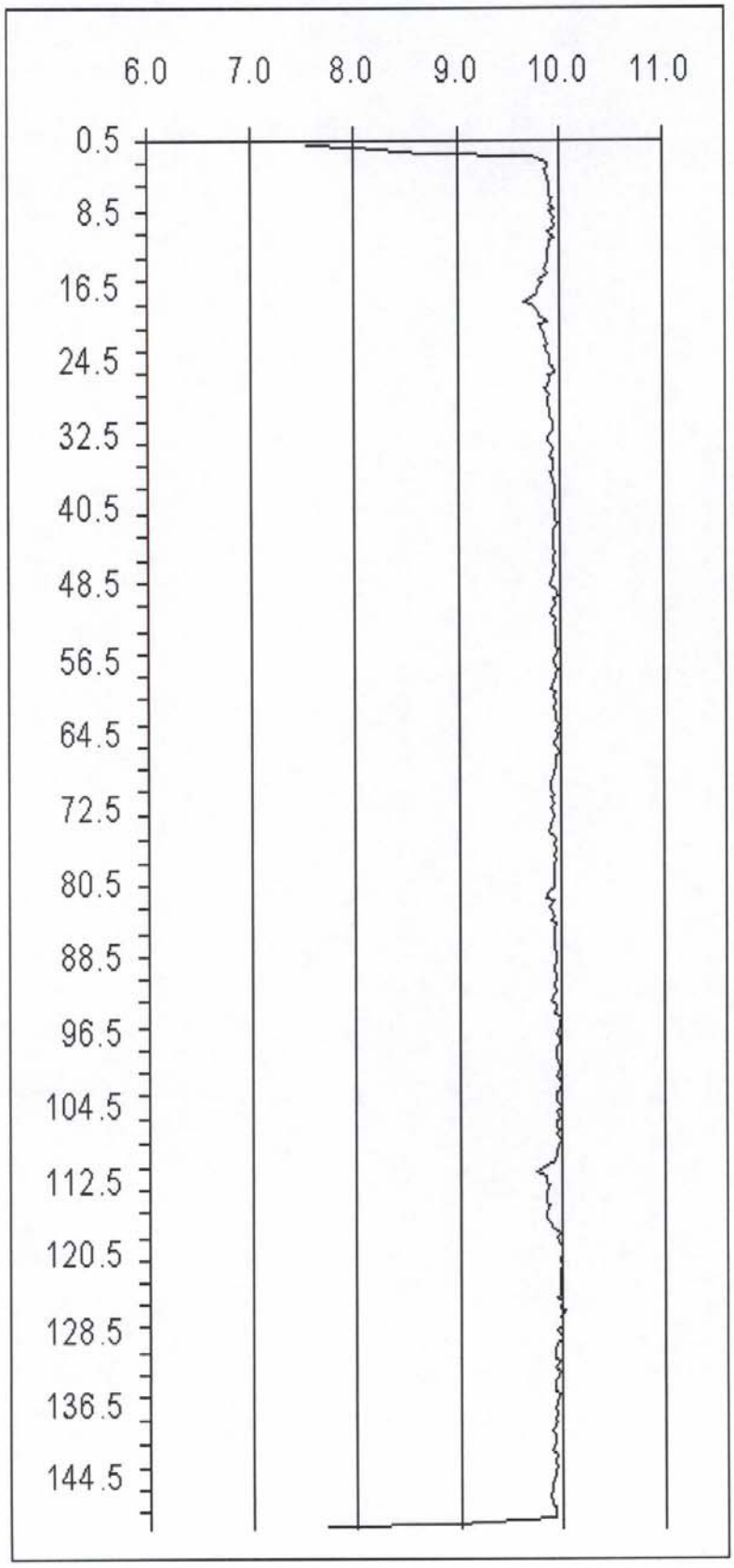
---

10YR3/1 zone of submidden leaching

2.5YR5/2 clay with 7.5YR6/6 diffuse mottles of oxidized clay

----------Terminus----------

Bulk Density (vertical axis = Depth Below Surface [cm]) - McReynolds Is. - 8FL162-4



McREYNOLDS ISLAND - 8FL162-4

----------top of core @ 77 cm below water surface----------

10YR5/3 medium sand

7.5YR2/0 organically enriched medium-fine sand

zone of leaching

10YR5/1 medium sand with faint, diffuse darker mottles

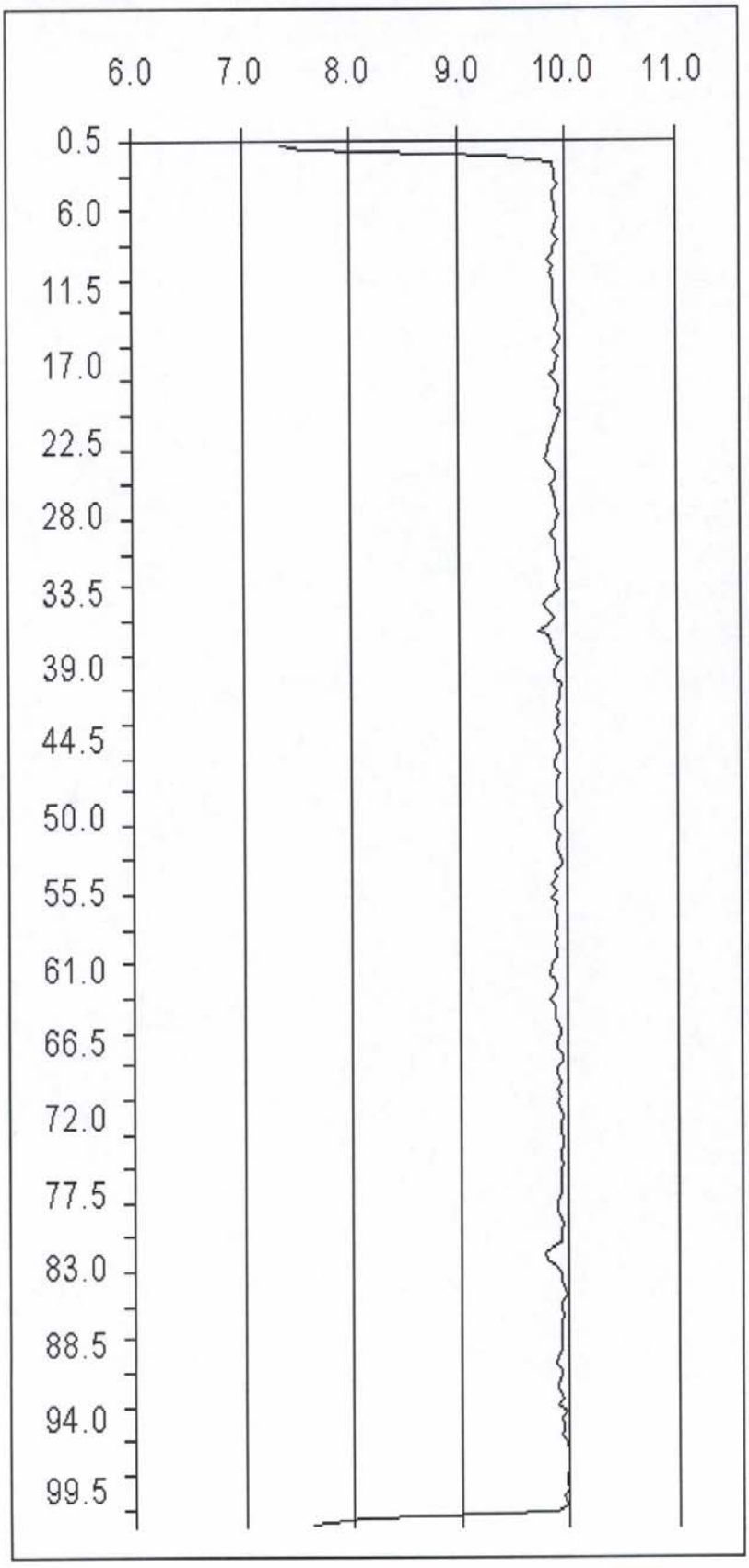
10YR3/1 organically enriched medium sand
9730 ± 50 rcybp

10YR6/2 fine sandy clay with 10YR4/1 mottles

10YR6/2 fine sandy clay with 10YR5/6 mottles

----------Terminus----------

Bulk Density (vertical axis = Depth Below Surface [cm]) – Morris 1-4



MORRIS1-4

----------top of core @ 78 cm below water surface----------

10YR5/2 medium-fine sand

10YR5/4 medium-fine sand

10YR6/2 medium-fine sand

---

bioturbated mix of 10YR6/2 and 10YR3/2 medium-fine sand

10YR3/2 medium-fine sand with occasional small flecks of charcoal throughout

---

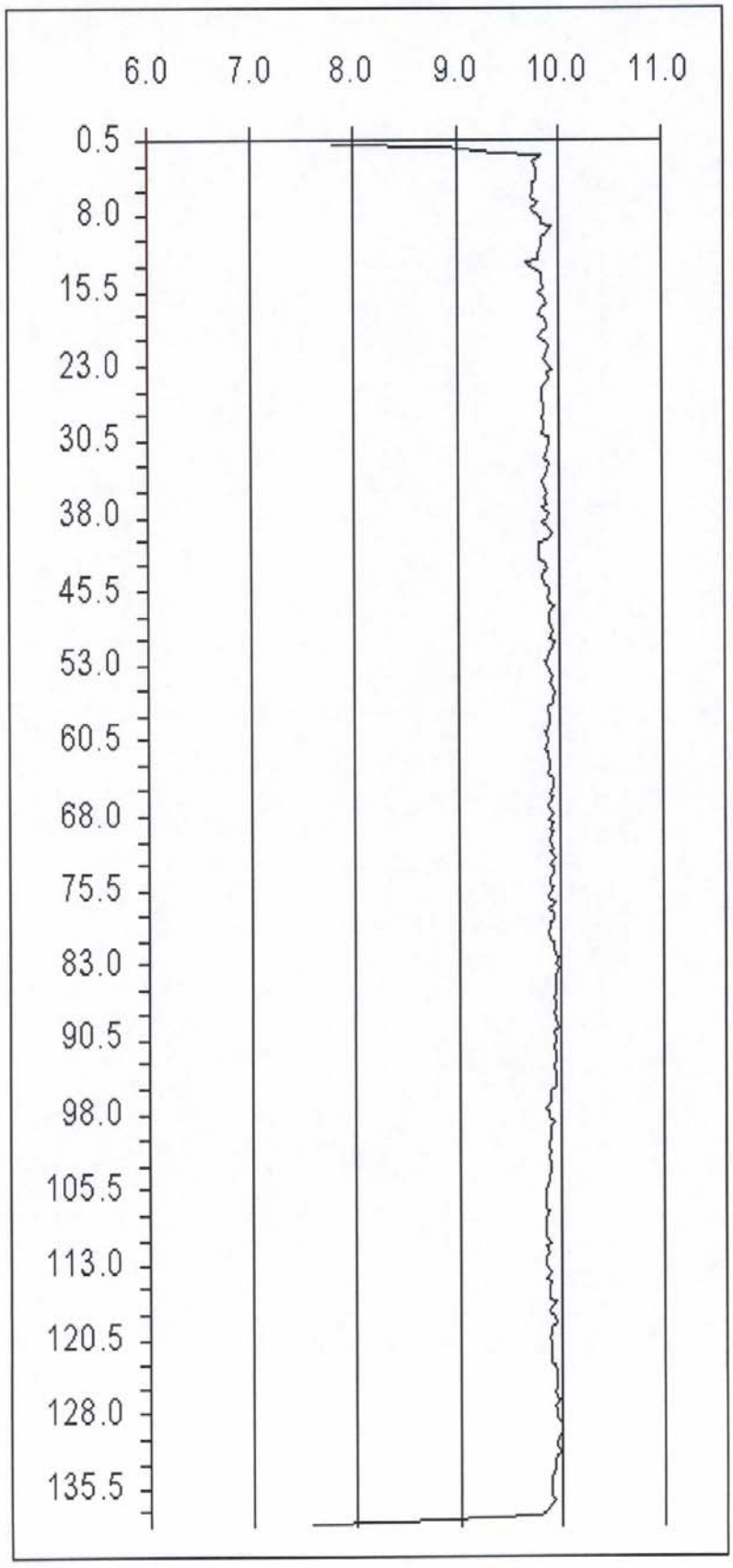
Bioturbated mix of 10YR3/2 and 10YR4/1 medium-fine sand

10YR4/1 medium-fine sand

10YR3/2 fine sand

----------Terminus----------

Bulk Density (vertical axis = Depth Below Surface [cm]) – Locus R – R-17



LOCUS R - R-17

----------top of core @ 108 cm below water surface----------
10YR3/1 medium-fine sand

intact *Viviparus* shell midden in 10YR2/1 medium-fine sand matrix

10YR3/1 medium-fine sand bioturbated with shell midden above

10YR3/2 submidden medium-fine sand

grades to 10YR4/2 medium-fine sand

10YR4/2-6/3 bioturbated fine sandy clay

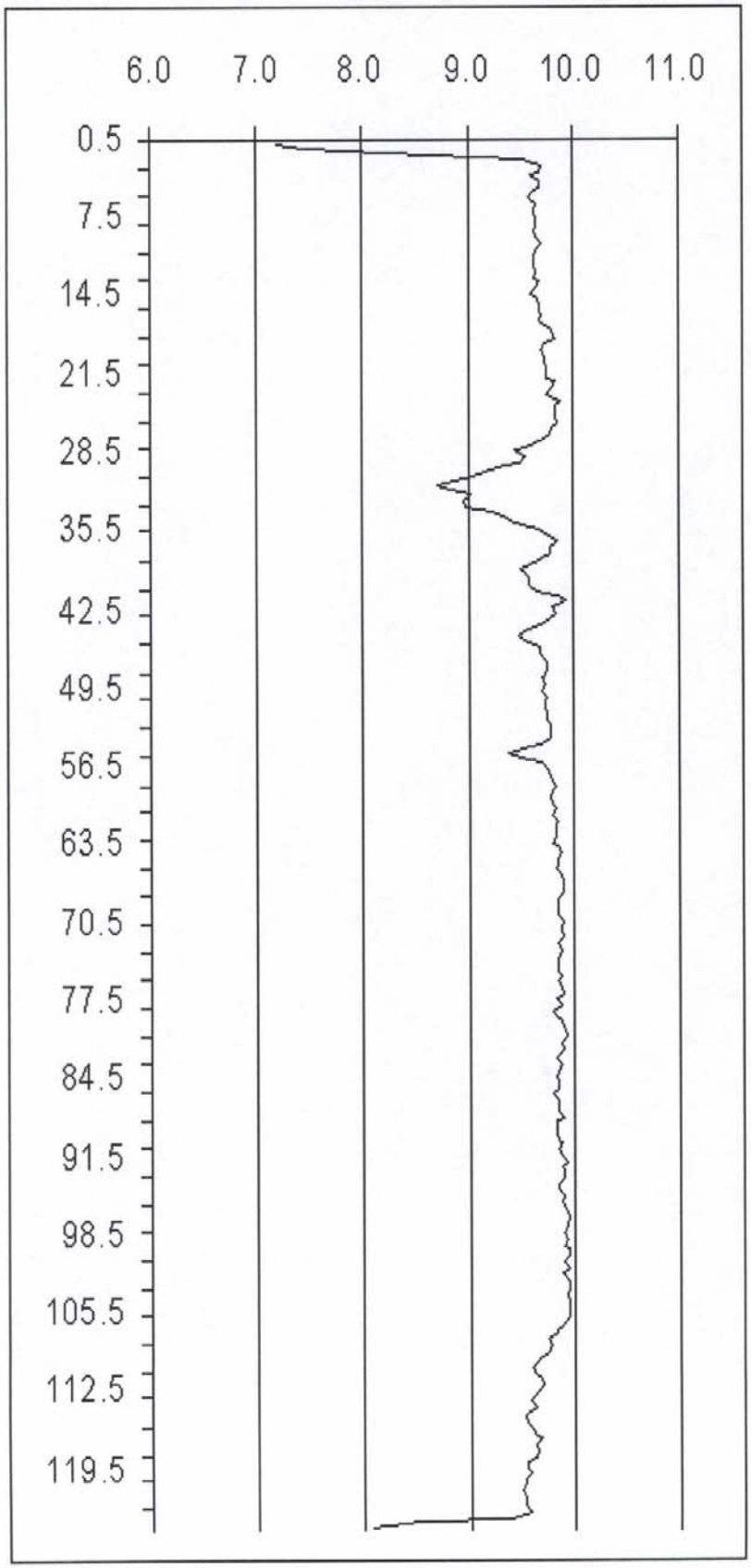
10YR6/3 clayey medium sand with concretions

10YR6/3-5/2 bioturbated clayey medium sand

10YR5/2 clayey medium sand

10YR4/2 medium-fine sand
----------Terminus----------

Bulk Density (vertical axis = Depth Below Surface [cm]) - – Locus R – R-18



LOCUS R - R-18

----------top of core @ 107 cm below water surface----------

10YR3/2 medium sand

---

intact *Viviparus* shell midden in 10YR2/2 medium-fine sand matrix (low density and highly fragmented *Viviparus*, with occasional *Pomacea*; one vertebrate fauna fragment)

1910 ± 40 rcybp (on rooted peat)

10YR3/2 medium sand with submidden leaching

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grades to 10YR4/2 medium sand

---

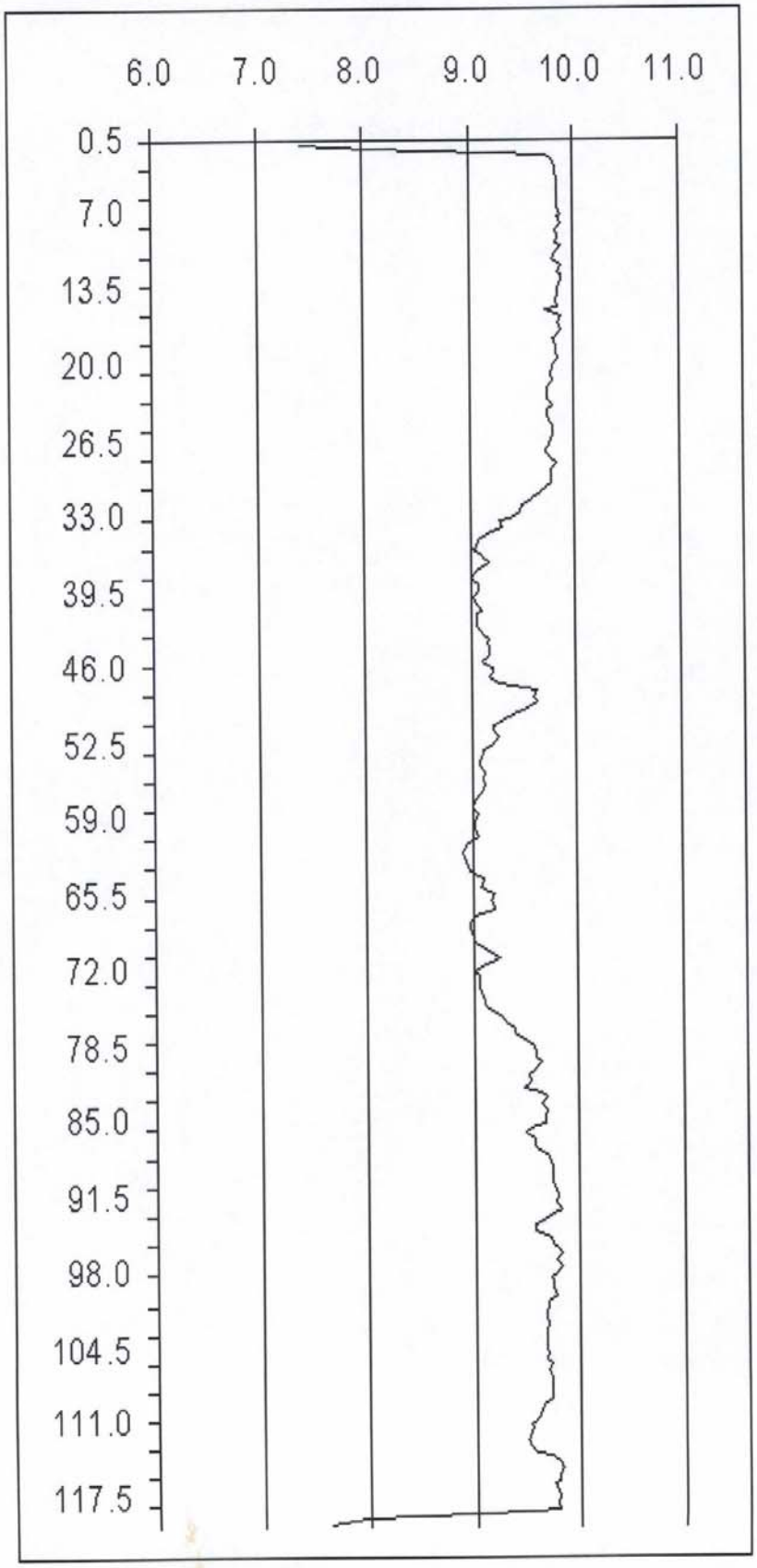
grades to 10YR5/2 medium sand

10YR6/2 medium-fine sand

10YR6/2 clayey fine sand with diffuse 10YR5/1 mottles

----------Terminus----------

Bulk Density (vertical axis = Depth Below Surface [cm]) – Locus U – U-2



LOCUS U - U-2

----------top of core @ 82 cm below water surface----------

10YR5/4 fine sand

5YR2/2 clayey silt with rooted peat and occasional stringers of 10YR5/4 fine sand

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7.5YR2/0 organically enriched clayey silt matrix with rooted peat
1550 ± 40 rcybp (on rooted peat)

7.5YR3/0 clay with minor rooted peat

10YR4/1 clay

grades to 10YR5/1 clay (with occasional wood)

----------Terminus----------

APPENDIX C: RADIOCARBON DATA

RADIOCARBON DATA, CRESCENT LAKE ARCHAEOLOGICAL SURVEY 2002

Prov.	Material	Beta Lab Number	Measured 14C Age BP	13C/12C Ratio	Conventional 14C Age BP	2-sigma Cal	2-sigma Cal BP
8PU90-1	charcoal	175783	560 ± 50	-25.4	550 ± 50	AD 1300-1440	650-510
8FL163-24-1	soot	175785	640 ± 40	-25.5	640 ± 40	AD 1280-1410	670-540
Locus U2-2	wood	175790	1540 ± 40	-24.6	1550 ± 40	AD 420-610	1530-1340
GRIM5-1	charcoal	175788	1700 ± 40	-26.0	1680 ± 40	AD 250-430	1700-1520
Locus R-18-1	wood	177043	1940 ± 40	-26.9	1910 ± 40	AD 20-220	1930-1740
8FL163/8PU17	soot	175787	3500 ± 40	-25.1	3500 ± 40	1920-1720 BC	3870-3670
8FL162-4-1	bulk soil	175784	9640 ± 50	-19.3	9730 ± 50	9260-9150 BC	11,210-11,100
8FL163-24-2	bulk soil	175786	20,410 ± 160	-20.5	20,480 ± 160	-	-