

### CHAPTER 3

## PRE-HISPANIC SUBSISTENCE PATTERNS IN THE SOUTHERN GEORGIA BIGHT

Zooarchaeological evidence of subsistence strategies in the southern Georgia Bight prior to the 17th century demonstrates the antiquity, flexibility, and richness of the pre-Hispanic subsistence heritage of the Guale people who lived on St. Catherines Island. The evidence shows that a coastal tradition combining fishing and hunting was practiced in the Georgia Bight for millennia before Spanish colonists arrived. This does not mean that pre-Hispanic strategies were inflexible or unchanged prior to the 17th century, but some broad features of animal use are found in the vertebrate record left by coastal peoples in the Georgia Bight over the centuries. This record is used to define a generalized pre-Hispanic baseline against which to measure change and continuity in Guale and Spanish diets and exploitation strategies at Santa Catalina de Guale, to assess Native American contributions to the Spanish economy, and to evaluate environmental change in the 17th century.

The zooarchaeological record of pre-Hispanic animal use in the southern Georgia Bight extends from the mid-Holocene (ca. 3000 B.C.) into the 16th century A.D. (e.g., Thomas, 2008b: table 15.3). This record shows that Guale and Spanish residents at Santa Catalina de Guale inherited a long cultural tradition of fishing and hunting in the tidewater region. In this tradition, people relied heavily upon the surrounding wetlands and estuaries as sources of animal nutrients (e.g., Crook, 2007; Keene, 2004; Quitmyer and Reitz, 2006; Reitz, 1982, 1988, 2008; Reitz and Quitmyer, 1988; Reitz et al., 2009; Weinand et al., 2000). This tradition is documented in quantified zooarchaeological collections recovered from

shell-bearing sites located on the sea islands and adjacent mainland throughout the area. Oysters (*Crassostrea virginica*) form much of the matrix at many of these sites, but other estuarine crustaceans and molluscs, in addition to a rich array of sharks, rays, finfishes, and a limited suite of other vertebrates, are mixed in with the oysters. Use of animals on St. Catherines Island is in many ways typical of that elsewhere in the region, though the zooarchaeological record shows evidence of choices that may be specific to each environmental and/or social setting.

Some researchers distinguish between hunter-gatherers who forage opportunistically and those who collect following a planned, logistic strategy (e.g., Binford, 1980; Lieberman, 1993). Others use the term *forager* instead of *hunter-gatherer* in order to emphasize that food acquisition is highly variable and cannot be characterized by a simple dichotomy of man the hunter of large mammals and woman the gatherer of shellfishes and plants (e.g., Bates and Lees, 1996: 13; Cane, 1996). The term *forager* recognizes the importance of fishing and trapping in addition to hunting and gathering in human subsistence strategies (Grier et al., 2006). Even a superficial review of the zooarchaeological and paleoethnobotanical literature shows that a two-part dichotomy is simplistic and fails to capture the variety of ways people acquire, distribute, and use plants and animals. Such reductionist concepts and terms are useful only as abbreviations for much more complex, dynamic relationships (e.g., Kim and Grier, 2006).

In the following pages, *forager* is used to refer to the vast array of distinct, but integrated,

strategies that people followed as they made use of wild, that is, not domestic, resources. In some cases, people took advantage of unexpected opportunities, but as a general rule, they knew exactly what they were doing, why they were doing it, and how to do it efficiently (e.g., Meehan, 1982). As used here, the term embraces hunting, fishing, trapping, digging, and gathering using a variety of simple to complex instruments, weapons, and facilities, including bare hands (Oswalt, 1976). Some of these techniques required active attendance by individuals or groups (e.g., leisters, animal drives, seine nets, digging sticks, rakes), whereas others (e.g., weirs, snares, trot lines, pit fall traps) did not require direct or constant attention (Reitz and Wing, 2008: 266–276; see García [1902: 202–203, 208] for a description of some fishing methods used on the coast). Both men and women could use these techniques and engage in some or all of these activities. The archaeological record does not clarify gender roles in the subsistence effort, though many of the activities required group participation that probably involved both men and women, in addition to children. Others could have been accomplished by women and children without men (Crook, 1992). All of these techniques require skill and rely upon a detailed knowledge of the opportunities and hazards of the coastal setting as well as of the habits and habitats of the resources used.

The following description of pre-Hispanic foodways in the southern Georgia Bight presumes that most of these sites were occupied throughout the year, even the very early sites. The settlement pattern, however, included some single-season, special-use camps for harvesting nuts, fruits, and other plant products, multiseason sites occupied repeatedly, but not permanently, such as hunting and shellfishing camps, and permanently occupied towns or villages (e.g., Crook, in prep.; Thomas, 2008c: 1067). Studies of incremental growth structures of molluscs indicate that some sites were occupied as single-season or multiseason camps and that others were occupied repeatedly but not necessarily continuously throughout the year in a pattern consistent with a permanent human presence (Andrus and Crowe, 2008; Quitmyer et al., 1997; Russo and Saunders, 2008). Positive archaeological evidence for season of occupation rarely is precise enough to distinguish between repeated reoccupation during multiple seasons and an essentially permanent residence.

It is entirely probable that at least some of the people at every community did travel various distances for a number of reasons (Reitz, 1988). Thus, the number of people in residence at each site, and the activities that took place there, may have varied considerably during an annual cycle.

The lack of evidence for residency during a specific season does not imply that the site was abandoned at that time. There are innumerable site formation processes that preclude recovering evidence for every season (Monks, 1981; Reitz and Wing, 2008: 260–266). Even resources that are seasonally abundant in a region may be absent from an archaeological site due to the cultural selectivity encapsulated in the concept of the “cultural filter” (Reed, 1963: 210). The tools of zooarchaeology seldom permit us to: (1) differentiate among frequent, but discontinuous, multiseasonal use of a location; (2) demonstrate continuous, year-round, permanent occupations; and (3) evaluate human decisions to avoid a resource that is abundant or to maximize the use of a resource that is uncommon.

It seems unlikely that residential mobility by entire communities was included among the strategies practiced by these coastal fishing populations. Typically, fishers jealously guard their preferred fishing ground and many of the tools of fishing are not easily transported. Some tools and facilities are too valuable to leave unprotected for long or require regular maintenance to remain operational. Thus, we consider favorably located, permanently occupied communities of various sizes to be the norm, supported by a variety of special-use sites. The number of people living at these locations at any given time and the number of years each site was occupied are difficult to assess. Undoubtedly the strategies practiced at each reflected the flexibility needed to live in an environment that changes with each tidal and annual cycle. Similar coastal sedentism without plant cultivation also was characteristic of Native Americans living along the Pacific coast between southern California and Alaska (Chartkoff and Chartkoff, 1984; Moratto, 1984).

At any given time, however, some members of every community may have been absent from the primary residence, perhaps using smaller hunting or fishing camps as part of an annual cycle, or due to social obligations. The North End site on Little St. Simons Island (Crook, 2005; Weinand et al., 2000) and the Jacksonville Electric Authority site (JEA) on the St. Johns River (table 3.1; fig. 3.1;

TABLE 3.1  
Summary of Archaeological Sites and Vertebrate Collections<sup>a</sup>

Site	Time period	Screen size, mm	NISP	MNI	No. Taxa	No. Fish Taxa
Bourbon Field, Mississippian (Savannah)	A.D. 1000–1350	6.35	15,331	563	35	19
Cathead Creek, Mississippian (Savannah)	A.D. 1200–1500	0.5	2248	84	34	16
Cathead Creek, Woodland (Swift Creek)	A.D. 300–700	0.5	1610	74	27	19
Fountain of Youth Park, Archaic	1450–500 B.C.	1.59	215	28	15	11
Fountain of Youth Park, Miss. (St. Johns Ilc)	A.D. 1513–1565	1.59	14,891	218	36	27
Jacksonville Electric Authority, Miss. (Savannah)	A.D. 1000–1500	1.59	7380	179	30	16
Kenan Field, Mississippian (Savannah)	A.D. 1000–1500	6.35	—	397	44	15
Kings Bay Locality, Mississippian (Savannah)	A.D. 1200–1500	1.59	36,667	903	57	26
Kings Bay Locality, Woodland (Swift Creek)	A.D. 300–700	1.59	37,530	1,704	46	27
North End Site, Mississippian	A.D. 900–1400	6.35	8481	139	26	14
Ribault Clubhouse, Archaic	2000 B.C.	3.18	2885	144	37	26
St. Catherines Shell Ring, Archaic	2560–2030 B.C.	6.35	2457	120	25	8
St. Simons Marsh Ring, Archaic	2240–1815 B.C.	3.18	19,970	345	45	25

<sup>a</sup>NISP refers to number of identified specimens (vertebrates only). MNI refers to minimum number of individuals (vertebrates only); No. Taxa refers to the total number of vertebrate taxa represented in each collection; and No. Fish Taxa is the number of fish taxa represented in each collection. Data are from the following sources: Bourbon Field (Crook, 1978, 1984; Reitz, 1982); Cathead Creek site (Quitmyer and Reitz, 2006; Reitz and Quitmyer, 1988); Fountain of Youth site (Reitz, 1991); Jacksonville Electric Authority site (Lee et al., 1984; Reitz et al., 2009); Kenan Field (Crook, 1978); Kings Bay Locality (Quitmyer and Reitz, 2006; Reitz and Quitmyer, 1988); North End site (Weinand et al., 2000); Ribault Clubhouse (Quitmyer and LeFebvre, 2004; Reitz et al., 2009); St. Catherines Shell Ring (Reitz, 2008); and St. Simons Island Marsh Ring (Colaninno, 2007; Marrian, 1975; Reitz et al., 2009). Descriptions of each site, the methods used during excavation, and the original zooarchaeological studies of each collection are found in the above sources. All of these materials were identified using the comparative skeletal collections at the Florida Museum of Natural History and the Georgia Museum of Natural History by students under the supervision of Elizabeth J. Reitz, Irvy R. Quitmyer, or Rochelle A. Marrian; or by these researchers personally. Swift Creek is a Woodland period, Savannah is a Mississippian period, and St. Johns Ilc is a Mississippian period.

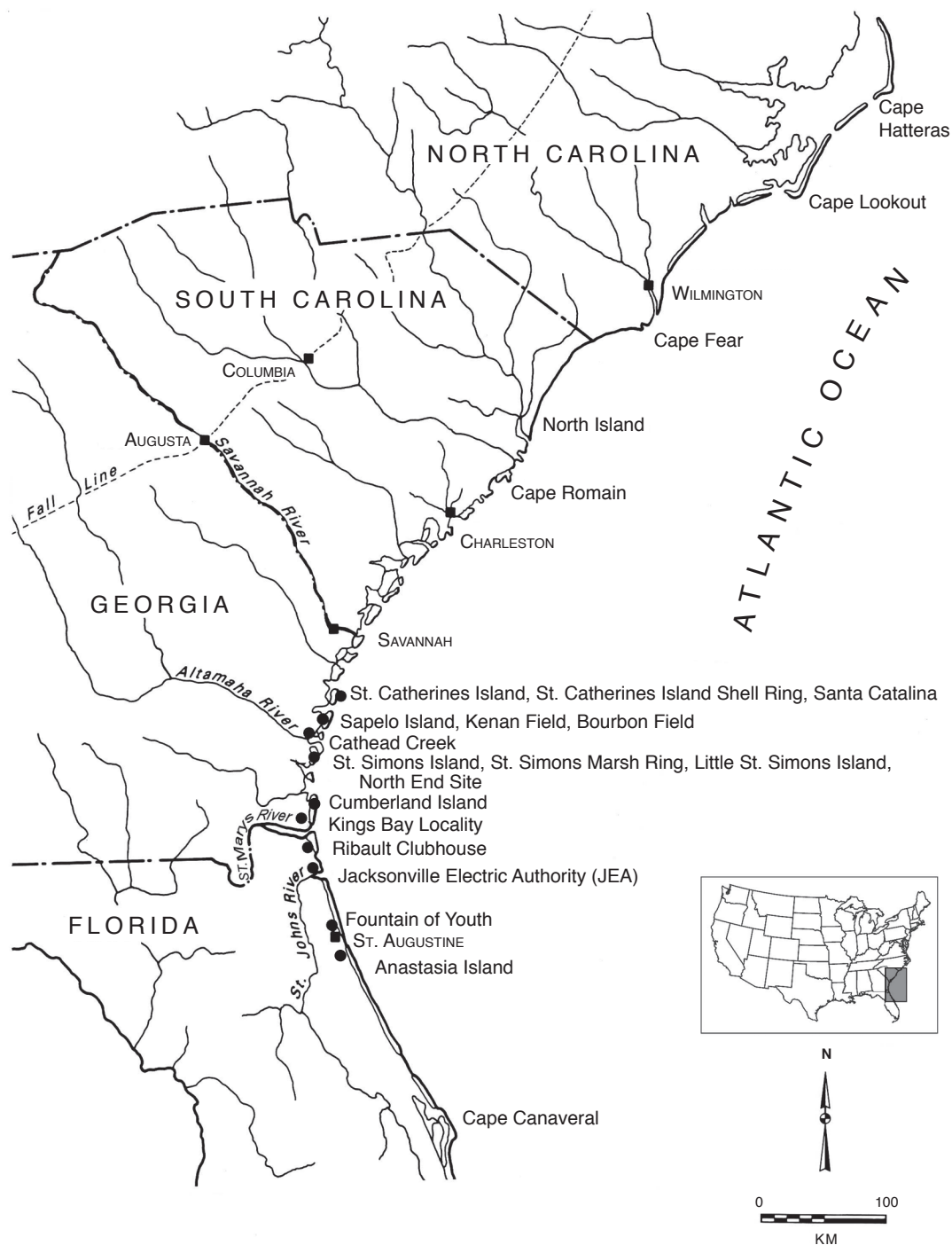


Fig. 3.1. Map of Spanish Florida showing major pre-Hispanic archaeological sites, designated by circles, and modern cities, designated by squares.

Lee et al., 1984; Reitz et al., 2009) are examples of such briefly occupied fishing camps.

The North End site consists of dense shell middens and smaller, discrete shell middens (Weinand et al., 2000). The warm-weather occupation of the North End site is substantiated by the presence of the seasonally migrant cownose ray (*Rhinoptera bonasus*). The vertebrate faunal assemblage from the North End site, however, is dominated by sea catfishes (Ariidae) among 24 other taxa, most of which are estuarine. Although the presence of cownose rays clearly indicates when the site was occupied, fishing for cownose rays was not the only activity at the site. In addition, the exposed beach location strongly suggests that people would not have stayed at the North End site for long.

The Jacksonville Electric Authority site also consists of numerous small, discrete shell middens (table 3.1; fig. 3.1; Lee et al., 1984). In this case, the animal remains suggest a series of brief winter occupations. One of the unusual aspects of the Jacksonville collection compared to other collections from the Georgia Bight is the focus on herrings (Clupeidae) and mullets (*Mugil* spp.) from trophic levels below 2.6 (Reitz et al., 2009; see appendix A for a discussion of trophic levels and their use in this study). This trophic-level focus suggests an energetically conservative strategy. The small fishes dominating this collection can be caught using mass capture methods through a communal effort, which may be less prestigious but yields a large amount of food. If the abundance of small fishes is evidence of communal fishing with a large seine net, we could argue that the fishing party at this site feasted on their catch as part of their communal, winter-time fishing and shellfishing expedition.

### CHRONOLOGY

The cultural chronology of St. Catherines Island is discussed in detail elsewhere (chap. 2; Thomas, 2008b: table 15.3, 298–300, 404–434) and is reviewed only briefly here. People probably lived along the southern Georgia Bight throughout the Holocene (ca. 10,000 B.C. to present), with settlements moving westward or eastward as active shorelines and associated wetlands expanded and contracted along the coastal plain before achieving approximately their present locations and configurations. Post-Pleistocene climates, shorelines, and plant communi-

ties were established during the Paleoindian (10,000–8500 B.C.) and the Early and Middle Archaic (8500–3000 B.C.) periods, but rising sea levels, changes in marsh configuration, and other biogeophysical phenomena (e.g., Linsley et al., 2008; Thomas, 2008a: 42–47, 301) have obscured evidence of the environmental and cultural changes associated with this early part of the sequence. These processes continued to alter the coastline after 3000 B.C., and continue to do so today. Much of the recent archaeological record has survived the middle to late Holocene changes; consequently we know more about the post-3000 B.C. part of the sequence than we do the early Holocene. A tight correlation between landscape changes and the record of human occupation at each coastal site would undoubtedly answer many questions about occupational sequences, changing resources, and resource use at each site. The inherent dynamics of estuaries undoubtedly influenced many aspects of life in the Georgia Bight and called for flexibility in subsistence strategies.

The earliest archaeological evidence for human life on St. Catherines Island and elsewhere in the southern Georgia Bight dates to the Late Archaic period between 2560 and 2030 B.C. (Thomas, 2008b: 432–433; see chap. 2). This Late Archaic occupation is known on St. Catherines Island as the St. Simons period (table 2.1). The Late Archaic was followed by an Early Woodland period, known locally as the Refuge period (1000–350 B.C.), and a Middle Woodland Deptford period (350 B.C.–A.D. 350). These two are often combined into a Refuge/Deptford period. This was followed by a Late Woodland, or Wilmington, occupation (A.D. 350–800), which was followed, in turn, by the St. Catherines period (A.D. 800–1300). Elsewhere in the Southeast, the Woodland period is associated with cultivation of plants but that does not appear to have been the case on St. Catherines Island or elsewhere in the southern Georgia Bight. On the Georgia coast, the Mississippian period is traditionally divided into Savannah and Irene occupations. Even though Savannah-period ceramics can be distinguished on St. Catherines Island from those of the preceding St. Catherines period and the subsequent Irene period, the radiocarbon dates for Savannah sites overlap with those from the St. Catherines and Irene periods on the island (Thomas, 2008b: 430–431). Irene is the last pre-Hispanic period on the island (A.D. 1300–1580). It is likely that



farming was part of the subsistence strategy by the middle or late Irene period (Thomas, 2008a: 1033–1035, 1038; see chap. 2).

The historic Native American period associated with Guale and Spanish coastal missions is known as Altamaha. The Altamaha period (A.D. 1580–1700) coincides with the First Spanish period on the island, which began in 1580 and ended shortly after the Roman Catholic mission effort on the island was abandoned in 1680. Actual European contact with people along the Atlantic coast began several decades before this, perhaps as early as A.D. 1513, with the entrada of Juan Ponce de León (Deagan, 1990; P. Hoffman, 1990: 3; Milanich, 1990).

The above summary focuses on the chronology of St. Catherines Island but local variations in dates, occupational sequences, and material culture characterize all sites in the region (Thomas, 2008b: table 15.3). This cautionary note is particularly pertinent to comparisons of chronologies between the island and the mainland. Terminology used for sites elsewhere in the southern Georgia Bight include: Late Archaic/St. Simons period (2500–500 B.C.), Swift Creek or Woodland period (A.D. 300–700), and Savannah/St. Johns IIc or Mississippian period (A.D. 900–1565).

Changes in material culture, as well as general trends of increasing social complexity, population size, and population density are associated with each cultural period. By the end of the Irene period, the number of sites on St. Catherines Island was much higher than during the earlier parts of the archaeological sequence (Thomas, 2008c: 1050–1052). This suggests both increased population size and increased population density. Likewise, the role of cultivated plants probably increased (Thomas, 2008c: 1052–1053). These cultural changes influenced acquisition, distribution, and consumption of animal products on the island and undoubtedly had an impact on the island's landscape as well as on estuarine resources (e.g., Crook, 1992).

#### PLANT USE, FARMING, AND BIOARCHAEOLOGY

Although it is difficult for zooarchaeologists to admit it, acquisition of plant resources probably was a more significant part of economic strategies than was the acquisition of animal resources. In most biotopes, people cannot obtain all, or even

most, of their nutrients and raw materials from animals. Nor can they satisfy the needs of belief systems, or of economic, kinship, political, and other cultural institutions exclusively with animal products. Plants are critical sources of nutrients, medicines, and raw materials for a number of purposes (e.g., Newsom and Wing, 2004). Thus, it seems implausible that humans ever used animals to the exclusion of plants in the Georgia Bight because the nutrients and other benefits of plants and animals are not interchangeable. To the extent that nutrients from domestic plants, such as carbohydrates, increased as farming became widespread, overall health and other aspects of human biology would have been affected. Unfortunately, the ramifications of the relationship between plant and animal resources cannot be tested objectively because quantified studies of archaeobotanical remains from pre-Hispanic sites in the southern Georgia Bight are very rare (for exceptions see Keene [2004] and Lee et al. [1984: 139]).

The shortage of data on plant use is not due to limited plant use in the past, but to poor preservation of plant remains and a lack of research strategies that facilitate the recovery and study of plant remains. The traditional focus on shell-bearing sites by excavators in the southern Georgia Bight precludes studies of smaller, less obvious special-use sites that might have been occupied specifically to collect plants, woods, and fibers (e.g., tuber or nut collecting sites). Such sites might be occupied briefly but repeatedly over decades. Furthermore, plant remains typically do not preserve well in the alkaline depositional contexts created or sustained in shell-bearing sites, whereas such deposits do facilitate the survival of vertebrate remains. The archaeological focus on shell-bearing contexts, therefore, precludes the recovery of plant remains in many cases. The most troubling explanation for the limited botanical data, however, is a failure on the part of project managers to ensure sampling for both plant and animal remains when developing data recovery plans.

Plants were vital to coastal life throughout the occupational sequence. Initially, these plants were wild and would have included woods, fibers, nuts, grains, fruits, seeds, tubers, rhizomes, and greens from terrestrial, freshwater, and estuarine settings. Available evidence suggests that cultivated plants were not a significant source of nutrients and other products in the southern Georgia Bight until late

in the Mississippian period (e.g., Cook, 1971; Keene, 2004; Larsen, 1982: 165–167; Larson, 1980: 206–220; Lee et al., 1984: 139). This is an aspect of life on the coast that obviously requires much more research.

In contrast to the limited quantified data for plant use and plant cultivation prior to the 17th century in the southern Georgia Bight, studies of human skeletal remains show changes in demographic composition, dental and general health, nutrition, diet, physical activity, labor, and behavior in early pre-Hispanic (400 B.C.–A.D. 1000) and late pre-Hispanic (A.D. 1000–1550) populations (Hutchinson and Larsen, 1988, 1990; Hutchinson et al., 1998; Larsen, 1982, 1990, 1993, 2001, 2002; Larsen and Harn, 1994; Larsen and Hutchinson, 1992; Larsen and Ruff, 1994; Larsen and Thomas, 1982, 1986; Larsen et al., 1990a, 1990b, 1991, 1992, 1996, 2001a, 2001b; Ruff and Larsen, 1990, 2001; Schoeninger et al., 1990; Simpson et al., 1990; Thomas and Larsen, 1979). When extended into the 17th century, these changes show that the consequences of colonization on Native Americans went beyond the well-known impacts of disease (Bushnell, 1981: 11–13; Hutchinson and Larsen, 1990; Larsen et al., 1990a, 1996, 2001a; Ruff and Larsen, 1990; Russell et al., 1990; Schoeninger et al., 1990; Simpson et al., 1990).

Bioarchaeological studies of human remains in interior and coastal settings demonstrate the presence of regional differences between inland and coastal settings as well as differences between peninsular Florida and coastal Georgia. These differences are compounded by local differences in timing and responses to farming prior to the First Spanish period (Hutchinson and Larsen, 2001). Various aspects of skeletal morphology are associated with the transition from foraging to farming prior to the 17th century in the southern Georgia Bight. Clark Spencer Larsen and his colleagues (Larsen, 2002: 64–65; Larsen et al., 2001a) report aspects of skeletal size and robusticity in human skeletal materials from the early pre-Hispanic period that are consistent with a nonfarming lifestyle. These patterns are followed by evidence for biological changes consistent with a lifestyle that included farming in the late pre-Hispanic period. Other health and activity indicators also change, within the same time frame, in ways characteristic of an increased consumption of domesticated sources of carbohydrates, often associated with starchy

crops such as maize (*Zea mays*).

Skeletal morphology suggests that some Native Americans at Spanish Florida missions lived more sedentary lives after the arrival of Spanish colonists and may have experienced an increase in body weight (Ruff and Larsen, 2001: 137). Compared to people prior to the 17th century, functional demands on Native Americans at Santa Catalina de Guale declined, an outcome indicated by a decrease in degenerative joint disease combined with changes in the shape and morphology of the femur and tibia (Larsen, 1982: 242; Ruff et al., 1984). People at Santa Catalina de Guale likely experienced greater body weight relative to stature, which might have been associated with increased carbohydrate consumption (Larsen and Ruff, 1994; Larsen et al., 1996; Ruff and Larsen, 1990, 2001; Ruff et al., 1984).

Skeletal remains indicate that women and men were influenced in different ways by missionization. Women at Santa Catalina de Guale experienced an increase in lower-limb loading compared to the late pre-Hispanic period on the coast. Upper-limb loading for women was low in the late pre-Hispanic period and remained low during the 17th century (Ruff and Larsen, 2001: 137). Men at Santa Catalina de Guale experienced an increase in both lower- and upper-limb loading during the 17th century compared to the preceding late pre-Hispanic period. Women, and some men, at Santa Catalina de Guale were less mobile during the 17th century compared to pre-Hispanic coastal peoples. Many men at the mission, however, were more mobile than their predecessors had been, perhaps because they were involved in long-distance portage as part of the repartimiento draft labor system (Bushnell, 1981: 11–13; Larsen et al., 2001a).

Oral and skeletal health are found to decline when early and late pre-Hispanic populations in the southern Georgia Bight are compared, and declined further during the 17th century (Larsen, 2002; Larsen et al., 2001a: 83–84, 93–94). The pre-Hispanic increase in dental caries and periosteal reactions (infection) is consistent with a transition from an exclusively foraging lifestyle in the early pre-Hispanic period to a late pre-Hispanic strategy that included plant cultivation and maize consumption (Larsen, 2002: 64). The increase in dental caries also may be related to a late pre-Hispanic diet that was low in protein at the same time that it was high in carbohydrates

(Larsen, 1982: 244–245; Larsen et al., 2001a). Pre-Hispanic dental size, postcranial size, and stature also declined (Larsen, 1982: 238). Increases in periosteal infections among farming populations prior to the 17th century may be related to increases in population size, sedentism, and population density. This, in turn, might have resulted in poor sanitation and other conditions favorable to the spread of infectious diseases (Larsen, 2002: 48). With missionization, the incidence of dental caries and periosteal reactions increased further among some portions of the 17th-century Native American population (Larsen et al., 2001a: 83–84, 93–94).

Dale Hutchinson and Larsen (1990, 2001) report that enamel hypoplasias, indicators of metabolic stress, were more common in individuals buried at Santa Catalina de Guale than among those living on the coast prior to the 17th century. The teeth of people living in the Georgia Bight before farming became widespread in the area evidenced a greater frequency of hypoplasias than did those of 17th-century St. Catherines Island populations (Hutchinson and Larsen, 1990: 64–65). The pre-Hispanic farmers and 17th-century mission populations experienced similar, and lower, frequencies. Pre-Hispanic farmers as well as Guale converts buried at the 17th-century mission, however, may have experienced stresses of greater severity and duration compared to earlier foraging populations (Hutchinson and Larsen, 1990). These data appear to indicate that the transition from foraging to farming was more stressful, in terms of hypoplasias, than was the transition from pre-mission to mission life, that both farming and missionization were accompanied by stresses (Hutchinson and Larsen, 1990, 2001). They also suggest that the transition to farming was associated with an increase in intrapopulation conflict, scarce resources, and internal strife (Hutchinson and Larsen, 2001: 199). To this list we would add evidence for extremes in rainfall and temperatures during the St. Catherines and Irene periods, conditions which would be particularly stressful for farmers (Blanton and Thomas, 2008).

Katherine Russell and her colleagues (1990: 36) conclude that the Santa Catalina de Guale population had a longer survivorship profile than did pre-Hispanic farming populations in the southern Georgia Bight. This demographic shift could represent a rebound in adult survivorship at missions compared to pre-Hispanic farming

communities or an age profile biased by selective burial of a portion of the population in the campo santo of the iglesia. The ratio of individuals older than 30 years compared to those between 5 and 30 years of age reveals an older population at Santa Catalina de Guale than the pre-Hispanic population on the island. This change may reflect a decline in fertility and birth rate, both of which are characteristic of a population under stress (Larsen et al., 2001a: 95–97; Russell et al., 1990: 47).

Men and women responded differently to changes in the quantity and quality of nutrition and in activity patterns associated with the adoption of farming prior to the 17th century (Larsen, 1982: 248–250; Larsen et al., 2001a). Sexual dimorphism might be related to differential access to protein, with women consuming more carbohydrates and men more protein, and to changes in subsistence-related activities. The activities of women were altered more fundamentally by the demands of plant cultivation than were those of men, who continued to hunt and fish much as they had done before farming was added to the subsistence repertoire (Larsen, 1982: 253). Dietary quality, dietary quantity, and activity patterns were further altered during the 17th century, perhaps in response to increased sedentism associated with mission life and the labor demands made specifically on Guale men to serve as porters.

Geochemical studies of stable isotopes support the premise that farming and the consumption of maize began on the island sometime after A.D. 1000 (e.g., Hutchinson et al., 1998; Larsen et al., 2001a, 2001b; Schoeninger et al., 1990; Thomas, 2008c: tables 32.2 and 32.3). Isotopic ratios of carbon ( $^{13}\text{C}/^{12}\text{C}$  [ $\delta^{13}\text{C}$ ]) in human skeletal remains from elsewhere in the southern Georgia Bight indicate an increase in  $\text{C}_4$  plant consumption after ca. A.D. 1000, documenting a transition from nonfarming economies to economies that included farming. The increase in  $\text{C}_4$  plant consumption indicates that maize became a dietary staple somewhat later on St. Catherines Island (Larsen, 1990, 2002). The 17th-century diet included more maize than did the diet of pre-mission farmers on St. Catherines Island (Larsen et al., 2001a: 82; 2001b). On the other hand, the  $\delta^{13}\text{C}$  values for 17th-century St. Catherines Island Guale are more negative than those for Puebloan farmers of the American Southwest, implying a lower dependence on maize by the island population compared to maize farmers in other



regions of the continent. The range of variability suggests that island residents used a broader range of subsistence alternatives than did their southwestern counterparts, which is consistent with the greater species richness and diversity for coastal environments compared to deserts.

Comparison of the pre-17th-century and 17th-century St. Catherines Island nitrogen isotopic ratios ( $^{15}\text{N}/^{14}\text{N}$  [ $\delta^{15}\text{N}$ ]), however, suggest a decline in the marine component of the diet relative to the terrestrial component (Larsen et al., 2001a: 81–82, 2001b: 71). Nitrogen isotopic ratios indicate similar high levels of marine resource use by early and late pre-Hispanic populations on the Georgia coast, but a decline in the use of marine resources in the diets of the 17th-century St. Catherines Island Guale population (Larsen et al., 2001a: 82; Schoeninger et al., 1990: 91). The observed  $\delta^{15}\text{N}$  values for the Santa Catalina de Guale samples overlap with those of Puebloan farmers of the American Southwest, though the continued use of marine resources on St. Catherines Island depresses the overall distribution of  $\delta^{15}\text{N}$  values in that population (Schoeninger et al., 1983, 1990: 91–92).

The combined carbon and nitrogen evidence indicates that farming and consumption of carbohydrates increased on the Georgia coast after ca. A.D. 1000. This may have been accompanied by a reduction in the dietary contribution of estuarine resources. Ethnohistorical and geochemical sources indicate that this trend continued into the 17th century (Jones, 1978; Larsen et al., 2001b). When stable isotope values are considered in conjunction with bone strength, individuals who ate more carbohydrates, specifically maize, and fewer estuarine resources tended to have greater upper arm strength and to have been less mobile, a trend that is more pronounced for women than it is for men (Larsen et al., 2001a: 107). Likewise, those eating larger quantities of estuarine resources tended to have greater bone strength in the femur. This suggests that people who consumed more seafood were more mobile than were those who ate less seafood (Larsen et al., 2001a: 105–106).

Overall, then, the bioarchaeological evidence from St. Catherines Island is consistent with expectations of population growth prior to the First Spanish period, a trend that is characterized by increased sedentism, increased crowding, and widespread consumption of carbohydrates, such as maize. Maize consumption continued to increase

in the 17th century. The combined consequences of poor nutrition, the repartimiento, increased exposure to European-introduced diseases, and overall increased stress resulted in a decline in health and in the population size during the 17th century (Larsen et al., 2001a).

Given the limited quantified paleo-ethnobotanical studies and the extensive bioarchaeological studies, the following interpretation presumes that plants provided many critical nutrients and raw materials on St. Catherines Island and elsewhere in the southern Georgia Bight. Further, our interpretation assumes that the role of cultivated plants increased during the later part of the Mississippian period. Not only was farming a part of the economies of some communities as the First Spanish period began, but it probably was associated with cultural changes and landscape changes at many locations. As farming became more widespread, modifications in land use and land cover, particularly those associated with clearing fields, enhancing drainage, and limiting predation, were undoubtedly important new factors in production, consumption, and disposal practices, as was the management of new time and labor demands.

As farming became more important, people managed their time, labor, and other assets to avoid scheduling conflicts between farming and strategies targeting animals. One way to do this was to engage in garden hunting (Linares, 1976; Neusius, 2008). Garden hunting refers to a strategy that focuses on a suite of animals that raid gardens and fields. Common garden and field raiders on the Atlantic coast include opossums (*Didelphis virginiana*), rabbits (*Sylvilagus* spp.), squirrels (*Sciurus* spp.) and other rodents, foxes (*Urocyon cinereoargenteus*), bears (*Ursus americanus*), raccoons (*Procyon lotor*), skunks and weasels (*Mephitis* spp., *Mustela* sp.), bobcats (*Lynx rufus*), white-tailed deer (*Odocoileus virginianus*), and a host of birds. During the First Spanish period, free-ranging pigs (*Sus scrofa*) joined the list of garden pests. Some of these animals could be trapped or snared in the fields and others could be hunted in the field or garden at dawn or dusk. Many of these animals are either crepuscular or nocturnal in their habits, which makes hunting them difficult. By combining untended facilities, such as traps (Oswalt, 1976), with what is essentially a baited field, garden hunting is an effective way to manage scheduling conflicts while protecting crops and securing

animal nutrients and by-products. Olga Linares (1976) suggests that there may be little use for domesticated animals where garden hunting is possible, though the system will break down if animal populations are overexploited. The other side of this relationship is that less time spent securing animal products meant more time devoted to farming. The efficiencies of garden hunting might even be extended to fishing (e.g., night fishing with lights, nets, or poisons in impounded areas at the turn of the tide).

Predictions about the relationships among plant use, landscape changes, and bioarchaeological changes cannot be fully tested until modern paleoethnobotanical studies become a routine component of archaeological studies of the coastal region. Improved research designs will permit direct comparisons and integrations of quantified bioarchaeological, paleoethnobotanical, and zooarchaeological data. Although it is not possible to elaborate upon these predictions at this time or to test hypotheses derived from them, they nonetheless underlie the following review.

#### VERTEBRATE USE IN THE SOUTHERN GEORGIA BIGHT

The zooarchaeological evidence reviewed here is drawn from quantified vertebrate collections deposited at shell-bearing sites on the sea islands and mainland of the southern Georgia Bight between 3000 B.C. and A.D. 1565 (table 3.1; fig. 3.1; Quitmyer and Reitz, 2006; Reitz, 1982, 1988; Reitz and Quitmyer, 1988; Reitz et al., 2009). These collections are discussed in detail elsewhere (see sources in table 3.1). This section summarizes evidence from the southern Georgia Bight (excluding St. Catherines Island) and the next section summarizes evidence for animal use on St. Catherines Island for the period prior to the 17th century.

Despite decades of evidence for the importance of standardized recovery techniques, screen size, and other field decisions in zooarchaeological analyses, these decisions continue to be highly variable and to impede regional comparisons and summaries. When contrasting the role of small-bodied animals such as fishes against that of large-bodied animals such as deer, the impact of screen size should not be ignored. It is clear that a 3.18 mm (1/8-inch) or smaller mesh screen produces faunal samples with much higher percentages of

fish individuals than does a 6.35 mm (1/4-inch) mesh screen, which produces faunal samples with much higher percentages of deer individuals (figs. 3.2 and 3.3). A far more subtle source of bias is the habit of field personnel to mix recovery methods; for example, using a 6.35 mm (1/4-inch) mesh to recover materials from general levels, a 3.18 mm (1/8-inch) mesh to recover materials from features, and flotation to recover materials from column samples. Although, presumably, this makes perfect sense in the field, summaries of resource use in a coastal setting founder on the effort to control which parts of a faunal assemblage were recovered with which screen-size (Reitz, 2004). In the following discussion, screen size, sample size, and field decisions about which activity areas to excavate are critical, but uncontrollable, factors in the patterns observed.

Despite these methodological problems, there is clear and compelling evidence that the tradition in the southern Georgia Bight was to use an array of estuarine resources and a limited number of terrestrial ones (fig. 3.4). The dominant practice prior to the 17th century was to combine estuarine resources, primarily fishes, with deer. The coastal subsistence strategy produced collections with an average richness of 37 vertebrate taxa out of a resource pool that includes at least 144 taxa (see appendix A for a discussion of richness). Fishes comprise 37% of these taxa. Estimates of the Minimum Number of Individuals (MNI) and biomass (tables 3.2 and 3.3; fig. 3.4) indicate that birds, reptiles, and mammals other than deer contributed little to the regional economy in the southern Georgia Bight compared to fishes.

The methods used to estimate MNI and biomass are reviewed in appendix A, but differences between these two measures are important because fishes generally provide most of the individuals but, in a few cases, venison contributes much of the biomass (tables 3.2 and 3.3). These two methods measure different aspects of the subsistence effort. MNI could be said to reflect the range of resources included in the diet, the biotopes from which most of these resources were taken, and the technologies deployed to capture most of these resources. Biomass indicates which of those resources, biotopes, and technologies contributed most of the meat. In terms of individuals, all of the archaeofaunal collections from the southern Georgia Bight are dominated by fishes, regardless of recovery methods, highlighting the role that fishing played

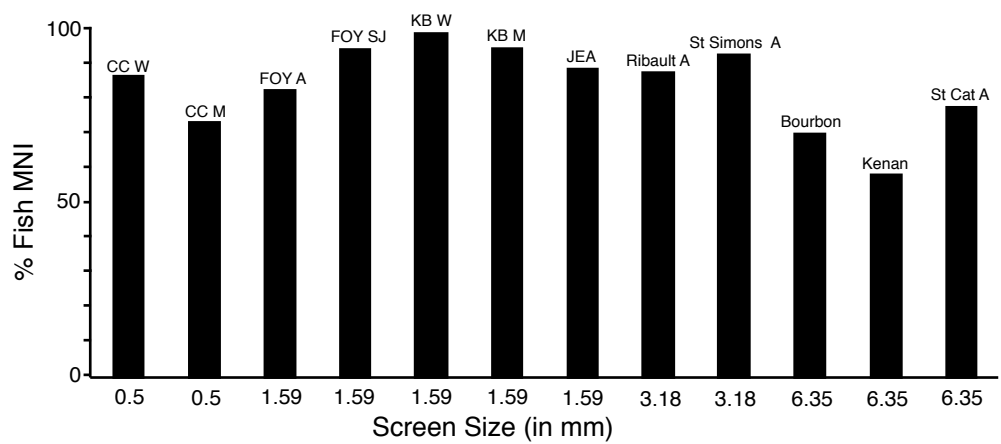


Fig. 3.2. Relationship between screen size and the percentage of fish individuals (MNI). Each bar represents the percentage of fish individuals in that specific collection. **CC W**, Cathead Creek, Woodland; **CC M**, Cathead Creek, Mississippian; **FOY A**, Fountain of Youth, Archaic; **FOY SJ**, Fountain of Youth, St. Johns Ilc; **KB W**, Kings Bay Locality, Woodland; **KB M**, Kings Bay Locality, Mississippian; **JEA**, Jacksonville Electric Authority; **Ribault A**, Ribault Clubhouse, Archaic; **St. Simons A**, St. Simons Marsh Ring, Archaic; **Bourbon**, Bourbon Field, Mississippian; **Kenan**, Kenan Field, Mississippian; and **St. Cat A**, St. Catherines Shell Ring. See table 3.1 for sources.

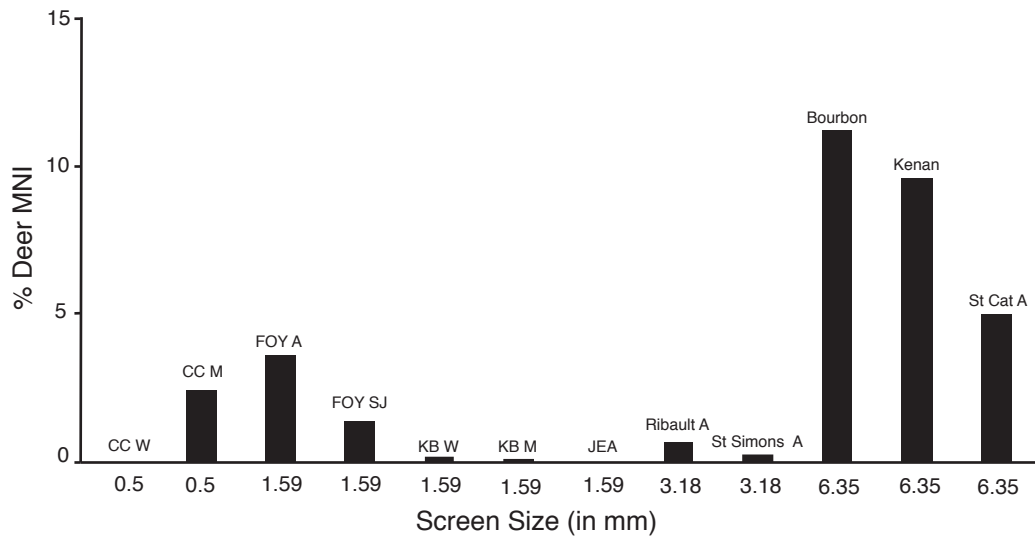


Fig. 3.3. Relationship between screen size and the percentage of deer individuals (MNI). Each bar represents the percentage of deer individuals in that specific collection. **CC W**, Cathead Creek, Woodland; **CC M**, Cathead Creek, Mississippian; **FOY A**, Fountain of Youth, Archaic; **FOY SJ**, Fountain of Youth, St. Johns Ilc; **KB W**, Kings Bay Locality, Woodland; **KB M**, Kings Bay Locality, Mississippian; **JEA**, Jacksonville Electric Authority; **Ribault A**, Ribault Clubhouse, Archaic; **St. Simons A**, St. Simons Marsh Ring, Archaic; **Bourbon**, Bourbon Field, Mississippian; **Kenan**, Kenan Field, Mississippian; and **St. Cat A**, St. Catherines Shell Ring. See table 3.1 for sources.

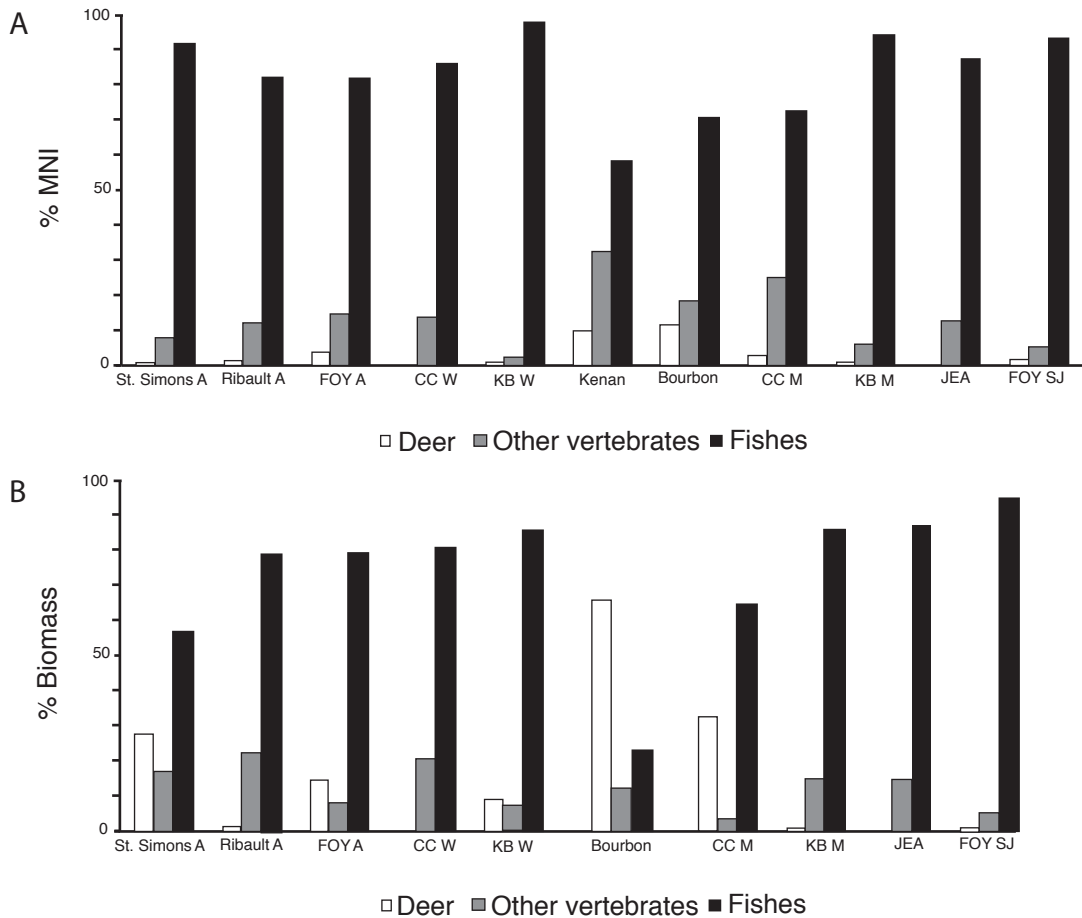


Fig. 3.4. Bar graph showing animal use at some sites in the Georgia Bight: (A) MNI and (B) biomass. Other vertebrates include birds, reptiles, amphibians, and wild mammals other than deer. **St. Simons A**, St. Simons Marsh Ring, Archaic; **Ribault A**, Ribault Clubhouse, Archaic; **FOY A**, Fountain of Youth, Archaic; **CC W**, Cathead Creek, Woodland; **KB W**, Kings Bay Locality, Woodland; **Kenan**, Kenan Field, Mississippian; **Bourbon**, Bourbon Field, Mississippian; **CC M**, Cathead Creek, Mississippian; **KB M**, Kings Bay Locality, Mississippian; **JEA**, Jacksonville Electric Authority; and **FOY SJ**, Fountain of Youth, St. Johns Ilc. See table 3.1 for sources.

in the pre-Hispanic subsistence tradition (table 3.1; fig. 3.4A). When biomass is considered, however, the picture is more complex; for example, in one case, venison contributes more biomass than does meat from any other taxon or group of taxa (fig. 3.4B).

A way to conceptualize the difference between MNI and biomass is to envision a number of meals, each consisting of several different foods. Approximately 75%, or more, of the meals at most sites included fishes as the primary source of animal nutrients (based on

the biomass percentages in tables 3.2 and 3.3). However, on those occasions when venison was eaten, it was a large serving compared to fish. This would result in fishes dominating the MNI estimates while venison contributes a high percentage of the biomass. Fish was probably the normal, daily fare at most of these sites, as suggested by the high percentages of both MNI and biomass in most of these collections. This routine fare was interrupted by an occasional large piece of venison. Thus, a great deal of the daily subsistence effort was directed toward

TABLE 3.2  
Summary of MNI and Biomass for Archaic Sites, Excluding St. Catherines Island<sup>a</sup>

	St. Simons Marsh Ring		Ribault Clubhouse		FOY (Archaic)	
MNI	No.	%	No.	%	No.	%
Deer	1	0.3	1	0.7	1	3.6
Other wild mammals	10	2.9	7	4.9	3	10.7
Wild birds	5	1.4	2	1.4	—	—
Turtles/alligators	6	1.7	1	0.7	1	3.6
Other reptiles	4	1.2	5	3.5	—	—
Amphibians	1	0.3	2	1.4	—	—
Sharks, rays, & fishes	318	92.2	126	87.5	23	82.1
Total	345		144		28	
Biomass	kg	%	kg	%	kg	%
Deer	3.119	27.3	0.047	2.2	0.114	14.6
Other wild mammals	0.914	8.0	0.395	18.4	0.047	6.0
Wild birds	0.042	0.4	0.056	2.6	—	—
Turtles/alligators	0.966	8.4	0.013	0.6	0.013	1.7
Other reptiles	0.007	0.1	0.014	0.7	—	—
Sharks, rays, & fishes	6.386	55.9	1.62	75.5	0.606	77.7
Total	11.434		2.145		0.78	

<sup>a</sup> Key to abbreviations: FOY, Fountain of Youth. See table 3.1 for sources. A human individual is omitted from the Fountain of Youth collection and biomass is not estimated for amphibians.

fishing, but occasionally at some sites over a quarter of the meat consumed was venison.

#### VERTEBRATE USE IN THE ARCHAIC PERIOD

Archaic-period faunal collections are available from several sites and demonstrate the degree to which use of vertebrates varied among these locations (table 3.2). An Archaic collection from the St. Simons Island Marsh Ring (9Gn57) was reported by Rochelle Marrinan (1975) and the vertebrate part of the collection was recently updated (table 3.1; Reitz et al., 2009). In the Marsh Ring collection, deer constitute less than 1% of the vertebrate individuals and fishes 92% of the individuals. Deer contribute over a quarter of the biomass and fish about half. Small-bodied

fishes contribute 35% of the fish taxa in this collection and fishes susceptible to mass-capture techniques constitute 46% of the fish taxa (fig. 3.5; Reitz et al., 2009; see appendix A for a discussion of the small-bodied and mass-captured categories). The Archaic-period collections from the Ribault Clubhouse midden (8Du76) and the Fountain of Youth site (8SJ31, FOY) contain small percentages of deer biomass in collections dominated by fish biomass (table 3.2; Reitz, 1991; Reitz et al., 2009). Small-bodied fishes contribute 35% of the fish taxa in the Ribault collection but are not present in the Fountain of Youth collection (fig. 3.5). This outcome is the reverse of what would be expected if screen size was the determining variable: a 3.18 mm (1/8-inch)



TABLE 3.3  
Summary of MNI and Biomass for Woodland and Mississippian Sites, Excluding St. Catharines Island<sup>a</sup>

	CC W		KB W		Kenan		Bourbon		CC M		KB M		JEA		FOY SJ	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
MNI																
Deer	—	—	3	0.2	38	9.6	63	11.2	2	2.4	1	0.1	—	—	3	1.4
Other wild mammals	3	4.1	6	0.4	45	11.3	43	7.6	4	4.8	13	1.4	5	2.8	3	1.4
Wild birds	—	—	2	0.1	8	2.0	2	0.4	1	1.2	4	0.4	—	—	1	0.5
Turtles/alligators	3	4.1	5	0.3	47	11.8	30	5.3	2	2.4	6	0.7	2	1.1	2	0.9
Other reptiles	3	4.1	5	0.3	16	4.0	8	1.4	6	7.1	11	1.2	5	2.8	3	1.4
Amphibians	1	1.4	11	0.6	12	3.0	19	3.4	8	9.5	15	1.7	10	5.6	2	0.9
Sharks, rays, & fishes	64	86.5	1672	98.1	231	58.2	398	70.7	61	72.6	853	94.5	157	87.7	204	93.6
Total	74		1704		397		563		84		903		179		218	

	CC W		KB W		Bourbon		CC M		KB M		JEA		FOY SJ	
	g	%	g	%	kg	%	g	%	g	%	kg	%	kg	%
Biomass														
Deer	—	—	418.1	9.1	19.06	64.9	428.4	32.3	33.31	0.9	—	—	0.023	1.5
Other wild mammals	145.4	11.4	26.0	0.6	2.36	8.0	19.6	1.5	300.95	8.0	0.029	4.1	0.008	0.5
Wild birds	—	—	25.4	0.6	0.011	0.04	4.7	0.4	40.8	1.1	—	—	0.007	0.4
Turtles/alligators	113.33	8.9	234.9	5.1	1.25	4.3	24.0	1.8	170.04	4.5	0.069	9.7	0.06	3.8
Other reptiles	2.72	0.2	10.9	0.2	0.014	0.05	0.01	tr	42.8	1.1	0.007	1.0	0.003	0.2
Sharks, rays, & fishes	1017.4	79.6	3861.9	84.4	6.662	22.7	849.2	64.0	3184.57	84.4	0.604	85.2	1.46	93.5
Total	1278.9		4577.2		29.357		1325.91		3772.47		0.709		1.561	

<sup>a</sup> Key to abbreviations: CC W, Cathad Creek, Woodland (Swift Creek); KB W, Kings Bay Locality, Woodland (Swift Creek); CC M, Cathad Creek, Mississippian (Savannah); KB M, Kings Bay Locality, Mississippian (Savannah); JEA, Jacksonville Electric Authority; and FOY SJ, Fountain of Youth, St. Johns Ilc. Biomass is unavailable for Kenan Field and is not estimated for amphibians. See table 3.1 for sources.

mesh was used to recover the Ribault materials and a 1.59 mm (1/16-inch) mesh was used at Fountain of Youth (table 3.1). The lack of small-bodied fishes in the Fountain of Youth collection is more likely due to the small vertebrate sample size (NISP = 215) than to the recovery technique. Mass-captured fishes constitute 58% of the taxa in the Ribault collection and 45% of the fish taxa in the Fountain of Youth collection (fig. 3.5).

#### VERTEBRATE USE IN THE WOODLAND AND MISSISSIPPIAN PERIODS

Animal remains from sites occupied during the Woodland and Mississippian periods demonstrate that the focus on estuarine organisms continued beyond the Archaic period. In the Cathead Creek (9Mc360) assemblage, fishes contribute 80% of the vertebrate biomass estimated for the Woodland-period occupation and 64% for the Mississippian-period occupation (table 3.3, fig. 3.4B). Deer are absent in the Woodland component at Cathead Creek, but contribute 32% of the biomass in the Mississippian component. In the assemblage from the Kings Bay Locality (9Cam171a, 9Cam177), fishes contribute 84% of the estimated vertebrate biomass in both the Woodland and the Mississippian components (table 3.3, fig. 3.4B). Deer are rare in the Kings Bay assemblages. The collections from the Jacksonville Electric Authority site (8Du634, 8Du669) and the St. Johns IIc component from Fountain of Youth are similar to those from

Cathead Creek and Kings Bay. In contrast, deer constitute 10–11% of the vertebrate individuals in two Mississippian village collections from Sapelo Island: Kenan Field (9Mc67) and Bourbon Field (9Mc71) (Crook, 1978, 1984; Reitz, 1982). Although biomass estimates are not available for Kenan Field, venison dominates the estimated biomass in the Bourbon Field collection. It is probable that venison was also a major source of meat at Kenan Field. Small-bodied fishes constitute between 20% and 42% of the taxa and mass-captured fishes constitute between 48% and 62% of the taxa at these Woodland and Mississippian sites, indicating that the focus on small-bodied and, particularly, mass-captured fishes continued beyond the Archaic period but that the use of these two groups of fishes was variable (fig. 3.5).

The limited use of deer at some of these Mississippian sites, presumably occupied by farmers, is an aspect that should be explored further. One characteristic worth considering is the tendency for collections from the sea islands (i.e., St. Simons Marsh Ring, Kenan Field, and Bourbon Field) to contain more deer individuals and biomass than those from mainland sites (i.e., Cathead Creek, Kings Bay Locality, Jacksonville Electric Authority, Ribault Clubhouse, and Fountain of Youth). One possible explanation is that deer were more circumscribed on the islands than on the mainland and, therefore, less costly in terms of search, pursuit, and capture. However,

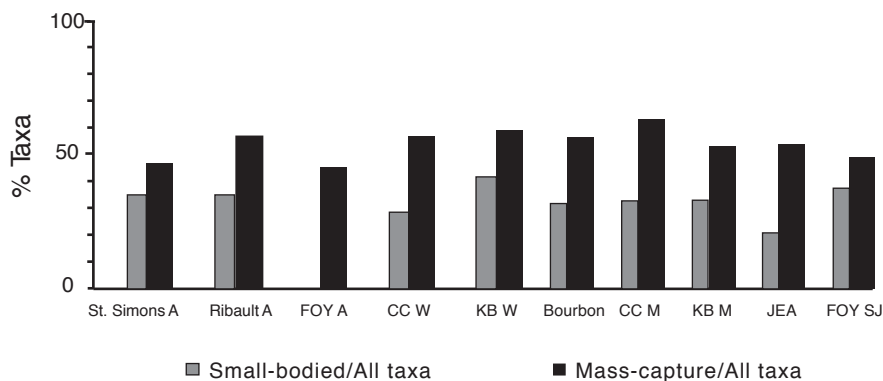


Fig. 3.5. Relationships among small-bodied fish and mass-captured fish taxa. **St. Simons A**, St. Simons Marsh Ring, Archaic; **Ribault A**, Ribault Clubhouse, Archaic; **FOY A**, Fountain of Youth, Archaic; **CC W**, Cathead Creek, Woodland; **KB W**, Kings Bay Locality, Woodland; **Bourbon**, Bourbon Field, Mississippian; **CC M**, Cathead Creek, Mississippian; **KB M**, Kings Bay Locality, Mississippian; **JEA**, Jacksonville Electric Authority; and **FOY SJ**, Fountain of Youth, St. Johns IIc. See table 3.1 for sources.

some sea islands are large, such as St. Catherines Island, so deer were not entirely circumscribed.

The on-going debate about whether Archaic shell rings and Mississippian villages were primarily feasting or ceremonial centers instead of secular villages is beyond the scope of this monograph, as is the question of Mississippian-period settlement patterns (e.g., Crook, in prep.; Thomas, 2008c:1067, 1113). Some argue that large villages such as Kenan Field and Bourbon Field were scenes of recurrent festive occasions (e.g., Crook, 2007, in prep.). In those feasts venison could have been a high-status food item, conforming to the profile of a festive resource that was rare, mobile, large-bodied, and had a high fat content. When compared to the almost daily diet of sea catfish, venison might have been a valued and welcome component of a feast or other ritual occasion. We note that two of the three sites with higher percentages of venison are the Late Archaic-period St. Simons Marsh Ring and the Mississippian-period Bourbon Field village (fig. 3.1; see Crook, 2007, in prep.; Russo, 1996). Both sites conform to the model of a ritual venue. A third site with a higher percentage of venison is the mainland Mississippian-period Cathead Creek site, which had no known ceremonial function. The use of 6.35 mm (1/4-inch) mesh during the Bourbon Field and Kenan Field excavations must be considered when comparing the island and mainland collections (table 3.1; figs. 3.2 and 3.3). Another consideration is that people at the Cathead Creek site might have engaged in garden hunting during the Mississippian period. A detailed analysis of the diets of deer in mainland and island settings might indicate whether they experienced a shift in carbon isotopes due to increased consumption of cultivated carbohydrates similar to that seen in human remains. Recovery of Mississippian faunal remains through the use of smaller-meshed screens and more extensive paleoethnobotanical studies are essential to resolving this question.

SUMMARY OF ARCHAIC, WOODLAND,  
AND MISSISSIPPIAN VERTEBRATE USE  
BEYOND ST. CATHERINES ISLAND

Vertebrate richness in these Archaic, Woodland, and Mississippian collections is impressive (see appendix A for a discussion of richness and ubiquity). MNI estimates have been made for 25 taxa of mammals, 14 taxa of birds, 15 genera of turtles and alligator (*Alligator*

*mississippiensis*), 20 taxa of snakes and lizards, 17 taxa of amphibians, 8 genera of sharks and rays, and 45 genera of bony fishes. The high-ubiquity taxa (present in at least 90% of the collections) are gars (*Lepisosteus* spp.), herrings, members of the sea catfish family, seatrouts (*Cynoscion* spp.), Atlantic croakers (*Micropogonias undulatus*), star drums (*Stellifer lanceolatus*), mullets, and flounders (*Paralichthys* spp.). The only nonestuarine animal present in as many collections is deer, with a ubiquity of 82%, a rank it shares with black drums (*Pogonias cromis*) and red drums (*Sciaenops ocellatus*).

These calculations include several taxa that are considered commensal (table 3.4; see appendix A for a discussion of commensal taxa). In most cases, the percentages of these commensal animals are not great. The highest percentage of commensal taxa in these collections (excluding those from St. Catherines Island) is found in the Mississippian (Savannah) period collection from Cathead Creek, reflecting a large number of anoles (*Anolis carolinensis*) and small amphibians (Quitmyer and Reitz, 2006).

Figure 3.5 presents the number of small-bodied and mass-captured fish taxa as a percentage of all fish taxa in each of the collections. A mix of small-bodied, presumably low-ranking, fishes and large-bodied, presumably high-ranking, fishes are present in every collection, except one. The Archaic collection from the Fountain of Youth site lacks small-bodied fishes. The absence of small-bodied fishes cannot be explained by recovery technique because a 1.59 mm (1/16-inch) mesh was used to recover the Fountain of Youth collection (table 3.1). The collection is small, so sample size is a plausible explanation for the absence of small-bodied fishes.

Direct archaeological evidence of fishing gear is rare in this area, but indirect evidence of fishing strategies may be inferred from the habits and habitats of the fish taxa in the collections. The study of technology is reduced to a dichotomy between mass-capture techniques (e.g., poisons, impoundments, nets, scoops, and weirs) and individual-capture techniques (e.g., leisters and gorge/hooks). Some technologies are not so easily reduced; for example, a trot line might be considered both a mass-capture and an individual-capture technology. Some individuals of all taxa can be taken either en masse or individually; for example, small sharks can be captured with seine nets. Some fishes, however, are more vulnerable

TABLE 3.4  
Summary of Commensal Taxa in Coastal Pre-Hispanic Collections<sup>a</sup>

Site	% commensal MNI	% commensal biomass
Bourbon Field, Mississippian (Savannah)	5.9	0.2
Cathead Creek, Mississippian (Savannah)	17.9	0.1
Cathead Creek, Woodland (Swift Creek)	4.1	0.2
Fountain of Youth, Archaic	—	—
Fountain of Youth, Mississippian (St. Johns IIc)	3.2	0.3
Jacksonville Electric Authority, Mississippian (Savannah)	9.5	3.4
Kenan Field, Mississippian (Savannah)	9.3	—
Kings Bay Locality, Mississippian (Savannah)	3.9	2.1
Kings Bay Locality, Woodland (Swift Creek)	1.2	0.7
Ribault Clubhouse, Archaic	6.9	1.5
St. Simons Marsh Ring, Archaic	2.6	0.3
<i>Sites on St. Catherines Island</i>		
Meeting House Field, Saunders, Irene	27.0	1.6
Meeting House Field, Thomas, Irene	4.4	1.2
Meeting House Field, combined, Irene	12.4	1.2
St. Catherines Shell Ring, Archaic	4.2	0.4
South End Mound I, Irene	23.3	0.2

<sup>a</sup> See table 3.1 for sources. St. Catherines Island data from Reitz (2008) and Reitz and Dukes (2008).

to mass-capture techniques regardless of body size because of their schooling habits and others are more likely to be taken individually because they tend to be solitary.

Mass-capture fishing techniques take advantage of the habits and habitats of fishes, particularly of those attracted to foods deposited in impounded areas and to lights at night (e.g., torches). Sea catfishes are often considered undesirable because they are bottom-feeding scavengers, but this is a habit that makes them vulnerable to human predation to the extent that people took advantage of it by discarding garbage in suitable locations. Hardhead catfishes (*Ariopsis felis*) feed in large numbers near the surface at night and are attracted to lights at night (McLane, 1955: 102–103).

Four of the five fishes found in each of these

southern Georgia Bight collections (fishes with 100% ubiquity) are large-bodied, mass-captured taxa. These four are hardhead catfishes, seatrouts, croakers, and mullets. Not only are these four taxa ubiquitous, but they often are the dominant fish taxa in terms of MNI and biomass. The fifth ubiquitous fish, gar, forms large schools but might be taken with a line because it is found in deeper waters in the middle of tidal creeks. Gars today are often captured in nets and trawls and are considered pests by fishermen because they have no commercial value and damage nets (Manooch, 1984: 32–33). It might be appropriate to consider gars mass-capture fishes as well. All of the high-ubiquity taxa in southern Georgia Bight collections can be taken using more than one method, from several different locations, during more than one season, and during more

than one part of the daily tidal cycle.

Most of these southern Georgia Bight collections are moderately diverse (table 3.5; fig. 3.6; see appendix A for a description of the method used to estimate diversity), reflecting the fact that most of the individuals and biomass are from only a few taxa. The average total MNI diversity is 2.5 (maximum value is 5.0) and the average total biomass diversity is 2.4, demonstrating that a few dominant taxa in each collection are augmented by many prominent taxa and a few rare ones. Total MNI and biomass diversity tend to rise and fall in tandem, particularly in Archaic collections. Low MNI diversity does not correlate with a high percentage of deer individuals, but the two lowest biomass diversity values correlate with the two highest percentages of venison. The low MNI diversity for the Woodland Kings Bay Locality component reflects the dominance of star drums (69% of individuals). Bourbon Field, which has the highest percentage of deer MNI (11%), also has an above average MNI diversity value, indicating that deer was but one of many taxa used. Biomass diversity in the Bourbon Field collection is low because 65% of the biomass is venison. Fish diversity in MNI and biomass is lower, with an average diversity of 2.1 for each (table 3.5; fig. 3.7). Nonetheless, the total diversity of each collection clearly is related to

the richness and diversity of fishes.

The mean trophic level for fish MNI is 3.1 and for fish biomass it is 3.2 (table 3.5; fig. 3.7). These trophic-level values are slightly below the 20th-century 3.4 mean trophic level reported by Pauly and his colleagues for both vertebrates and invertebrates (Pauly et al., 1998). There is a slight trend for mean trophic level to vary inversely with fish diversity. In sites with higher diversity, the mean trophic level often is lower and when diversity is lower, the mean trophic level often is higher. This correlation is more pronounced when measured using MNI (fig. 3.7A) than biomass (fig. 3.7B). Although it is unclear if this is a causal relationship, it appears that when the resource base expanded (diversity increased), more emphasis was placed on fishes at lower trophic levels. The lower trophic-level fishes also tend to be both small-bodied and susceptible to mass capture techniques, though such a relationship is not obvious when mean trophic level is plotted against body size and capture techniques (fig. 3.8).

Although many aspects of pre-Hispanic coastal resource use could be explored, the above summary serves to demonstrate that use of fishes, and few other vertebrates, was the consistent and dominant tradition in the southern Georgia Bight. This strategy persisted from the Late Archaic

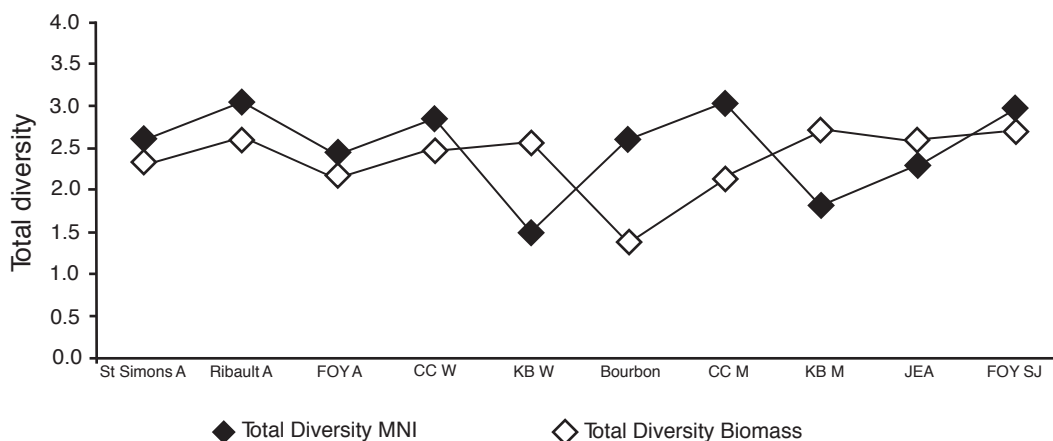


Fig. 3.6. Total collection diversity based on MNI and biomass. **St. Simons A**, St. Simons Marsh Ring, Archaic; **Ribault A**, Ribault Clubhouse, Archaic; **FOY A**, Fountain of Youth, Archaic; **CC W**, Cathead Creek, Woodland; **KB W**, Kings Bay Locality, Woodland; **Bourbon**, Bourbon Field, Mississippian; **CC M**, Cathead Creek, Mississippian; **KB M**, Kings Bay Locality, Mississippian; **JEA**, Jacksonville Electric Authority; and **FOY SJ**, Fountain of Youth, St. Johns Iic. See table 3.1 for sources.



TABLE 3.5  
Diversity, Equitability, and Mean Trophic Level (TL) for Pre-Hispanic Sites, Excluding St. Catherines Island<sup>a</sup>

	St. Simons	Ribault	FOY A	CC W	KB W	Bourbon	CC M	KB M	JEA	FOY SJ	Average
MNI	345	144	28	74	1704	563	84	903	179	218	
MNI diversity	2.603	3.035	2.404	2.848	1.492	2.604	3.037	1.814	2.293	2.935	2.506
MNI equitability	0.684	0.841	0.888	0.864	0.39	0.732	0.861	0.449	0.674	0.819	
MNI richness	45	37	15	27	46	35	34	57	30	36	
Fish MNI diversity	2.279	2.706	2.065	2.52	1.373	2.0	2.328	1.501	1.843	2.739	2.135
Fish MNI equitability	0.708	0.831	0.861	0.856	0.417	0.679	0.84	0.461	0.665	0.831	
Fish MNI richness	25	26	11	19	27	19	16	26	16	27	
Fish MNI TL	2.911	3.187	3.323	2.96	3.267	3.046	3.031	3.224	2.782	3.246	3.098
Biomass diversity	2.365	2.604	2.179	2.458	2.581	1.376	2.127	2.712	2.573	2.731	2.371
Biomass equitability	0.629	0.745	0.805	0.774	0.695	0.394	0.67	0.704	0.821	0.768	
Biomass richness	43	33	15	24	41	33	24	47	23	35	
Fish bio. diversity	1.914	2.251	1.831	2.156	2.282	1.306	2.035	2.316	2.296	2.553	2.094
Fish bio. equitability	0.595	0.699	0.764	0.732	0.693	0.452	0.734	0.711	0.828	0.775	
Fish Bio. richness	25	25	11	19	27	18	16	26	16	27	
Fish biomass TL	3.236	3.465	3.438	3.249	3.29	3.207	3.223	3.153	2.975	3.255	3.249

<sup>a</sup> The Delphinidae in the FOY A collection is not included in the Fish estimates of diversity, equitability, or mean trophic level. Key to abbreviations: FOY A, Fountain of Youth, Archaic; CC W, Cathead Creek, Woodland (Swift Creek); KB W, Kings Bay Locality, Woodland (Swift Creek); CC M, Cathead Creek, Mississippian (Savannah); KB M, Kings Bay Locality, Mississippian (Savannah); JEA, Jacksonville Electric Authority; and FOY SJ, Fountain of Youth, St. Johns IIs. See table 3.1 for sources.

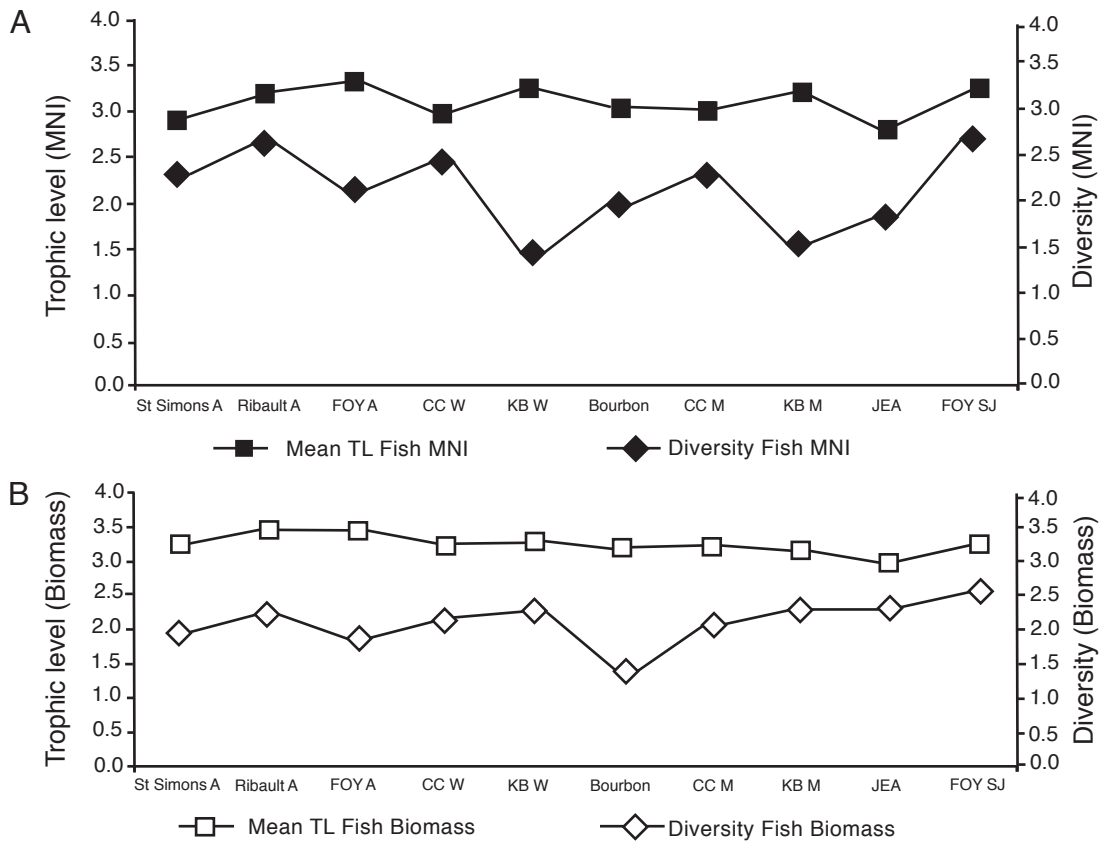


Fig. 3.7. Relationship between mean trophic level and fish diversity: (A) MNI and (B) biomass. **St. Simons A**, St. Simons Marsh Ring, Archaic; **Ribault A**, Ribault Clubhouse, Archaic; **FOYA**, Fountain of Youth, Archaic; **CC W**, Cathead Creek, Woodland; **KB W**, Kings Bay Locality, Woodland; **Bourbon**, Bourbon Field, Mississippian; **CC M**, Cathead Creek, Mississippian; **KB M**, Kings Bay Locality, Mississippian; **JEA**, Jacksonville Electric Authority; and **FOY SJ**, Fountain of Youth, St. Johns Ilc. See table 3.1 for sources.

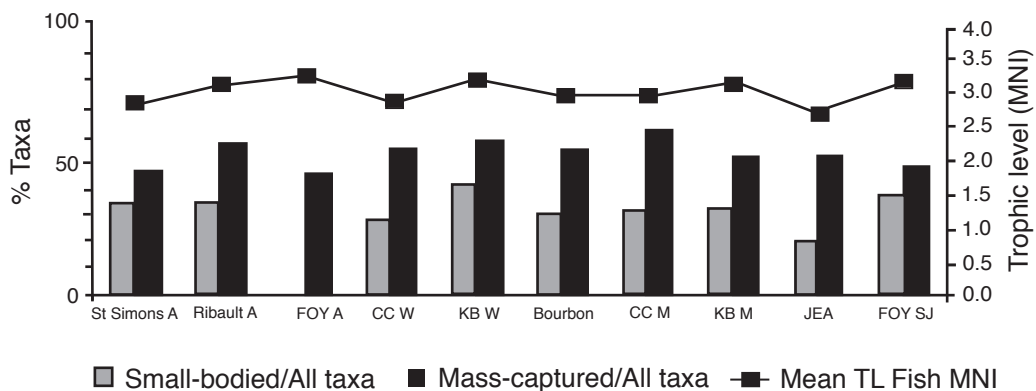


Fig. 3.8. Relationships among small-bodied fish taxa, mass-captured fish taxa, and mean trophic level using MNI. **St. Simons A**, St. Simons Marsh Ring, Archaic; **Ribault A**, Ribault Clubhouse, Archaic; **FOYA**, Fountain of Youth, Archaic; **CC W**, Cathead Creek, Woodland; **KB W**, Kings Bay Locality, Woodland; **Bourbon**, Bourbon Field, Mississippian; **CC M**, Cathead Creek, Mississippian; **KB M**, Kings Bay Locality, Mississippian; **JEA**, Jacksonville Electric Authority; and **FOY SJ**, Fountain of Youth, St. Johns Ilc. See table 3.1 for sources.

period up to the 17th century. Many of these same characteristics are found in pre-Hispanic collections from St. Catherines Island; however, some aspects of the St. Catherines Island data suggest that resource use on this large sea island was different from that practiced on the mainland. These differences might have been perpetuated in the strategies practiced during the 17th century at Santa Catalina de Guale by both Guale and Spanish residents.

#### VERTEBRATE USE ON ST. CATHERINES ISLAND

To explore the variables involved in human use of animals, it is necessary to have a long record from the same locality. Access to such a record is rare because it requires a long-term commitment to studying a specific place. St. Catherines Island is not unique in having a long Holocene record of human use of animals in the southern Georgia Bight, but it is unique in having the most thoroughly explored archaeological record of that history. Vertebrate data from the transect survey of St. Catherines Island (Reitz, 2008; Thomas, 1987, 2008b: 525–601), from the Irene-period South End Mound I mortuary site (9Li3; Larsen, 2002; Reitz, 1993b; Reitz and Dukes, 2008; Reitz et al., 2002; Thomas, 2008b: 698–701), and from the Irene-period Meeting House Field site (9Li21; May, 2008; Reitz and Dukes, 2008; Thomas, 2008b: 707–726) indicate that the pre-Hispanic pattern of resource use on St. Catherines Island differed in some respects from the general practice described for the southern Georgia Bight (tables 3.6 and 3.7; figs. 3.9 and 3.10). After the Archaic period, vertebrate use on the island changed little until the Irene period. Delineating the Savannah period archaeologically is problematic on the island (Thomas, 2008b: 430–433), but the designation is retained here to facilitate comparison with other southern Georgia Bight collections securely dated within the Savannah period.

Most of the pre-Hispanic faunal data from St. Catherines Island were collected from sites sampled during an island-wide transect survey in 1977 (Reitz, 2008; Reitz and Dukes, 2008; Thomas, 2008b: 525–601). The purpose of the transect survey was to identify settlement patterns on the island for each of the occupational periods and to associate those periods and patterns with residential mobility. The survey results also were

to provide a framework within which additional research objectives could be identified. Few of the sites recorded during the survey were excavated beyond what was necessary to identify the presence of a site and to determine when it was occupied (Thomas, 2008b: 519, 525). The survey followed a systematic grid designed to sample 20% of the island through a series of east-west transects (Thomas, 2008b: fig. 20.1). The transect faunal data are derived from small samples collected from what subsequently proved to be 122 individual sites within the transect grid (Thomas, 2008b: 525). Each site was tested with two or more 1 m<sup>2</sup> test units. Faunal materials were recovered from these tests using a 6.35 mm (1/4-inch) mesh screen. Faunal data from 77 of these transect survey sites are reported in a monograph devoted to the Native American landscape of St. Catherines Island (Reitz, 2008). Some faunal samples excavated by Joseph R. Caldwell in the 1960s are included in the transect study because they fell within the transect grid (Reitz, 2008). Caldwell used 11/32-inch mesh screens during his excavations.

Faunal data from the St. Catherines Island transect survey are, with few exceptions, aggregated by cultural period rather than by site. The aggregated data do not represent a coherent behavioral unit and the data cannot be used to discuss site formation processes, butchering strategies, or redistribution systems for specific sites or time periods. A further limitation of the transect data is that the time periods between the Archaic and the Irene periods are represented by very small samples from only a few test pits (Reitz, 2008: 625). On the other hand, the transect survey assemblage is systematically collected and samples are from all time periods and all biotopes on the island. As such, it is a unique and excellent tool for generating hypotheses about trends in animal use on the island. For details of the transect survey zooarchaeological data, the reader is referred to Reitz (2008) and Reitz and Dukes (2008).

Of the more extensive excavations conducted during the transect survey, the most important collection is from the Archaic-period site known as the St. Catherines Shell Ring (9Li231; Reitz, 2008: 627; Thomas, 2008b: 555–557; see fig. 3.9). This is the oldest and largest of the transect survey collections. The site is on the leeward side of the island. Three test pits were excavated at the Shell Ring during the transect survey. Unique

TABLE 3.6  
**St. Catherines Island Survey: Summary of MNI Percentages<sup>a</sup>**

Category/period	St. Simons	Refuge/ Deptford	Wilmington	St. Catherines	Savannah	Irene
Domestic mammals	—	—	—	—	—	—
Domestic birds	—	—	—	—	—	—
Deer	5.0	23.8	23.1	22.2	25.8	22.6
Other wild mammals	5.8	16.7	13.8	18.5	29.0	15.1
Wild birds	2.5	4.8	-	3.7	3.2	1.4
Turtles/alligators	6.7	23.8	15.4	22.2	12.9	21.2
Snakes	1.7	2.4	3.1	3.7	3.2	0.5
Amphibians	1.7	2.4	—	3.7	3.2	2.4
Sharks, rays, & fishes	76.7	26.2	44.6	25.9	22.6	36.8
Total MNI	120	42	65	27	31	212

<sup>a</sup> Data from Reitz (2008).

TABLE 3.7  
**St. Catherines Island Survey: Summary of Biomass Percentages<sup>a</sup>**

Category/period	St. Simons	Refuge/ Deptford	Wilmington	St. Catherines	Savannah	Irene
Domestic mammals	—	—	—	—	—	—
Domestic birds	—	—	—	—	—	—
Deer	66.8	79.5	78.5	73.8	76.8	75.4
Other wild mammals	8.3	4.3	3.4	5.4	12.1	8.1
Wild birds	2.1	0.5	-	0.6	0.2	0.1
Turtles/alligators	3.1	10.3	6.9	16.9	6.0	7.8
Snakes	0.4	tr	2.1	0.02	0.2	tr
Sharks, rays, & fishes	19.2	5.5	9.1	3.3	4.7	8.5
Total biomass (kg)	15.431	16.114	15.093	6.523	6.48	33.582

<sup>a</sup> Biomass is not estimated for amphibians. Data from Reitz (2008).

among the sites sampled by the transect survey, the Shell Ring produced a faunal collection that is large enough to be evaluated without being merged with data from other sites. A second shell ring (McQueen Shell Ring; 9Li1648) was subsequently located on the seaward side of the island and the vertebrate remains are currently being studied by Carol Colaninno.

Fishes dominate the individuals (MNI) and venison dominates the biomass estimates for the St. Catherines Shell Ring collection (table 3.8; fig. 3.11; Reitz, 2008: 627). Commensal individuals are not a major portion of the collection by either measure (table 3.4). No small-bodied fish taxa are present in the Shell Ring collection but 37% of the fish taxa are susceptible to mass-

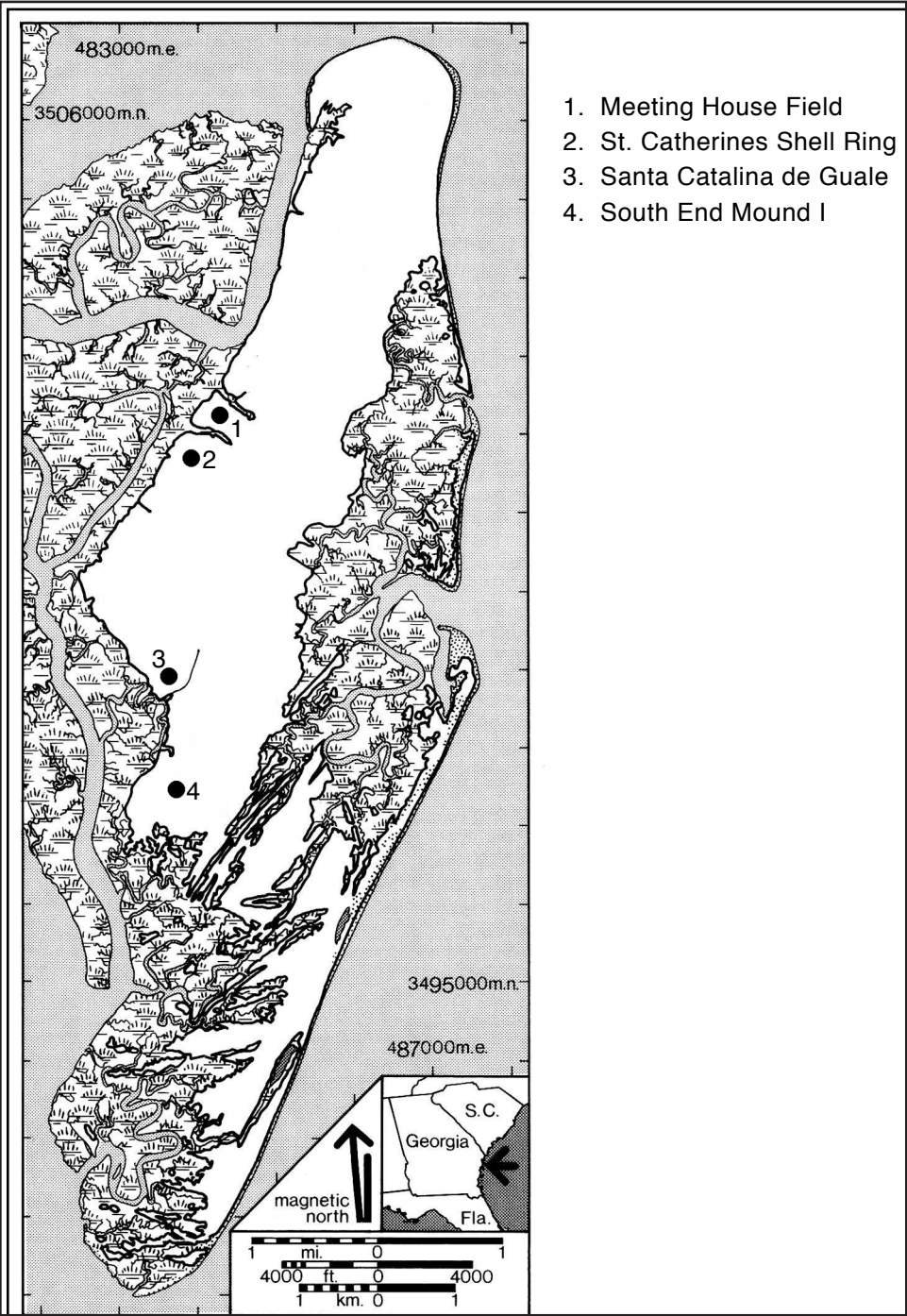


Fig. 3.9. Map of St. Catherine's Island showing major sites.



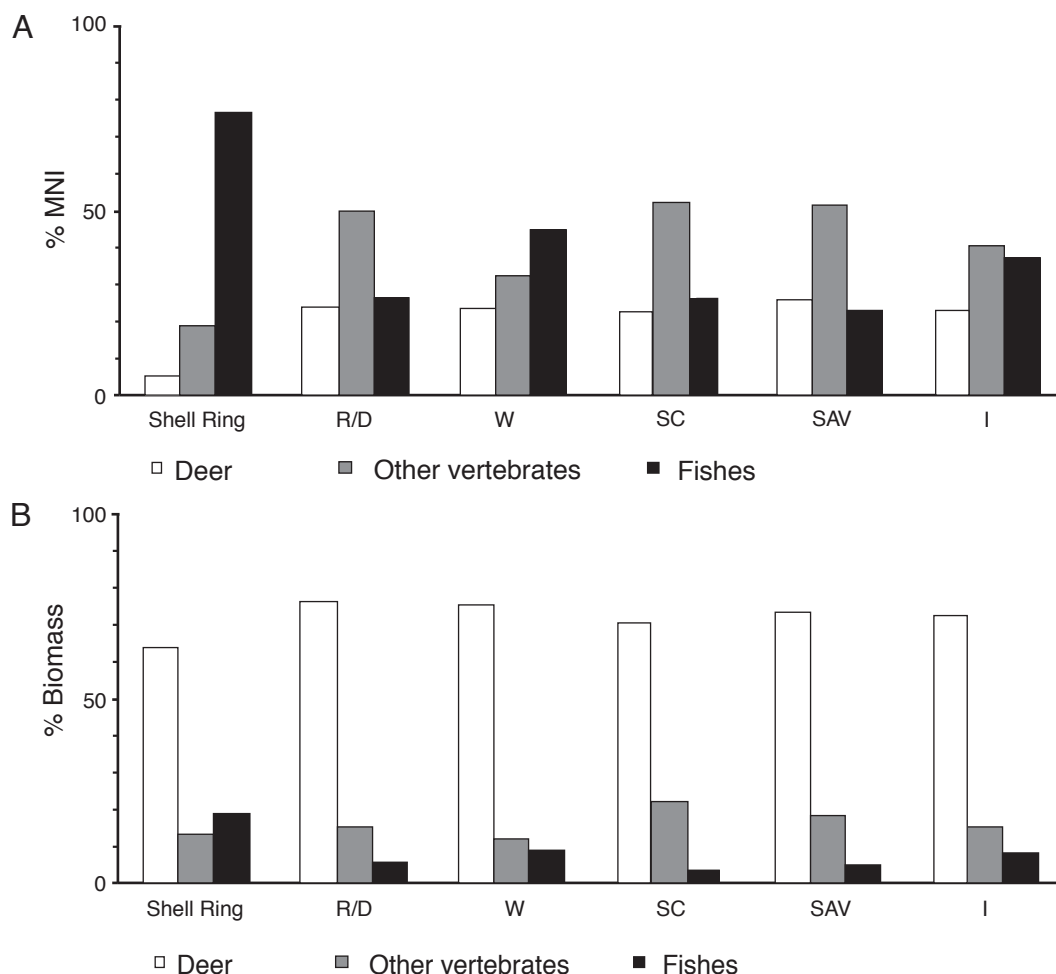


Fig. 3.10. Bar graph of animal use on St. Catherines Island: (A) MNI and (B) biomass. Other vertebrates include birds, reptiles, amphibians, and wild mammals other than deer. **Shell Ring**, St. Catherines Shell Ring, Archaic period; **R/D**, Refuge/Deptford period; **W**, Wilmington period; **SC**, St. Catherines period; **SAV**, Savannah period; and **I**, Irene period. Data from Reitz (2008).

capture techniques (fig. 3.12). The Shell Ring collection contains four of the high-ubiquity fishes (gars, sea catfishes, seatrouts, and flounders). The collection has a very low overall diversity compared to all other southern Georgia Bight pre-Hispanic collections (tables 3.5 and 3.9; figs. 3.6 and 3.13). This is largely due to the dominance of hardhead catfish individuals (68% of the MNI) and venison (67% of the biomass). Because of the dominance of hardhead catfishes, the fish MNI diversity is very low compared to other Georgia Bight collections, and the fish

mean trophic level is very high (figs. 3.7A and 3.14A). Hardhead catfishes feed at a trophic level of 3.5. Differences in the fish biomass diversity and mean trophic level between the St. Catherines Shell Ring and other coastal collections are not as pronounced. The Shell Ring collection is at the bottom of the fish biomass diversity range and the mean fish biomass trophic level is among the highest (figs. 3.7B and 3.14B). Both the low fish biomass diversity and the high fish biomass trophic level values can be attributed to the dominance of hardhead catfishes.

This Archaic collection is similar to the two Sapelo Island Mississippian collections (Kenan Field and Bourbon Field) in some respects, undoubtedly reflecting the 6.35 mm mesh screen used at all three sites (table 3.1; figs. 3.4 and 3.11). The St. Catherines Shell Ring collection is what one would expect in an Archaic collection when a large-meshed screen is used during excavation. If this same pattern is observed once these sites are excavated with finer-meshed screens, the similarities among an Archaic shell ring and two Mississippian villages may indicate that the relevant variable is not screen-size or time period, but continuity at an island location and, perhaps, continuity with regard to site function. The other transect data enable us to observe that the use of deer is lower at the Archaic-period St. Catherines Shell Ring than during subsequent occupations on St. Catherines Island (fig. 3.10), and that the Archaic-period use of deer at the St. Catherines Shell Ring is lower than at the two Mississippian villages on Sapelo Island (tables 3.3, 3.6, and 3.8; figs. 3.4 and 3.10).

Our ability to interpret animal use on the island during the intervening centuries between the Archaic and Irene periods is limited because the only data available are drawn exclusively from the merged transect survey data, a compilation of dozens of tests from across the island instead of from one or two well-studied sites. The transect assemblage suggests that a strong continuity in vertebrate use prevailed on the island after the Archaic period, which contrasts with the trend elsewhere in the southern Georgia Bight (tables 3.3, 3.6, and 3.7; figs. 3.4 and 3.10). The primary differences between the island transect survey and the mainland assemblages are the high percentages of deer MNI and biomass in the transect assemblage, which exceed anything found on the mainland coast. Most collections from coastal mainland sites, even those from the Mississippian-period sites (Savannah) when cultivated crops might have attracted deer, do not show the level of deer use that apparently prevailed on St. Catherines Island (Keene, 2004; Quitmyer and Reitz, 2006; Reitz, 1982, 1985, 1988). Although use of small mammals, birds, turtles, and fishes varied somewhat over the centuries, deer constituted approximately a quarter of the individuals and three-quarters of the biomass during all post-Archaic occupations on St. Catherines Island.

With the exception of the abundance of deer

in these collections, the specific taxa identified in the transect survey are similar to those identified in other coastal collections. Wetlands and estuaries were the primary sources of most of the species identified in the transect survey assemblage. A reduction in marine resource use associated with the transition from foraging to farming during the Irene period, predicted on the basis of isotopic evidence, is not reflected in the St. Catherines Island transect vertebrate data (fig. 3.10). Instead of declining, as the isotopic evidence predicts, fish biomass is slightly higher in the Irene-period transect assemblage when it is compared to the pre-farming St. Catherines and Savannah transect components.

On St. Catherines Island, the Irene transect survey data are augmented with data from two excavated sites: the Irene-period South End Mound I mortuary site (9Li3; Larsen, 2002; Larsen and Thomas, 1986; Reitz and Dukes, 2008: 789; Reitz et al., 2002) and the Irene-period middens at Meeting House Field (9Li21; Reitz and Dukes, 2008: 781, 785; Saunders, 2009; Thomas, 2008b: 707–726; see fig. 3.9). The zooarchaeological collections from these two sites are remarkably different (table 3.8, fig. 3.11).

The South End Mound I collection is from disturbed mound fill. A 3.18 mm (1/8-inch) mesh screen was used to recover the faunal materials with the intent of recovering small fishes. As it turned out, fishes are more rare in the South End Mound I materials than they are in other island collections (tables 3.6, 3.7, and 3.8; fig. 3.11). In addition, the percentage of deer individuals is lower than in other post-Archaic assemblages from the island, though the percentage of deer biomass is extremely high. Thus, these remains do not confirm the expectation that fine-screen recovery would yield larger quantities of fish, though the fine-screen recovery might be responsible for the high percentage of commensal moles (*Scalopus aquaticus*), mice, snakes, and amphibians (table 3.4; Reitz and Dukes, 2008: 789). The nitrogen signature in the human skeletal remains from South End Mound I, however, suggests a strong marine orientation, which is not reflected in the faunal remains (Reitz et al., 2002: 45). All of the five fish taxa identified in the South End Mound I collection are mass-capture taxa, four are large-bodied taxa, and four have a ubiquity of at least 90% in the coastal collections reviewed earlier. The faunal remains at South End Mound I probably represent food offerings associated with

mortuary rites by people who lived elsewhere on the island and whose normal diet was not focused on venison. It seems likely that the commensal animals were attracted to food offerings left at the mound. These data might serve as a baseline with which to assess feasting or other ritual behaviors involving animals at other coastal sites.

The Meeting House Field data may not represent typical Irene subsistence habits (tables 3.6, 3.7, and 3.8; figs. 3.10, 3.11, and 3.12; Reitz and Dukes, 2008). Substantial differences are found among the four middens excavated at the site (Middens D, E, H, and M; Reitz and Dukes, 2008; Thomas, 2008b: 709–711). These differences could reflect the different screen sizes used during excavation

of Middens D and E (6.35 mm [1/4-inch] mesh screen) by Thomas compared to that used to excavate Middens H and M (1.59 mm [1/16-inch] mesh screens) by Rebecca Saunders. Alternatively, the differences could be the result of functional, seasonal, social, structural, or temporal differences among the middens.

When the collections from the four middens are combined, deer are less abundant in the Meeting House Field assemblage, both in terms of individuals and biomass, compared to other post-Archaic assemblages from the island (figs. 3.10 and 3.11). Particularly interesting is the high percentage of diamondback terrapins (*Malaclemys terrapin*; 40% of the MNI and 36%

TABLE 3.8  
Summary of MNI and Biomass for St. Catherines Shell Ring,  
South End Mound I, and Meeting House Field<sup>a</sup>

	Shell Ring		South End Mound I		Meeting House Field	
MNI	No.	%	No.	%	No.	%
Deer	6	5.0	5	16.7	4	3.8
Other wild mammals	7	5.8	8	26.7	9	8.6
Wild birds	3	2.5	1	3.3	3	2.9
Turtles/alligators	8	6.7	5	16.7	47	44.8
Other reptiles	2	1.7	2	6.7	7	6.7
Amphibians	2	1.7	3	10.0	3	2.9
Sharks, rays, & fishes	92	76.7	6	20.0	32	30.5
Total	120		30		105	
Biomass	kg	%	kg	%	kg	%
Deer	10.312	66.8	14.661	91.2	6.579	51.1
Other wild mammals	1.28	8.3	0.632	3.9	0.875	6.8
Wild birds	0.33	2.1	0.012	0.1	0.025	0.2
Turtles/alligators	0.478	3.1	0.513	3.2	4.912	38.2
Other reptiles	0.064	0.4	0.028	0.2	0.15	1.2
Sharks, rays, & fishes	2.967	19.2	0.236	1.5	0.325	2.5
Total	15.431		16.082		12.866	

<sup>a</sup> Meeting House Field columns combine data from all four mounds. Biomass is not estimated for amphibians. Commensal taxa are combined with other members of their class in this table. Data from Reitz (2008) and Reitz and Dukes (2008).

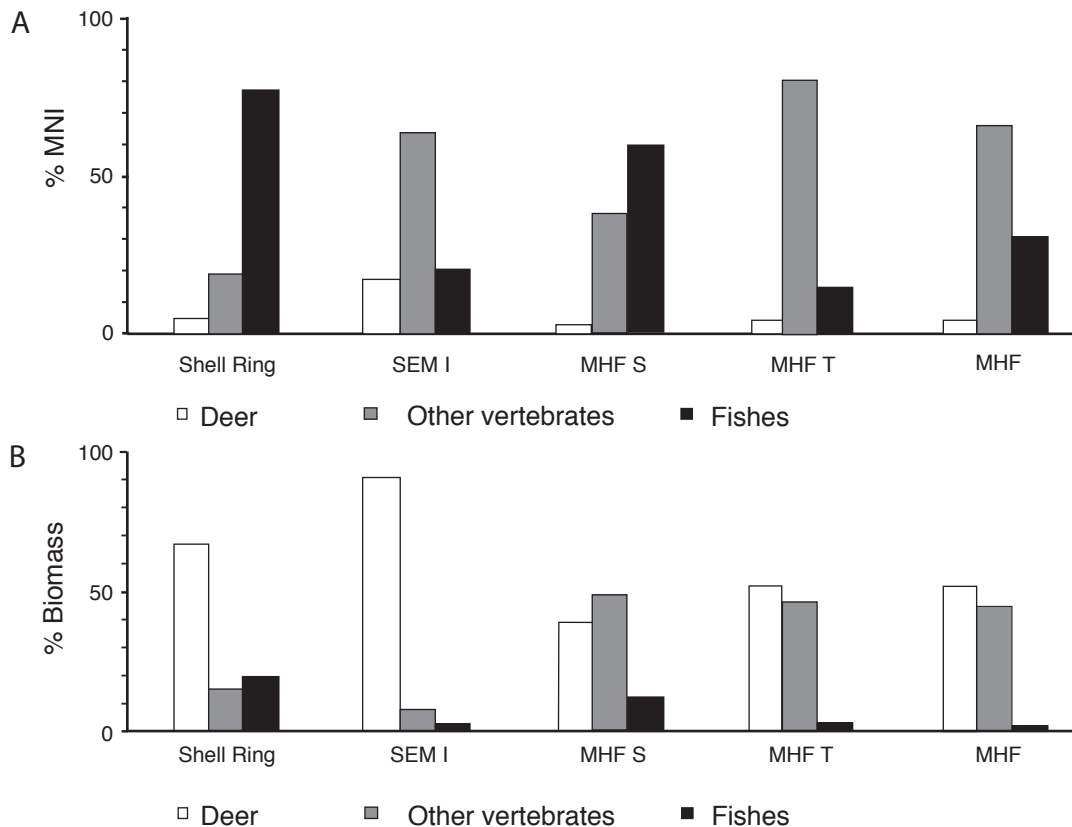


Fig. 3.11. Bar graph of animal use at some sites on St. Catherines Island: (A) MNI and (B) biomass. Other vertebrates include birds, reptiles, amphibians, and wild mammals other than deer. **Shell Ring**, St. Catherines Shell Ring; **SEM I**, South End Mound I; **MHF S**, Meeting House Field, Saunders excavation; **MHF T**, Meeting House Field, Thomas excavation; and **MHF**, Meeting House Field data combined. Data from Reitz (2008) and Reitz and Dukes (2008).

of the biomass) in the assemblage. This can be attributed to a concentration of terrapins in the lower levels of Midden E (Reitz and Dukes, 2008). Irene-period transect survey data indicate that the use of turtles on the island generally was higher during the Irene period than during some of the earlier periods on the island (tables 3.6 and 3.7; Reitz, 2008), so Midden E may reflect an island-wide increase in the use of turtles during the Irene period.

Perhaps the Meeting House Field data indicate that pre-Hispanic subsistence efforts began to change during the Irene period on St. Catherines Island before the 17th century (bearing in mind the different recovery techniques). Although still low by comparison with many southern Georgia Bight collections, the Meeting House Field MNI

diversity is higher than the St. Catherines Shell Ring diversity, reflecting the reduction in deer individuals and the increase in diamondback terrapin (tables 3.5 and 3.9; figs. 3.6 and 3.13). Meeting House Field biomass diversity is very low compared to the St. Catherines Shell Ring (fig. 3.13) and other Georgia Bight collections (fig. 3.6). Almost all of the biomass is from venison and diamondback terrapin.

Compared to the Archaic collection, the mean trophic level in the combined Meeting House Field assemblage declined and fish diversity either rose (MNI) or was relatively constant (biomass) (table 3.9; fig. 3.14). The Meeting House Field assemblage contains only seven fish taxa. One of these, the small-bodied mummichog (*Fundulus heteroclitus*), contributes

TABLE 3.9  
**Diversity, Equitability, and Mean Trophic Level (TL)**  
**for Pre-Hispanic Sites on St. Catherines Island<sup>a</sup>**

Category/Site	Shell Ring	MHF S	MHF T	MHF Combined	Average
MNI	120	37	68	105	
MNI diversity	1.562	2.091	1.618	2.272	1.917
MNI equitability	0.485	0.792	0.584	0.724	
MNI richness	25	14	16	23	
Fish MNI diversity	0.549	1.087	0.639	1.47	1.01
Fish MNI equitability	0.264	0.675	0.582	0.755	
Fish MNI richness	8	5	3	7	
Fish MNI TL	3.49	2.425	3.46	3.0	3.245
Biomass diversity	1.355	1.615	1.146	1.19	1.273
Biomass equitability	0.432	0.673	0.423	0.398	
Biomass richness	23	11	15	20	
Fish biomass diversity	1.381	1.524	0.68	1.205	1.293
Fish biomass equitability	0.664	0.947	0.619	0.619	
Fish biomass richness	8	5	3	7	
Fish biomass TL	3.462	2.797	3.446	3.373	3.418

<sup>a</sup> Key to abbreviations: MHF S, Meeting House Field, Saunders; MHF T, Meeting House Field, Thomas; and MHF Combined, Meeting House Field, Saunders and Thomas combined. Averages are for the St. Catherines Shell Ring and MHF Combined columns only. Data are from Reitz (2008) and Reitz and Dukes (2008).

41% of the fish individuals and another, hardhead catfishes, contributes 65% of the fish biomass. The mummichogs and a star drum individual, all recovered in the fine-screened Meeting House Field collection, are the only small-bodied fishes in the assemblage (fig. 3.15). Six of the seven fish taxa in the Meeting House Field assemblage are susceptible to mass-capture techniques and five are large-bodied. All but one of the Meeting House Field fish taxa have a ubiquity of at least 90% in southern Georgia Bight collections, excluding St. Catherines Island. The Meeting House Field mean trophic level is lower compared to that from the St. Catherines Shell Ring largely because mullets, low trophic-level fishes that constitute 19% of the fish individuals in the Meeting House Field assemblage, are absent in the Shell Ring

collection. Mulletts are present only in the fine-screened samples from Meeting House Field.

The apparent increase in small-bodied and mass-captured fish taxa between the Archaic-period St. Catherines Shell Ring collection and the Irene-period Meeting House Field assemblage could be evidence of the fishing equivalent of garden hunting. The heavy use of diamondback terrapins at Meeting House Field conforms to the garden hunting/fishing pattern to the extent that these turtles might be caught in traps in estuarine marshes or collected by hand if they venture beyond the water's edge (Carr, 1952: 176). Both changes may also reflect the impact of the rainfall and temperature fluctuations that occurred between A.D. 1200 and 1600 (Blanton and Thomas, 2008: 800–801). These possibilities



need to be tested through more detailed studies of sites occupied between the Archaic and Irene periods, oxygen isotope analysis, and studies of incremental growth patterns in fishes.

The transect survey demonstrates that the pre-Hispanic diet and exploitation strategy relied on fishes to a great extent. In addition, deer and several other terrestrial resources are represented in the St. Catherines Island transect survey collections. Most of these animals are active primarily at dawn and dusk (crepuscular) or at night (nocturnal). Opossums, rabbits, and raccoons, particularly

troublesome garden raiders, are susceptible to trapping. Trapping has the advantage of avoiding conflicts with the inflexible demands of fishing governed by the tidal cycle while capturing animals that might otherwise be relatively hard to acquire because of their crepuscular or nocturnal habits. This preference for crepuscular or nocturnal animals that can be taken in traps might explain why squirrels and turkeys (*Meleagris gallopavo*), and other animals with diurnal habits, or animals that are difficult to trap, are rare in collections from the southern Georgia Bight.

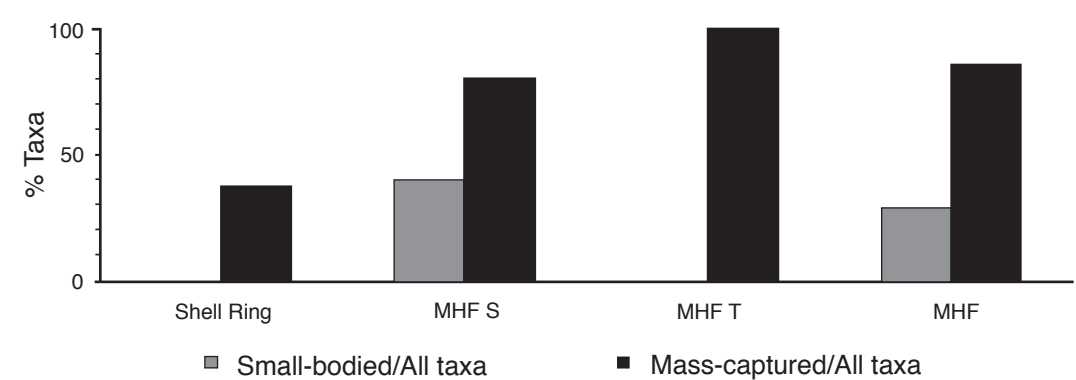


Fig. 3.12. Relationships among small-bodied fish taxa and mass-captured fish taxa, St. Catherines Island. **Shell Ring**, St. Catherines Shell Ring; **MHF S**, Meeting House Field, Saunders excavation; **MHF T**, Meeting House Field, Thomas excavation; and **MHF**, Meeting House Field data combined. Data from Reitz (2008) and Reitz and Dukes (2008).

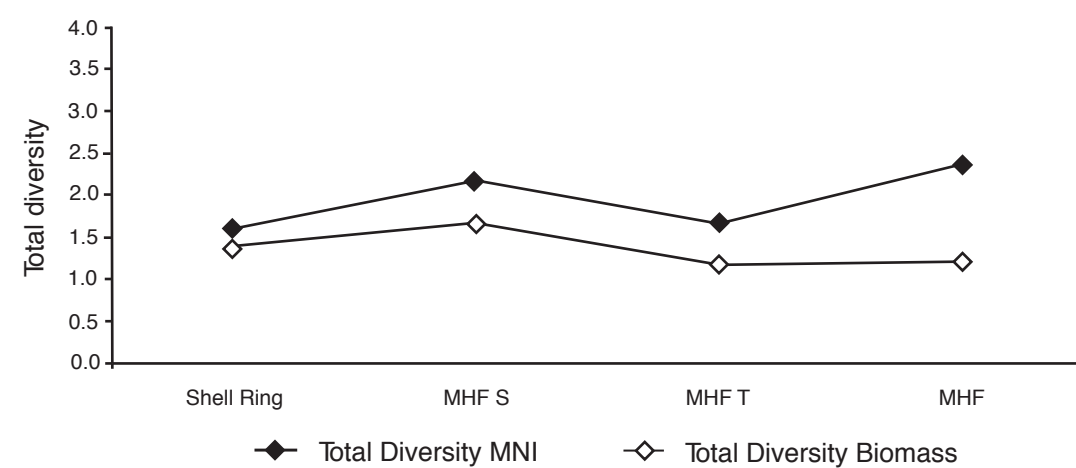


Fig. 3.13. Total collection diversity based on MNI and biomass, St. Catherines Island. **Shell Ring**, St. Catherines Shell Ring; **MHF S**, Saunders excavation; **MHF T**, Meeting House Field, Thomas excavation; and **MHF**, Meeting House Field data combined. Data from Reitz (2008) and Reitz and Dukes (2008).

### PRE-HISPANIC DIET AND EXPLOITATION STRATEGIES

The transect survey data do not allow for the full temporal span of resource use on St. Catherines Island to be summarized in as much detail as is possible for other southern Georgia Bight sites. The Irene faunal data from the transect survey represent a large collection and likely offer a better representation of animal use on the island just prior to the 17th century than do the materials from South End Mound I, which

is a burial mound, or from the Meeting House Field mounds, which are difficult to collapse into a homogeneous Irene strategy. It is likely that the differences summarized here reflect different recovery techniques, sampling of noncomparable activity areas, differential disposal practices, and subsistence patterns in flux as both the recent Holocene climate and the coastal landscape changed and farming began. It also is possible that both South End Mound I and Meeting House Field are ritual sites. Although these studies indicate that changes in pre-Hispanic strategies

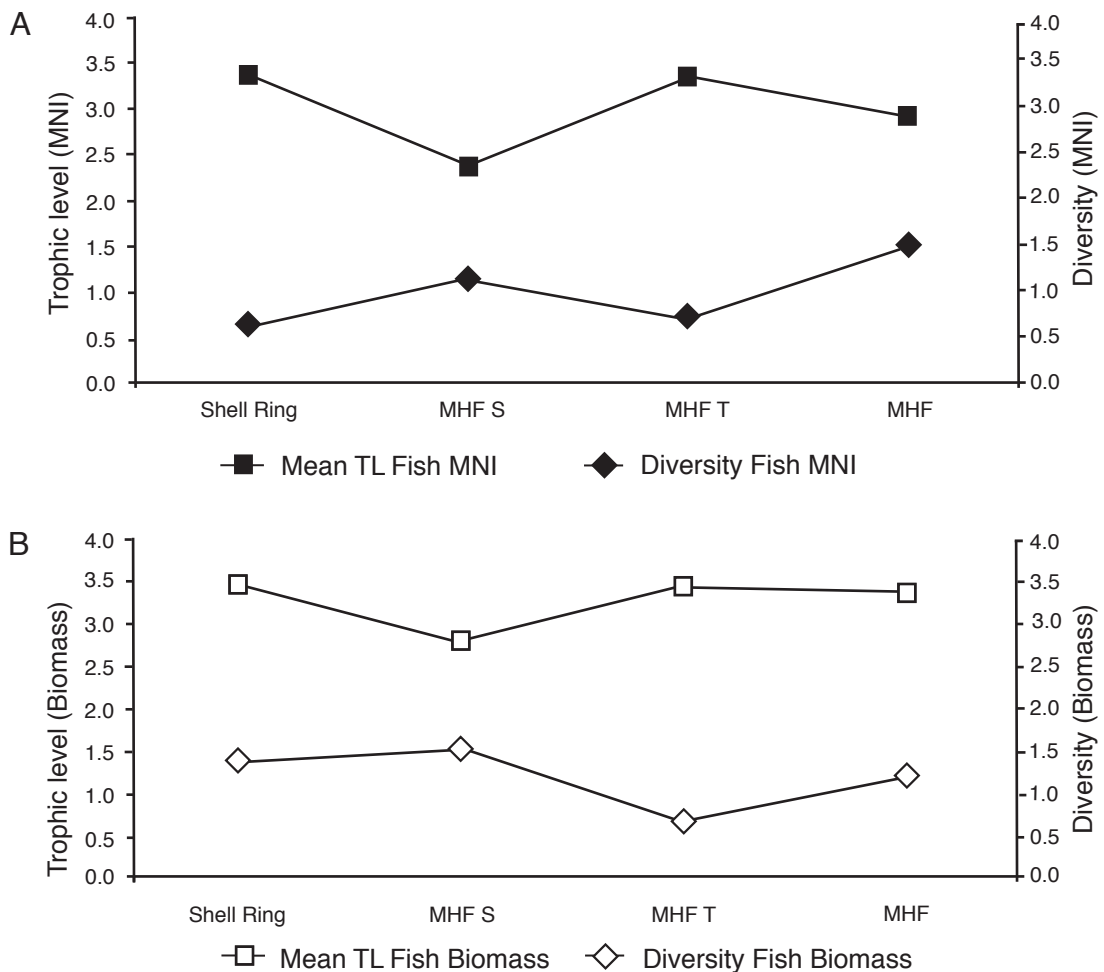


Fig. 3.14. Relationship between mean trophic level and fish diversity on St. Catherines Island: (A) MNI and (B) biomass. **Shell Ring**, St. Catherines Shell Ring; **MHF S**, Meeting House Field, Saunders excavation; **MHF T**, Meeting House Field, Thomas excavation; and **MHF**, Meeting House Field data combined. Data from Reitz (2008) and Reitz and Dukes (2008).

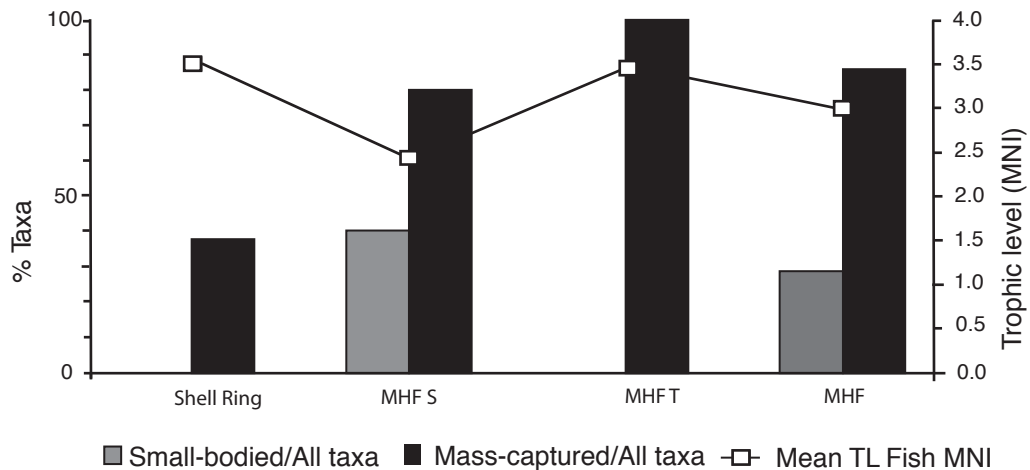


Fig. 3.15. Relationships among small-bodied fish taxa, mass-captured fish taxa, and mean trophic level on St. Catherines Island using MNI. **Shell Ring**, St. Catherines Shell Ring; **MHF S**, Meeting House Field, Saunders excavation; **MHF T**, Meeting House Field, Thomas excavation; and **MHF**, Meeting House Field data combined. Data from Reitz (2008) and Reitz and Dukes (2008).

did occur over time, much more work needs to be done before these suggestions can be accepted as anything other than artifacts of excavation and analytical biases.

It remains to be seen whether the St. Catherines Island transect survey data accurately reflect the pre-Hispanic balance between estuarine resources and deer. It is possible that the ratios of deer to fish in the transect collections are the result of small sample sizes, the aggregation of multiple small samples from dozens of temporally similar tests, and the use of a 6.35 mm (1/4-inch) mesh screen. The data from Kenan Field and Bourbon Field, also collected with a 6.35 mm (1/4-inch) mesh screen, mirror a similar role for deer on Sapelo Island, one of the other large sea islands (fig. 3.1). Perhaps the larger size and ecological diversity of large sea islands, such as Sapelo and St. Catherines, supported more deer than did mainland locations, or there were fewer stresses on island deer, making these islands advantageous locations for deer and hunting opportunities. Foodways on the sea islands may have been different from foodways in the tidewater mainland through time. These issues cannot be resolved without additional fieldwork at individual sites from all time periods, and biotopes using a finer-mesh screen, both on St. Catherines Island and on the mainland.

Despite uncertainty about the roles of deer and estuarine resources on the island, other aspects of pre-Hispanic resource use testify to the presence of a long-standing tradition leading up to the 17th century. Overall diversity (MNI) for collections from elsewhere on the coast averaged 2.5 compared to 1.9 for collections from St. Catherines Island and fish diversity in collections from elsewhere on the coast averaged 2.1 compared to 1.0 for St. Catherines Island collections (tables 3.5 and 3.9). Average biomass shows the same pattern: overall diversity is 2.4 elsewhere on the coast compared to 1.3 for St. Catherines Island and fish diversity is 2.1 elsewhere compared to 1.3 for St. Catherines Island (tables 3.5 and 3.9). Overall diversity in the St. Catherines Island collections is lower because of the greater use of deer on the island and a lower use of fish. Despite a resource base of 144 different vertebrate taxa, only sea catfishes and seatrouts are found in all of the collections reviewed in this chapter. These large-bodied fishes can be taken with mass-capture techniques that conform to a fishing model that is similar to the garden hunting modal and compatible with it in terms of scheduling and labor demands.

The mean trophic levels exploited prior to the 17th century averaged 3.1 (MNI) and 3.2 (biomass) elsewhere in the Georgia Bight

and somewhat higher on St. Catherines Island (tables 3.5 and 3.9). The mean trophic level from which most of the fish biomass was taken on St. Catherines Island is considered high and perhaps unsustainable today (Reitz, 2004), yet mean trophic levels of 3.4 were exploited during the Archaic period and again in the Irene period. Without site-specific data, we cannot tell if these were peaks or represent a sustained level of use for the intervening time periods, but this raises the possibility that the fishery was stressed by a traditional focus on high trophic-level fishes. If both the St. Catherines Shell Ring and Meeting House Field sites were venues for feasting or other social displays, this use of fish from high trophic levels combined with venison would be a significant display of authority and power (Reitz and Wing, 2008: 285). Both of these possibilities should be explored in more detail with larger samples from sites occupied during the intervening centuries and the use of fine mesh screens.

Despite these problems, the data reviewed in this chapter offer a solid baseline against which to measure change and continuity in Guale foodways in the 17th century as well as the Guale imprint on Spanish foodways at Santa Catalina de Guale. Native Americans on the island and elsewhere in the southern Georgia Bight had a long tradition of combining estuarine resources with deer to sustain a rich, diverse, and generally equitable strategy for exploiting vertebrates. Much of the fishing effort emphasized a few high trophic-level fishes. The primary technology allowed for the capture of large-bodied fishes using mass-capture techniques that required scheduling to be compatible with the tidal cycle and the coordinated efforts of several people. Besides fishing and deer hunting, other strategies focused on terrestrial animals that could be taken using traps, taking advantage either of their nocturnal habits or their garden-raiding habits. These strategies did not conflict with demanding and time-sensitive farming and fishing schedules. Few terrestrial vertebrates, other than deer and other garden raiders, were used even before farming became part of the subsistence strategy. None of this implies that pre-Hispanic strategies were inflexible or unchanged over the millennia, but the broad features of coastal life in the Georgia Bight prior to the 17th century are clear.

To the extent that these Guale traditions became Spanish traditions, these characteristics are expected in the faunal assemblage from

Mission Santa Catalina de Guale (see chap. 5). To the extent that these Guale traditions continued unchanged by Spanish influence, these characteristics would be expected to prevail in the Pueblo Santa Catalina de Guale faunal assemblage (see chap. 6).

## CONCLUSIONS

The available data demonstrate the antiquity, flexibility, and richness of a well-established, dynamic coastal fishing and hunting tradition in the southern Georgia Bight that existed for millennia before the 17th century, albeit with local spatial and temporal variations. This coastal fishing and hunting tradition was practiced by Native Americans on St. Catherines Island long before Mission Santa Catalina de Guale was built.

This broad outline of coastal fishing and hunting traditions should not be taken to imply that Native American cultures were static prior to the 17th century; they were clearly dynamic, as even a casual glance at the archaeological record demonstrates. Our purpose in summarizing this coastal tradition is to establish generalized characteristics of the interactions of people with their environments prior to the arrival of Europeans, Eurasian livestock, and missionization. This summary enables us to assess the consequences of 17th-century contextual changes on those interactions.

When Spanish priests, soldiers, and officials expected the Guale people on the island to supply them with animal nutrients, the Guale converts drew upon the heritage summarized in this chapter. This provides a benchmark against which to: (1) measure First Spanish period change and continuity in Guale and Spanish diets; (2) to assess exploitation strategies at Santa Catalina de Guale; (3) to measure Native American contributions to the Spanish economy; and (4) to evaluate environmental change. We would expect that somewhat different responses occurred in other parts of Spanish Florida, as will be seen in chapter 4.

In the next chapter, we: (1) review what colonists and Native Americans did elsewhere in Spanish Florida during the First Spanish period with particular emphasis on pre-Hispanic diets; (2) examine exploitation strategies used by the Spanish colonists and the degree to which Eurasian animals replaced pre-Hispanic animals in Native American strategies; and (3) consider the contributions that Native Americans made to the Spanish economy.