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VERTEBRATE FAUNA FROM FOUR COASTAL MISSISSIPPIAN SITES

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ABSTRACT.—Samples of vertebrate fauna recovered from three archaeological sites on barrier islands off the Georgia coast and one on the mainland coast indicate a specialized economy emphasizing marine resources. Faunal evidence suggests a use of fishes from the immediate estuarine-salt marsh system. The few highly seasonal resources of the region were not exploited. Vertebrate evidence indicates that occupation was either intermittant or continuous at these coastal sites. The collections total 17 bird, 213 mammal, 941 fish, 114 reptile, and 40 amphibian individuals.

INTRODUCTION

Along the Atlantic coast between North Island, South Carolina, and Anastasia Island, Florida, lies a series of barrier or sea islands (Fig. 1). Behind these islands is found a rich estuarine-salt marsh system. For many years scholars of diverse interests have examined this unique environment because of its importance to the American fisheries industry. Archaeologists have also been attracted to the coastal islands, and have excavated and tested sites of all temporal phases. Although questions on chronology and settlement patterns have been and continue to be the major focus by archaeologists in this region, questions pertaining to subsistence have been considered by coastal archaeologists for a number of years with indications that estuarine fishes have been important food items throughout human occupation on the coast (Larson 1980). In spite of this interest in human use of the estuaries, until recently an adequate vertebrate data base had not been assembled for studies of aboriginal use of marine resources. As of 1979, some 17 sites have been excavated between Sapelo Island and Anastasia Island, but only five of the faunal assemblages passed the test of adequacy, that is, had over 200 individuals and 1400 total bones (Reitz 1979a; Wing and Brown 1979). Of the five adequate samples, only two were aboriginal: the Archaic St. Simons Shell Ring excavated by Rochelle Marrinan (1975) and the Savannah Kenan Field excavated by Ray Crook (1978). Since 1979 three additional sites have produced large samples. As a result there are now four adequate late Mississippian vertebrate faunal assemblages available for analysis from the Georgia sea islands.

These four collections indicate a prehistoric/historic subsistence strategy based on fishing, supplemented by deer hunting. Deer *(Odocoileus virginianus),* sea catfishes (Ariidae), and drums (Sciaenidae) were the major resources to the exclusion of most other species. Species utilization was not the same at the four sites, suggesting that even in a small geographical area where resources are basically similar throughout, there were sufficient subsistence variations to be reflected in the faunal record. Of further interest was the minor importance of highly seasonal resources such as migratory waterfowl, bluefishes *(Pomatomus saltatrix),* and herrings (Clupeidae). Based on the faunal evidence it appears that occupation of the coastal islands was not confined to a single season, but may have been sporadic throughout the year, or even continuous.

SITE DESCRIPTIONS

The sites all date primarily to Savannah or Irene Phases. The Savannah phase is the late Mississippian phase on the Georgia coast, beginning around AD 1000 (Crook 1982) or AD 1150 (Pearson 1979). The Savannah Phase is followed by the Irene Phase, but the time span is subject to debate. Charles Pearson initiates the Irene Phase at AD 1350,

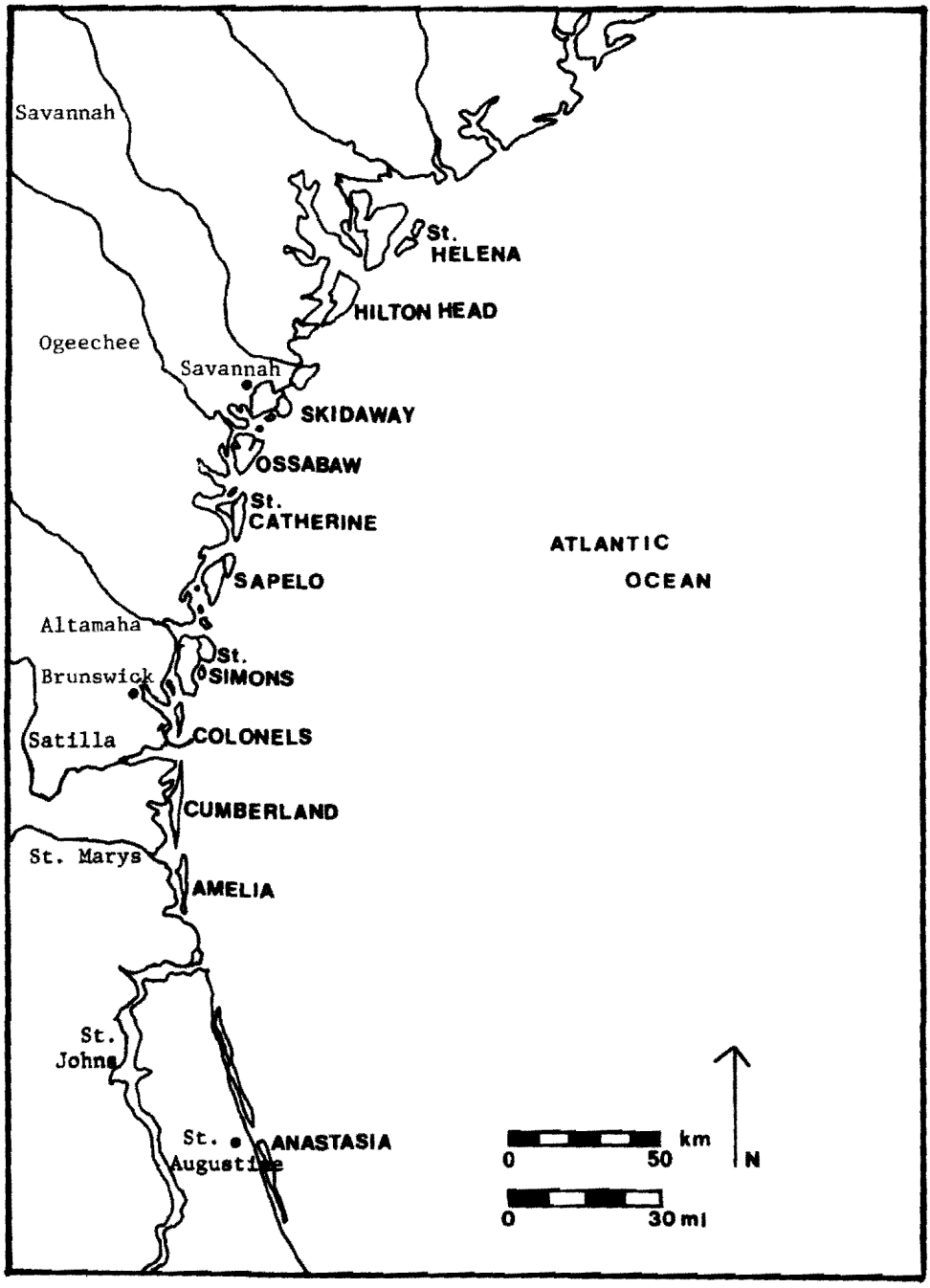

FIG. 1—Sea Islands of the Atlantic Coastal Plain.

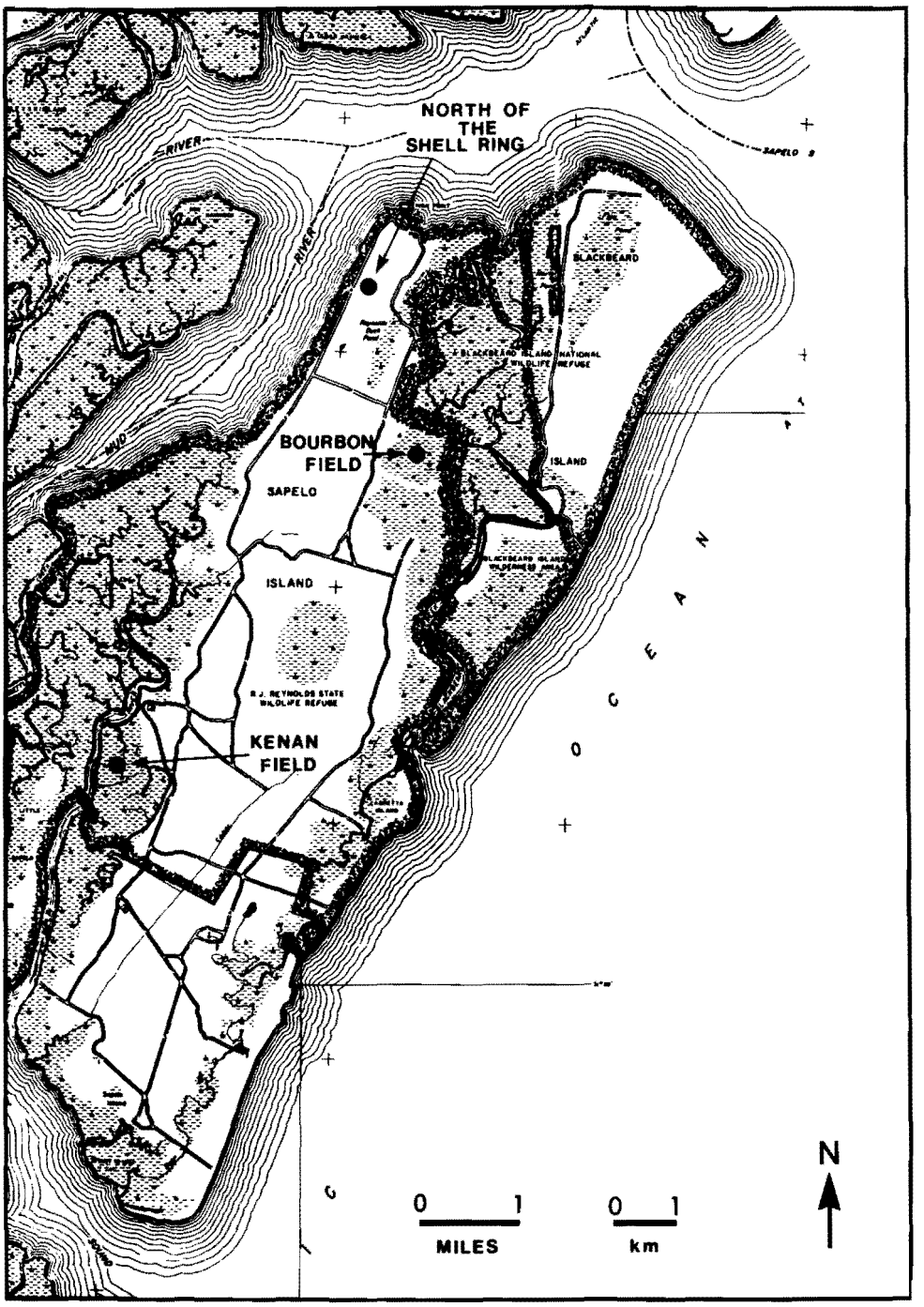

FIG. 2—Sapelo Island, Georgia (Anonymous 1968).

while Lewis Larson, Ray Crook, and Robin Smith interpret this phase as an early historic aboriginal phase beginning about 1540 (Crook 1982) or 1526 (Milanich 1977). The Irene Phase may have ended as early as 1550 (Pearson 1979), but the excavators of the sites terminate it with the end of the Mission Period at 1680 (Milanich 1977). A C_{14} date from Irene-San Marcos Phase context at Bourbon Field indicates an occupation within the 1540-1680 period (Crook 1982). Pine Harbor Phase is the Irene Phase equivalent on the Altamaha River and Smith's San Marcos Phase corresponds with Crook's Sutherland Bluff Phase. Irene and San Marcos Phases may be contemporaneous (Crook 1982). The temporal designations used below are those provided by the excavators. At contact, Spanish administrators identified the residents of the Kings Bay area as Timucuans and the Sapelo area as Guales (Larson 1978).

Three of the four sites discussed here are on Sapelo Island, Georgia (Fig. 2). Kenan Field was excavated by Dr. Ray Crook in 1976-1977 (Crook 1978). It is a multicomponent aggregate village covering 60 ha. The site is composed of 589 discrete shell middens measuring 5-10 m in diameter, two mounds, and several structures. Pine trees currently are grown on the site. The site is located on the west side of Sapelo Island, bordered on the northwest by Duplin River and on the south by Barn Creek, near a salt marsh. Six structures, one mound, and 11 shell middens were excavated. Quarter-inch screens were used at each non-feature until except for portions of three test pits in shell middens. A 11 soil sample was taken from columns from each shell midden but not analyzed. Soil from two portions of each shell midden and from features was screened through 1/16 in mesh and chemically floated. Although a Sutherland Bluff component was found at Kenan Field, the occupation was primarily Savannah and Irene Phases.

Bourbon Field is a similar multi-component aggregate village approximately seven km northwest of Kenan Field, on the east side of Sapelo Island. It is located behind Blackbeard Island facing Blackbeard Creek and a salt marsh (Crook 1982) and was excavated in 1979-1980 by Crook. Bourbon Field covers 14 ha and is composed of 119 discrete shell middens and a small earthern mound. It is currently an open field used by the Georgia Department of Natural Resources as a migratory bird feeding station. During excavations, 63 tests were conducted in the off-midden areas and ten shell middens were studied. A ¼ in screen was used at all excavations features and shell-midden volumetric samples. Volume samples of 20 l each were taken from each natural level and screened through a graduated series of meshes. Faunal samples collected in ¼ in portion were lumped with ¼ in fraction from the rest of the shell midden, therefore "column sample" refers only to fine-screened fractions of bone with the ¼ in fraction removed. Features were also screened in this manner. While the Bourbon Field site contains materials dating from the Sapelo through San Marcos Periods, the Savannah/Irene Phase occupation is primarily represented (Crook 1982).

The third Sapelo site is located on the west side of the island, about 2 km west of Bourbon Field and 5 km north of Kenan Field, and by the Mud River and a salt marsh. The excavations were placed 45 m north of a drainage ditch north of the Sapelo Shell Ring, hence the site is known as North of the Shell Ring Drain. The excavations were conducted in 1979 by Dr. Lewis Larson. The faunal sample comes from four contiguous 2 x 2 m units, placed on one undisturbed shell midden. At present, magnolia trees and live oaks primarily grow at this site. During excavations, ¼ in screens were used except for a 50 cm^2 column sample from the shell matrix which was screened through 1/16 in mesh. The ceramic assemblage contained Irene Burnished Plain, Irene Filfot Stamped, and Savannah Check-Stamped, and an occasional Spanish Olive Jar fragment. It is thought this represents an Irene occupation somewhat later in time than the main occupation at either Kenan or Bourbon Field (Crook, personal communication).

The fourth site, the Kings Bay Site (9Cam171), is located on the mainland behind Cumberland Island (Fig. 3) approximately 81 km south of Sapelo Island and was excavated by Robin Smith in 1978-1979 (Smith et al. 1981). The site is a multicomponent discontinuous shell midden covering 91.5 ha and stretching 4.5 km along the western

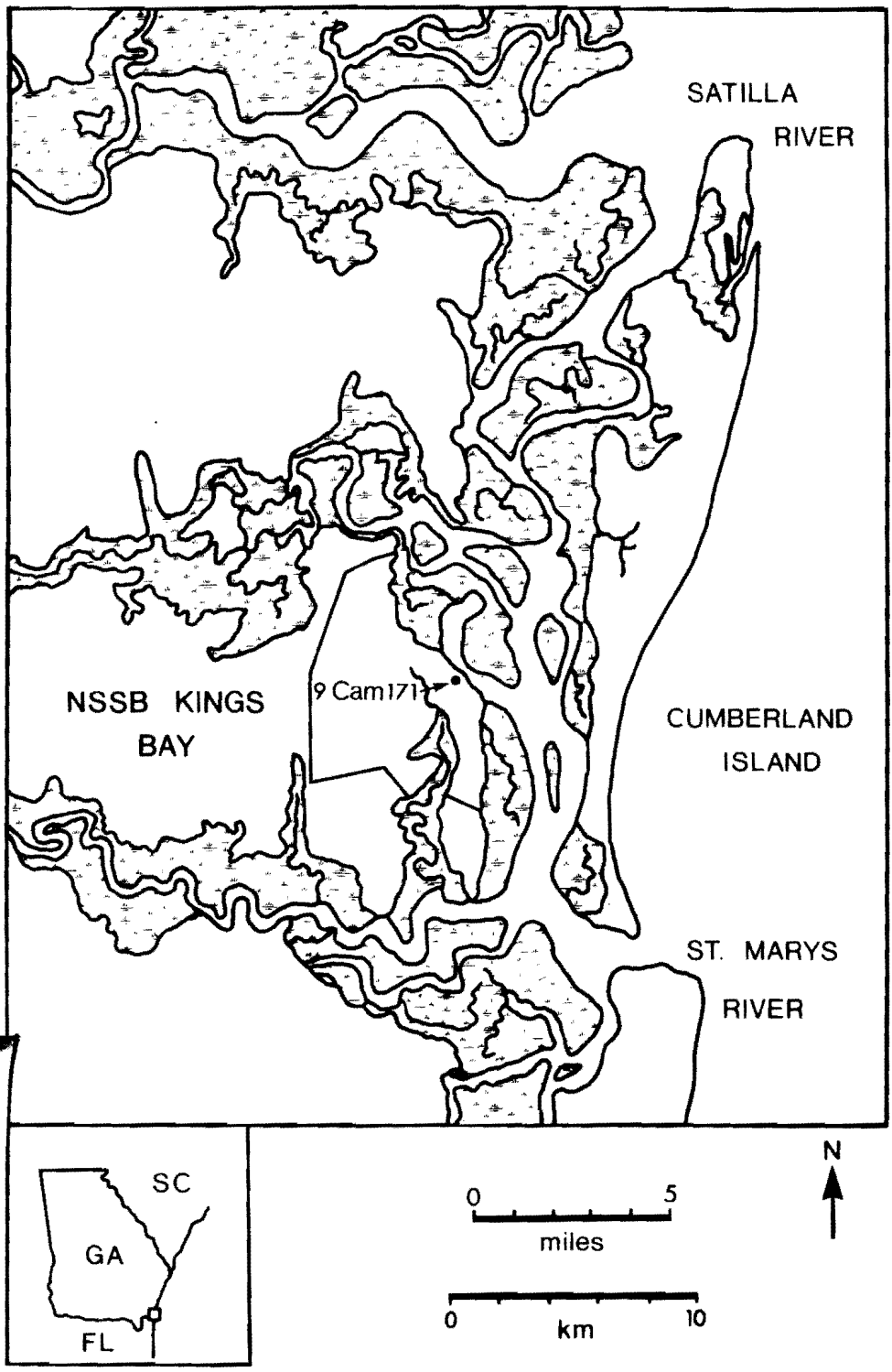

FIG. 3—Kings Bay (9Cam171), Georgia

edge of Kings Bay, bordered by a salt marsh. The Kings Bay Site is covered by pine plantation and Southern Mixed Hardwoods and is currently being impacted by construction of the Naval Submarine Support Base. During excavations, a series of sheet deposits and features were uncovered, but reference here is primarily to the Savannah Phase features. Soil from the Savannah Phase features was screened with 1/8 in mesh. Column samples also screened with 1/8 in mesh, were taken from zone deposits, but only two [San Marcos period column samples] were studied. Zone material was screened using 1/4 in mesh.

In most respects the environments of the Sapelo Island sites and the Kings Bay site are similar (Johnson et al. 1974). All are bordered by salt marshes and estuaries connected by large sounds leading to the ocean. Tidal creeks of various sizes twist through the marshes. Freshwater biotopes are available within .5 km of all sites but beaches are more distant. Dominant vegetation aboriginally was probably Maritime Oak Forests in all cases (Johnson et al. 1974). This is a region of moderate mean annual temperatures of 22 degrees C and average rainfall of 110 cm. Mean tide level at Sapelo Island and at Crooked River, just north of Kings Bay site, is 1.036 m, with a spring tide range of 2.438 m. Mean tidal ranges are 2.072 m (Tide Tables 1981). Sapelo and Cumberland Islands are in the Carolina Region with water temperatures of 15-20 degrees C (Ekman 1953; Briggs 1974) and where wide turbidity, salinity, and temperature fluctuations place unusual stresses on the estuarine fauna (Hoese 1967; Stickney and Miller 1973). Among the species best adapted to these conditions are herrings (Clupeidae), sea catfishes (Ariidae), and drums (Sciaenidae) (Mahood et al. 1974; DEIS 1978).

Seasonal variations in species availability are less pronounced in this region than elsewhere. None of the mammals hibernate (Golley 1962). While sea turtles are strictly warm weather visitors, other turtles are inactive only on very cold days (Carr 1952). Birds increase in density and diversity during the winter, representing one of the most seasonally variable resources, however coastal Georgia is not a major area for migratory flocks (Robertson and Kushlan 1974). Sharks are primarily present during warm weather conditions, but the bony fishes (Osteichthyes) present a variable dispersal pattern depending on individual age and species. Many species are represented in the estuaries by adults, juveniles, or both throughout the year (DEIS 1978). Some species remain inside the estuary throughout the year, but occupy different habitats within the estuary in response to water temperatures or salinity levels. Other species visit the estuaries only in the winter either as adults or juveniles, but more species visit estuaries in the summer. The young of most fishes live in the estuary for the first year or two of life and can be found there throughout the year. Adults are less able to tolerate estuarine extremes. Diversity, measured as an index of the number of species and the number of individuals, does not change seasonally as much as relative abundance (Dahlberg and Odum 1970); however, the total number of species is higher in the summer and fall (Dahlberg 1972). Variations in species occurrence are also found between years depending upon rainfall and temperatures. Seasonal behavior of fishes in the estuarine setting is complex based upon several variables which may not be known to the archaeologist. The species list itself provides only a general guide. Ideally it should be possible to determine seasonal patterns of exploitation of bony fishes by examining growth rings of otoliths, vertebrae, or scales (Casteel 1976).

METHODS

The faunal remains were identified and analyzed using standard zooarchaeological procedures (Wing and Brown 1979). Kenan Field and Kings Bay materials were identified using the comparative skeletal collections at the Zooarchaeology Laboratory, Florida State Museum. Bourbon Field and North of the Shell Ring Drain samples were identified at the University of Georgia's Zooarchaeology Laboratory, Department of Anthropology. Minimum Numbers of Individuals (MNI) were determined by paired elements and age, and aggregated as MNI (strata) for each non-contiguous unit following Grayson (1973).

Biomass was calculated using least-squares analysis of logarithmic data (Reitz 1979b; Wing and Brown 1979). Formulae used to obtain biomass estimates are on file at the Zooarchaeology Laboratorys of the University of Georgia and the Florida State Museum. Biomass for Kenan Field was not calculated since the necessary weight information was not readily available. Diversity was calculated using the Shannon-Weaver Diversity Index (Shannon and Weaver 1949) and equitability was calculated using the Sheldon Evenness Index (Sheldon 1969). Species were grouped into classes for analysis. "Commensal" species include amphibians and small rodents. Snake remains are so rare in the collection that these reptiles were probably commensal animals and are included as such at Kings Bay.

RESULTS

Two basic characteristics upon which reliable faunal analysis depends are sample size and screening procedures. These field-related variables affect faunal samples dramatically. It has been demonstrated that samples of fewer than 200 individuals and 1400 bones are subject to biases which influence both species diversity and equitability (Casteel 1976-1977; Grayson 1978, 1981; Wing and Brown 1979). Using these measures as guidelines for adequacy, all of the samples discussed here are reliable, with the possible exception of that from North of the Shell Ring Drain, with 5462 bones but only 107 individuals. Faunal remains identified from the four sites are listed in Tables 1-4. The Shell Ring Drain faunal list is almost identical to that of the other samples, so that while diversity may be depressed the list and proportions of fauna are probably reliable. Equitability at North of the Shell Ring Drain may be inaccurate, however; the low MNI may be a result of using a minimal distinction method (MNI site) (Grayson 1973). This method was used because the units were contiguous, representing a single midden component.

TABLE 1.—*Species List for Kenan Field (Crook, 1978)*

Species		MNI	
		No.	%
Didelphis virginiana	Opossum	1	0.3
Scalopus aquaticus	Mole	5	1.3
Sylvilagus sp.	Rabbit	13	3.3
Sciurus niger	Fox squirrel	1	0.3
Peromyscus sp.	Mouse	1	0.3
Sigmodon hispidus	Hispid cotton rat	3	0.8
Cetacea	Dolphin	1	0.3
Procyon lotor	Raccoon	16	4.0
Mustela vision	Mink	1	0.3
Mephitis mephitis	Striped skunk	2	0.5
Lutra canadensis	Otter	1	0.3
Odocoileus virginianus	Deer	38	9.6
Bos taurus	Cow	1	0.3
Unidentified Bird		4	1.0
Aix sponsa	Wood duck	1	0.3
Meleagris gallopavo	Turkey	1	0.3
Zenaidura macroura	Dove	1	0.3
Passeriformes	Song bird	1	0.3
Alligator mississippiensis	Alligator	1	0.3
Kinosternon subrubrum	Musk turtle	17	4.3
Deirochelys reticularia	Chicken turtle	3	0.8
Malaclemys terrapin	Diamondback terrapin	18	4.5
Terrapene carolina	Box turtle	7	1.8

TABLE 1.–(Continued)

Chelonia mydas	Green turtle	1	0.3
Anolis carolinensis	Green anole	2	0.5
Ophisaurus sp.	Glass lizard	1	0.3
Unidentified snake		7	1.8
Colubridae	Colubrid snake	5	1.3
Agkistrodon piscivorus	Cottonmouth	1	0.3
Rana/Bufo sp.	Frog or Toad	12	3.0
Rajiformes	Skates & Rays	10	2.5
Lepisosteus sp.	Gar	24	6.0
Elops saurus	Lady fish	1	0.3
Clupeidae	Herring	5	1.3
Ariidae	Sea catfishes	64	16.1
Ariopsis felis	Hardhead catfish	23	5.8
Bagre marinus	Gafftopsail catfish	27	6.8
Archosargus probatocephalus	Sheepshead	6	1.5
Cynoscion nebulosus	Spotted sea trout	5	1.3
Micropogonias undulatus	Atlantic croaker	11	2.8
Pogonias cromis	Black drum	28	7.0
Scianops ocellatus	Red drum	1	0.3
Stellifer lanceolatus	Star drum	2	0.5
Mugil sp.	Mullet	19	4.8
Paralichthyes sp.	Flounder	5	1.3
Total		398	

TABLE 2.–*Species List for Savannah Phase Features from the Kings Bay Site, 9Caml71.*

Species	Ct	MNI		gms	Biomass	
		No.	%		kg	%
Unidentified Mammal	66	–	–	26.6	0.54	5.3
Didelphis virginiana Opossum	2	1	0.4	0.5	0.01	0.1
Scalopus aquaticus Mole	2	1	0.4	0.3	0.009	0.09
Unidentified Rodent	3			0.1	0.003	0.03
Peromyscus sp. Mouse	8	2	0.8	0.2	0.006	0.06
Sigmodon hispidus Cotton rat	10	3	1.2	1.4	0.036	0.4
Procyon lotor Raccoon	8	1	0.4	3.1	0.07	0.7
Odocoileus virginianus Deer	20	3	1.2	112.8	2.03	19.9
Unidentified Bird	6	–	–	3.2	0.07	0.7

TABLE 2.—(Continued)

Species	Ct	MNI		gms	Biomass	
		No.	%		kg	%
Anatidae Duck	1	1	0.4	0.3	0.007	0.07
Mergus serrator Merganser	1	1	0.4	0.3	0.007	0.07
Unidentified Turtle	119	—	—	35.55	0.394	3.9
Kinosternidae Mud turtles	9	5	1.9	3.1	0.1	1.0
Kinosternon sp. Mud turtle	3	—	—	0.9	0.04	0.4
Emydidae Basking turtles	14	—	—	9.9	0.15	1.5
Malaclemys terrapin Diamondback terrapin	44	5	1.9	44.5	0.46	4.5
Sceloporus undulatus Fence lizard	1	1	0.4	0.5	—	—
Colubridae	1	1	0.4	0.1	0.001	0.01
Opheodrys aestivus Rough green snake	3	1	0.4	0.1	0.001	0.01
Amphibian	1	—	—	0.03	—	—
Frog/Toad	2	—	—	0.15	—	—
Bufo sp. Toad	5	3	1.2	0.35	—	—
Rajiformes Skates & Rays	15	1	0.4	0.5	0.008	0.8
Dasyatis sp. Sting ray	1	1	0.4	0.2	0.03	0.3
Unidentified Fish	1183	—	—	134.9	1.94	19.0
Amia calva Bowfin	3	2	0.8	0.35	0.015	0.1
Lepisosteus sp. Gar	77	5	1.9	8.35	—	—

TABLE 2.–(Continued)

Species	Ct	MNI		gms	Biomass	
		No.	%		kg	%
Elops saurus Lady fish	1	1	0.4	0.1	0.005	0.05
Brevoortia sp. Herring	19	3	1.2	0.5	0.026	0.3
Siluriformes Catfishes	7	–	–	0.7	0.01	0.1
Ariidae Sea catfishes	293	–	–	35.1	0.62	6.1
Ariopsis felis Hardhead catfishes	51	10	3.9	7.9	0.15	1.5
Bagre marinus Gafftopsail	217	15	5.8	85.7	1.41	13.8
Lobotes surinamensis Triple tail	45	2	0.8	40.7	0.63	6.2
Archosargus probatocephalus Sheepshead	5	3	1.2	1.7	0.026	0.3
Sciaenidae Drums	31	–	–	4.95	0.157	1.5
Bairdiella chrysoura Silver perch	31	11	4.3	1.4	0.06	0.6
Cynoscion sp. Sea trout	28	10	3.9	4.45	0.16	1.6
Larimus fasciatus Banded drum	1	1	0.4	0.6	0.03	0.3
Leiostomus xanthurus Spot	5	5	1.9	0.3	0.017	0.2
Menticirrhus sp. Kingfish	1	1	0.4	0.1	0.007	0.07
Micropogonias undulatus Croaker	7	5	1.9	0.8	0.047	0.5
Pogonias cromis Black drum	13	3	1.2	2.55	0.097	1.0

TABLE 2.—(Continued)

Species	Ct	MNI		gms	Biomass	
		No.	%		kg	%
Stellifer lanceolatus Star drum	478	122	47.5	17.7	0.377	3.7
Bairdiella/Stellifer sp.	155	14	5.4	2.85	0.104	1.0
Mugil sp. Mullet	88	7	2.7	2.95	0.094	0.9
Paralichthyes sp. Flounder	50	6	2.3	7.4	0.17	1.7
Unidentified Bone	—	—	—	136.9	—	—
Total	3134	257	—	743.2	10.195	—

TABLE 3.—*Species List of Bourbon Field, 1980-1981.*

Species	Ct	MNI		gms	Biomass, kg	
		No.	%		Kg	%
Unidentified Mammal	3271	—	—	2272.51	29.95	43.9
Scalopus aquaticus Mole	3	3	0.5	0.76	0.02	0.03
Sylvilagus sp. Rabbit	47	12	2.1	21.61	0.44	0.6
Unidentified Rodent	1	—	—	0.01	0.0004	0.0006
Cricetidae New World mice	9	—	—	0.38	0.01	0.01
Sigmodon hispidus Hispid cotton rat	10	3	0.5	0.94	0.02	0.03
Carnivore	1	—	—	0.01	0.003	0.004
Ursus americanus Bear	1	1	0.2	1.9	0.05	0.07
Procyon lotor Raccoon	78	22	3.9	99.75	1.77	2.6
Mustelidae Mink family	3	—	—	0.72	0.02	0.03

TABLE 3.–(Continued)

Species	Ct	MNI		gms	Biomass, kg	
		No.	%		Kg	%
Mephitis mephitis Skunk	5	2	0.4	2.55	0.06	0.09
Odocoileus virginiana Deer	492	63	11.2	1365.37	19.06	27.9
Unidentified Bird	57	–	–	14.65	0.25	0.4
Laridae Gull Family	1	1	0.2	0.6	0.01	0.01
Icteridae Blackbird Family	1	1	0.2	0.02	0.0006	0.0009
Unidentified Reptile	3	–	–	0.06	–	–
Unidentified Turtle	2711	–	–	894.95	3.91	5.7
Kinosternon subrubrum Mud turtle	55	20	3.6	16.82	0.26	0.4
Emydidae Basking turtles	222	–	–	121.75	0.98	1.4
Deirochelys reticularia Chicken turtle	14	1	0.2	23.5	0.26	0.4
Malaclemys terrapin Diamondback terrapin	46	8	1.4	54.03	0.53	0.8
Trionyx ferox Softshell turtle	1	1	0.2	0.41	0.2	0.3
Unidentified Snake	15	–	–	0.85	0.01	0.01
Colubridae Colubrid snakes	8	7	1.2	0.4	0.005	0.007
Elaphe sp. Ratsnakes	1	(1)	–	0.1	0.001	0.002
Viparidae Pit vipers	2	1	0.2	0.62	0.009	0.01
Amphibian	8	–	–	0.07	–	–
Rana/Bufo sp. Frog/Toad	49	19	3.4	2.61	–	–

TABLE 3.–(Continued)

Species	Ct	MNI		gms	Biomass, kg	
		No.	%		kg	%
Chondrichthyes Sharks & Rays	7	–	–	0.22	0.03	0.04
Sharks	44	11	2.0	2.05	0.28	0.4
Rays	18	10	1.8	0.24	0.04	0.06
Dasyatis sabina Atlantic stingray	2	2	0.5	0.8	0.1	0.1
Unidentified Fish	5435	–	–	187.46	2.68	3.9
Lepisosteus sp. Gar	64	12	2.1	10.26	0.23	0.3
Clupeidae Herrings	484	24	4.3	4.15	0.10	0.1
Ariidae Sea catfishes	920	194	34.5	300.47	4.7	6.9
Ariopsis felis Hardhead catfish	141	(26)	–	12.51	0.22	0.3
Bagre marinus Gafftopsail catfish	191	(30)	–	35.14	0.61	0.9
Perciformes Perciform fishes	2	–	–	0.19	0.007	0.01
Pomatomus saltatrix Bluefish	15	1	0.2	0.24	0.01	0.01
Archosargus probatocephalus Sheepshead	12	7	1.2	2.4	0.04	0.06
Sciaenidae Drums	24	–	–	6.42	0.19	0.3
Bairdiella chrysoura Silver perch	20	12	2.1	0.77	0.03	0.04
Cynoscion sp. Sea trout	12	8	1.4	4.47	0.14	0.2
Leiostomus xanthurus Spot	8	8	1.4	0.1	0.01	0.01

TABLE 3.–(Continued)

Species	Ct	MNI		gms	Biomass, kg	
		No.	%		kg	%
Micropogonias undulatus Croaker	28	19	3.4	4.38	0.15	0.02
Pogonias cromis Black drum	54	21	3.7	5.84	0.2	0.3
Scianops ocellatus Red drum	9	7	1.2	18.77	0.4	0.6
Stellifer lanceolatus Star drum	14	11	2.0	0.16	0.01	0.01
Mugil sp. Mullet	679	43	7.6	8.3	0.19	0.3
cf. Eleotridae Sleepers	2	2	0.4	0.03	0.002	0.003
Paralichthyes sp. Flounder	20	5	0.9	1.18	0.03	0.04
Diodontidae Porcupine fishes	1	1	0.2	0.91	–	–
Unidentified Bone	–	–	–	1321.22	–	–
Totals	15331	563	–	6827.33	68.228	–

TABLE 4.–*Species List for North of the Shell Ring Drain*

Species	Ct	MNI		Weight	Biomass	
		No.	%	Gm	Kg	%
Ud. Mammal	391	–	–	2173.91	26.5	63.1
Sylvilagus sp. Rabbit	68	6	5.6	41.06	0.7	1.7
Cricetidae New World Mice	3	–	–	0.15	0.005	0.01
Peromyscus sp. Mouse	2	1	0.93	0.03	0.001	0.003
cf. *Sigmodon hispidus* Cotton Rat	1	1	0.93	0.10	0.003	0.01

TABLE 4.—(Continued)

Species	Ct	MNI		Weight	Biomass	
		No.	%	Gm	Kg	%
Delphinidae Dolphin Family	1	1	0.93	29.39	0.5	1.2
Procyon lotor Raccoon	3	1	0.93	10.15	0.21	0.5
Odocoileus virginianus Whitetail Deer	51	2	1.9	270.40	4.06	9.7
Ud. Bird	117	—	—	18.95	0.30	0.71
Anas sp. Surface-feeding Duck	28	3	2.8	15.97	0.25	0.60
Rallidae Rail	3	1	0.93	0.54	0.01	0.02
Icteridae Blackbird Family	1	1	0.93	0.19	0.005	0.01
Ud. Turtle	71	—	—	20.41	0.24	0.57
Emydidae	69	—	—	24.20	0.27	0.64
Malaclemys terrapin Diamondback Terrapin	60	2	1.9	37.23	0.36	0.86
Ud. Snake	1	—	—	0.05	0.0007	0.002
Colubridae Non-Poisonous Snakes	1	—	—	0.05	0.0007	0.002
Coluber constrictor Black Racer	1	1	0.93	0.08	0.001	0.003
cf. Viparidae Poisonous Snakes	1	1	0.93	0.20	0.003	0.01
Ud. Amphibian	2	—	—	0.02	—	—
Rana/Bufo Frog/Toad	11	2	1.9	0.42	—	—
Squaliformes Sharks	1	1	0.93	0.01	0.002	0.005
Dasyatis sabina Atlantic Stingray	2	1	0.93	0.01	0.002	0.005

TABLE 4.–(Continued)

Species	Ct	MNI		Weight	Biomass	
		No.	%	Gm	Kg	%
Ud. Fish	2872	–	–	279.37	2.83	6.7
Ariidae Sea Catfishes	489	–	–	95.31	1.5	3.6
Ariopsis felis Hardhead Catfish	583	54	50.5	149.01	2.32	5.5
Bagre marinus Gafftopsail Catfish	106	4	3.7	32.10	0.54	1.3
Sciaenidae Drum Family	33	–	–	27.47	0.45	1.1
Bairdiella chrysoura Silver Perch	16	8	7.5	0.68	0.03	0.07
Cynoscion regalis Weakfish	9	7	6.5	0.61	0.03	0.07
Leiostomus xanthurus Spot	11	6	5.6	0.17	0.01	0.02
Pogonias cromis Black Drum	155	1	0.93	102.87	1.20	2.9
Scianops ocellatus Red Drum	12	1	0.93	0.37	0.02	0.05
Mugil sp. Mullet	3	1	0.93	0.04	0.002	0.005
Ud. Bone	284	–	–	14.68	–	–
Totals	5462	107	–	3346.27	42.36	–

While the samples from these coastal sites are generally outstanding in terms of size, there remains screening biases. As is the custom where fine-screen recovery methods are used, soil from entire units was screened through ¼ in mesh, but only a portion of the unit was screened through 1/8 in mesh (Kings Bay) or 1/16 in mesh (Sapelo Island). For analysis, faunal remains collected from the ¼ in zone and fine-screened column samples and features were combined. Obviously it is not accurate to present as a single, unified sample a collection in which roughly 6% of the soil was screened through 1/8 or 1/16 in mesh and the remaining 94% was collected by ¼ in mesh. As a result of such a combination there is an over representation of large bones, representing species such as deer, and a reduction in small species such as star drum.

TABLE 5.—*Exploitation Patterns*

MNI

	Kenan		Bourbon		NSRD		Kings Bay	
	No.	%	No.	%	No.	%	No.	%
Terrestrial Mammals	73	18.3	100	17.8	9	8.4	5	1.9
Cetacea	1	0.3	—	—	1	0.9	—	—
Birds	8	2.0	2	0.4	5	4.7	2	0.8
Turtles and Gator	47	11.8	30	5.3	2	1.9	10	3.8
Snakes	13	3.3	8	1.4	2	1.9	—	—
Fish, Sharks, Rays	231	58.0	398	70.7	84	78.5	228	88.7
Commensals	25	6.3	25	4.4	4	3.7	12	4.7
Total	398	—	563	—	107	—	257	—

Biomass

	Bourbon		NSRD		Kings Bay	
	Kg	%	Kg	%	Kg	No.
Terrestrial Mammals	21.4	72.8	4.97	48.4	2.11	33.6
Cetacea	—	—	0.5	4.9	—	—
Birds	0.01	0.03	0.27	2.6	0.01	0.2
Turtles	1.25	4.3	0.36	3.5	0.6	8.9
Snakes	0.01	0.03	0.004	0.04	—	—
Fish, Sharks, Rays	6.7	22.7	4.16	40.6	3.5	56.3
Commensals	0.04	0.1	0.004	0.04	0.05	0.8
Total	29.36	—	10.27	—	6.27	—

This observation becomes critical when evaluating the results in Table 5 which provides a summary of major groups of fauna represented at each site. The primary taxa at all four sites are marine animals, while marsh and terrestrial fauna are generally minor by comparison. The most striking anomaly is observed from the Savannah Phase features at Kings Bay where less than 2% of the individuals are mammals. Recall that this is the collection where 100% of the soil was screened through 1/8 in mesh, rather than only 6% at Sapelo Island sites.

The importance of this anomaly can be seen in two more examples. The first example compares three components of the Kings Bay Site (Table 6). The San Marcos zone material was recovered with ¼ in screen while all of the column samples were recovered by 1/8 in screen. While the difference between deer and small drums might be the result of cultural factors, it is more likely to be a function of screen-size. With only 50 individuals represented, the San Marcos column sample provides only a relative basis for comparison, but it does serve to explain the difference between the San Marcos Zone example and the Savannah phase features where the MNI is similar.

For the second example, the Bourbon Field shell midden tests were reevaluated (Table 6). Each unit was excavated 94% using ¼ in screen and 6% was fine-screened. When the column samples are examined alone, terrestrial mammals provided only 2% of the individuals and fish 89%, a distribution similar to that of the Savannah phase features and San Marcos column samples at Kings Bay.

For the purposes of this analysis, it seems reasonable to conclude that features and column samples where 100% of the sample was recovered in the same screen size are more reliable than samples collected unequally by different screen sizes.

DISCUSSION

It is common to consider the Mississippian subsistence strategy as more or less uniform based upon horticulture and hunting, primarily of deer (Cleland 1966; Smith 1975). While in many interior areas this may well have been the case, it seems reasonable to predict that there would be variation on this theme in response to locally available food stuffs. The response might be so precise that populations occupying the same environment separated by only 81 km of coast may have practiced different subsistence strategies, none of which emphasized deer. There also appears to have been a subsistence shift between Savannah and Irene phases on Sapelo Island as evidenced by the differences in faunal assemblages from the North of the Shell Ring Drain site and the two villages.

When the faunal assemblages from Kenan Field and Bourbon Field are compared there were few striking differences (Table 5). These two sites are primarily Savannah/Irene phases, although Crook does not think they were occupied simultaneously (personal communication). The only substantial difference is in the amount of turtles consumed at Kenan Field compared with Bourbon and a related reduction in the volume of fish. The Kenan materials are more diverse than those at Bourbon, perhaps because of the more extensive salt marsh bordering Kenan Field compared to that of Bourbon. Another interesting contrast is found between the use of mullets *(Mugil* spp.), star drum *(Stellifer lanceolatus),* silver perch *(Bairdiella chrysoura),* and herrings (Clupeidae) at Bourbon and the virtual absence of these animals at Kenan. These fishes should be equally common on both sides of the Island. The mullets at Bourbon Field were small individuals, represented primarily in the 1/8 in mesh samples, the same screen size in which star drums *(S. lanceolatus),* silver perches *(B. chrysoura),* and herrings (Clupeidae) are most likely to be recovered. It appears that a fine-meshed, mass-capture technique was used extensively at Bourbon and seldom used at Kenan Field. If not occupied throughout the year, Bourbon may have been occupied intentionally at specific periods to take advantage of these species. Although they could have been captured off of Kenan Field, it is possible that it was more efficient to catch these fish at Bourbon for reasons not evident today.

TABLE 6.—*Comparison of Fine-Screened (FS) and ¼ in-Screened Samples*

	Sapelo Island					Kings Bay				Savannah	
	Bourbon		C.S. + F.S.	NSRD	F.S.	San Marcos Zone ¼"		San Marcos C.S.* F.S.		Features F.S.	
	MNI	%		MNI	%	MNI	%	MNI	%	MNI	%
Terrestrial Mammals	3	1.9		9	8.4	37	18.0	2	4.0	5	1.9
Cetacea	—	—		1	0.9	—	—	—	—	—	—
Birds	—	—		5	4.7	8	3.9	2	4.0	2	0.8
Reptiles	4	2.6		4	3.7	26	12.7	2	4.0	10	3.8
Fish, Sharks, Rays	139	89.1		84	78.5	127	61.9	43	86.0	228	88.7
Commensals	10	6.4		4	3.7	7	3.4	1	2.0	12	4.7
Total	156	—		107	—	205	—	50	—	257	—
Deer	2	1.3		2	1.9	13	6.3	1	2.0	3	1.2
Stellifer/Bairdiella	22	14.1		8	7.5	1	0.5	5	10.0	147	57.2

\+ Bourbon Column Samples
* San Marcos Column Samples

It is generally agreed that Sapelo Island and Kings Bay were occupied historically by two distinct groups: Guale at the northern location and Timucuans at Kings Bay and points south (Milanich and Proctor 1978). It is tempting, therefore, to interpret the difference observed between the aboriginal Sapelo Island data and the Kings Bay data as cultural ones. In order to keep recovery technique relatively constant, the column-sample data from Bourbon Field should be compared with the Savannah Phase features at Kings Bay. The animals of choice at Kings Bay were clearly small drums, primarily the star drum *(S. lanceolatus)*. Neither mullets *(Mugil* spp.) nor herrings (Clupeidae), the dominant species at Bourbon, are common at Kings Bay. The emphasis on star drums at Kings Bay strongly suggests an intentional effort to acquire this fish to the exclusion of other animals. Star drums prefer more saline waters than do some other estuarine fishes. More data are needed about natural differences between the two areas and human use of both locations before this difference can be ascribed cultural significance, but there does appear to be tentative evidence for such a difference.

The later coastal strategy, here represented by the Irene component at North of the Shell Ring Drain, was different in some aspects from earlier subsistence patterns. In the first place, deer are a minor component. Since deer bones were more likely to be recovered than the fishes because of recovery techniques, this suggests low numbers of deer taken by the inhabitants. This finding may also be the result of differential distribution of refuse as the midden was deposited, since the excavation units were contiguous at the site rather than randomly distributed over a wide area as at the other Sapelo Island sites and at Kings Bay. Placement of excavation units would affect MNI aggregation. The two striking features of this sample are the abundant remains of sea catfishes (Ariidae), primarily the hardheaded catfish *(Ariopsis felis)*, and the somewhat increased number of bird elements. The presence of so many catfishes may indicate a primarily hook-and-line technology in contrast to an earlier net technology. The presence of both spots *(Leiostomus xanthurus)* and silver perches *(B. chrysoura)* suggests continued use of nets, weirs, or basketry scoops although both fish will take hooks. Use of birds during this period is unusual for aboriginal subsistence on the Georgia coast, but not unusual for historic occupations (Reitz 1979a, 1979b; Smith et al. 1981). The San Marcos component at Kings Bay also reflected an increased use of birds (Table 6). This may have been the result of European influence on the aboriginal hunting strategy.

While fishing was clearly a major activity at all of these sites, fish were not the only source of animal protein in the diet. Biomass was calculated for three of the sites. As might be expected, terrestrial mammals, primarily deer, contributed a substantial amount of biomass. However, deer contributed over 50% of the biomass only at Bourbon Field. Based on sampling considerations, the figures from the Savannah Phase features at Kings Bay are thought to give the most accurate picture of the diet. They show that fishing and hunting were both important activities, with fishing somewhat more so.

The diversity and equitability figures also demonstrate this point. Diversity ranged from 2.0 at North of the Shell Ring Drain to 3.2 at Kenan Field. Equitability range was 0.65 to 0.83. In terms of individuals (MNI) the strategy was one in which a few major species and a number of less important ones were used. In terms of biomass, considering only the Savannah Phase features from Kings Bay, once again a limited range of species was used, with a few animals being more important than the others. Diversity range was 1.4 to 2.2 and equitability 0.39 to 0.64. The most important animals were drums, particularly silver perches, and star drums; sea catfishes; deer; diamond-back terrapines; and occasionally spots and croakers.

The major biotope exploited appears to have been the tidal creeks. Terrestrial areas were exploited primarily for deer; very few other mammals, freshwater or terrestrial turtles, and birds were taken. The fishes, sharks, rays, sea turtles, diamond-back terrapins, bottle-nosed dolphins, and alligators could have been taken in the nearby marshes and tidal creeks. Most fishing could have been done from shore or in shallow waters.

Seasonal indicators are less apparent than could be expected from other geographical areas. The species used are primarily multi-seasonal and those few animals which are restricted seasonally were not exploited to any great extent. Distinctly warm weather species such as sea turtles and sharks attest to warm weather occupation at the Kenan, Bourbon, and North of the Shell Ring Drain sites. Herrings and fingerling mullets at Kenan, Bourbon, North of the Shell Ring Drain, and Kings Bay may document a cold weather occupation (DEIS 1978). Star drums and silver perches are more abundant in the fall and spring and suggest fall and spring occupations at all sites. It appears that occupation of sea-island locations was not confined to a single summer residence, but was either intermittent throughout the year or continuous. This possibility is partially supported by ethnographic and archaeological evidence (Crook 1978).

Fishing technology clearly emphasized techniques appropriate to the capture of small fishes. Star drums *(S. lanceolatus)* have an approximate maximum length of 15 cm (Hoese and Moore 1977) and silver perch *(B. chrysoura)* have a maximum length of about 23 cm. The mullets recovered at most sites, particularly at Bourbon Field, were also in this size range. Spots *(L. xanthurus)* and croakers *(Micropogonias undulatus)* are small fishes; spots occasionally attain 25 cm in length and croakers about 6 cm in length. The small drums might have been caught by hook and line, but not the mullets. The quantity of small drums and the presence of mullets suggest use of impoundment or trapping devices such as nets, scoops, or weirs. Nets could have been placed across tidal creeks, while weirs could have been used where the bottom was firm such as near oyster bars. Even catfishes (Ariidae) and the small sharks found in these collections could have been captured by these devices. Such mass capture techniques would indicate group-subsistence efforts were in use.

CONCLUSIONS

The data presented here suggest resources of the estuarine environment were selectively exploited. Sites were occupied perhaps during more than one season as these resources became available. Mass-capture techniques may have been employed in securing selected species, most of which were small drums and mullets, while other estuarine species and deer were also taken. Among the sites there is sufficient variations of represented fauna suggest there were strategies specific to each location with some evidence for temporal and cultural variation as well. However, these samples conform to a general coastal pattern which includes the following: use of deer to some extent, varying from site to site but rarely more than 50% of the biomass or 11% of the individuals; low use of birds; occasional use of turtles, both marine and aquatic; heavy use of marine fishes, primarily small drums and sea catfishes. Use of large numbers of small fishes suggests a fishing technology employing nets and weirs rather than hand-lines or trot-lines.

Clearly more work needs to be done on coastal subsistence, with appropriate concern for field techniques. Based on these collections it can be predicted that systematic column sampling will undoubtedly produce faunal samples over the 200 MNI mark. On that basis it is recommended that future excavators submit for identification and analysis only their column samples and features. It can be argued that 1/4 in mesh is inadequate for sampling coastal aboriginal shell middens. It is also inappropriate to use 1/4 in screen for the bulk of the soil and fine-screen only a portion, but combine the species lists. Archaeologists need to consciously make a decision concerning screen sizes to use in the field as recommended by Thomas (1969). If these guidelines are followed, it may be that the full complexity of coastal subsistence of mainland, marsh-island, and sea-island sites along the Georgia coast for all times periods will be revealed.

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