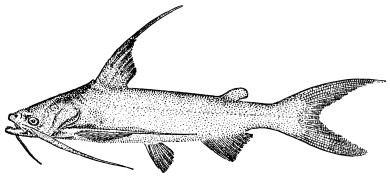

CHAPTER 6
VARIABILITY IN FIRST SPANISH PERIOD ANIMAL USE WITHIN PUEBLO SANTA CATALINA DE GUALE

Periods of biological, climatological, and cultural stress experienced along the Atlantic coast of North America in the 17th century affected diet, exploitation strategies, and economic relationships during the early days of colonization at frontier locations such as the missions of Spanish Florida. As reviewed in chapter 5, the diet of Spaniards posted to Mission Santa Catalina de Guale was different from that elsewhere in Spanish Florida, particularly in the amount of venison consumed. Animal remains from portions of Pueblo Santa Catalina de Guale, designated archaeologically as Pueblos South and North, provide insights into the Guale diet in the pueblo, their exploitation strategies, and their economic contributions to the mission. Data from Pueblos South and North are supplemented by data from the sector known as Fallen Tree (9Li8; fig. 5.1), which are reported elsewhere (Reitz and Dukes, 2008). Data from these three sectors of the pueblo provide a framework with which to explore change and continuity in the Guale diet and exploitation strategies, to elaborate on the extent to which animal remains from the mission compound were the product of Spanish or Guale dietary choices and exploitation strategies, and to examine other economic relationships between Guale and Spanish people on the island. This chapter concludes with a comparative summary of Spanish and Guale diet, exploitation strategies, and labor at Santa Catalina de Guale.

Subsistence strategies are components of broader environmental, social, and technological systems and are relatively stable once established, as seen in the long record of animal use in the Georgia Bight (Reitz et al., 2009; see chap. 3). Departures from the previous system and high degrees of variation might be expected, however, when traditional adaptations become unsatisfactory. Subsistence systems on St. Catherines Island were likely to change in the 17th century after Spanish fortifications and Roman Catholic missions were established. Altering the behavior of Native Americans to ensure their support of the wider colonial economy was, after all, one of the objectives of these outposts. Deteriorating health, nutrition, and diet; increased crowding; increased exposure to new diseases; modified activity and labor patterns; and increased physiological and social stress, however, weakened or killed many members of native and Spanish communities (Hann, 1986b: 378; Larsen, 1990: 18, 1993; Larsen et al., 2001a; see chap. 3). Others fled to what they thought might be safe havens away from Spanish influence. Demographic collapse left social systems unable to function as effectively as they had in the past. The factors associated with colonization were compounded by droughts and temperature changes that coincided with the mission effort (Blanton and Thomas, 2008). As a result, it seems likely that there were significant departures from the long-standing fishing and hunting traditions that had prevailed in the Georgia Bight and on St. Catherines Island before the 17th century.

To the extent that Spaniards influenced Guale patterns of animal use, we might expect to find several differences between the Pueblo Santa Catalina de Guale assemblage and pre-Hispanic assemblages. First, there would be the addition of Eurasian animals to the menu. Second, the use

of venison in the pueblo would reflect either an increase in the already-high pre-Hispanic level, or a decrease if Spanish demands were excessive. Third, there would be differences in the types of skeletal elements represented if preferred portions were sent to the mission compound. Fourth, species diversity would be altered either in response to Spanish food and labor demands or because of a deteriorating resource base. Fifth, the pre-Hispanic focus on estuarine resources would continue, though 17th-century fishing would exploit different trophic levels using different capture technologies yielding different fish diversity. Changes in fishing strategies would be expected because of the time required to attend religious instruction, to participate in daily religious services, to produce surplus maize for the colonial economy, and to meet other repartimiento requirements (Bushnell, 1990; Hutchinson et al., 1998; see chap. 2). These changes would be extensive to the extent that men left for extended periods of time on repartimiento service and women spent a lot of time processing maize (Larsen et al., 2001a; Larsen and Ruff, 1994; Larsen et al., 1996). The use of Spanish technologies such as cast nets might be reflected in the pueblo fish remains. Sixth, social or spatial distance between Spaniards and the Guale people might be reflected in the degree to which Spanish features were adopted by native peoples. These distinguishing features might include use of Eurasian animals, access to venison and valued portions of the carcass, dietary diversity, and mean trophic levels exploited. Foods are important status and ethnic markers and we should find a variety of Native American responses to Spanish colonization reflected in food remains because of distinctive social identities (Cusick, 1998a). The intensity or frequency of individual and collective interactions between Spanish and Guale residents at Santa Catalina de Guale, and among the Guale people themselves, might be a component of diet and exploitation strategies at the mission. Additionally, all of these factors occurred within the context of the 17th-century drought (Blanton and Thomas, 2008).

Both the Pueblo South and the Pueblo North collections contain few Eurasian domestic animals, thereby replicating the Fallen Tree evidence that wild resources were the primary sources of animal-based nutrients in the Guale village despite, or because of, the adjacent mission compound. The more significant result of the pueblo study is evidence that the use of animal resources varied among the three different sectors within the pueblo. This suggests that these sectors were used: (1) as different activity areas; (2) at different times; (3) by distinct ethnic or social groups; and/or (4) by people with different relationships with the Spanish personnel stationed at the mission. The differences among the three sectors of the pueblo are highlighted by comparisons with pre-Hispanic Irene-period Meeting House Field (9Li21; May, 2008; Reitz and Dukes, 2008; Thomas, 2008b: 707–726; see chap. 3). The relationship between the pueblo and the mission compound is examined by comparisons between the pueblo and Eastern Plaza Complex (9Li13; see chap. 5). Some aspects of the pueblo assemblage may be related to supplying venison to Spaniards but certainly all were affected by the dynamic climatic and social environment of the 17th century and accompanying biological and cultural stresses.

FALLEN TREE

The details of animal use in the sector of Pueblo Santa Catalina de Guale known as Fallen Tree (9Li8) are discussed in more detail elsewhere in this series (May, 2008; Reitz and Dukes, 2008; Thomas, 2008b: 579–580) but are summarized here. The Fallen Tree materials include the remains of a few Eurasian animals in conjunction with many white-tailed deer (*Odocoileus virginianus*) and estuarine animals (table 6.1; fig. 6.1; Reitz and Dukes, 2008). Limited quantities of pigs (*Sus scrofa*) and chickens (*Gallus gallus*) were present in the Fallen Tree collection. A single shark or ray (Chondrichthyes) individual comprises 11% of the fish taxa, 6% of the fish individuals, but less than 1% of the fish biomass in the Fallen Tree collection.

When compared to the preceding Irene-period Meeting House Field assemblage, the Fallen Tree collection suggests that many of the resources and strategies used prior to the 17th century continued to predominate at the pueblo, albeit in different frequencies (table 6.1; Reitz and Dukes, 2008). Specifically, the Guale people living at Fallen Tree shifted their focus from a strategy that combined deer and other mammals with a moderately diverse array of turtles and fishes. The new one used a richer suite of animals dominated by venison (tables 3.9 and 6.2; fig. 6.2). This subtle change in the traditional

TABLE 6.1
Irene-Period Meeting House Field and First Spanish Period Fallen Tree Summaries[a]

	Meeting House Field				Fallen Tree			
	MNI		Biomass		MNI		Biomass	
	No.	%	kg	%	No.	%	kg	%
Domestic mammals	—	—	—	—	2	2.5	1.024	2.6
Domestic birds	—	—	—	—	1	1.3	0.030	0.1
Deer	4	3.8	6.579	51.1	12	15.0	32.564	84.2
Other wild mammals	6	5.7	0.865	6.7	15	18.8	1.937	5.0
Wild birds	3	2.9	0.025	0.2	9	11.3	0.349	0.9
Turtles	47	44.8	4.912	38.2	11	13.8	2.201	5.7
Sharks, rays, & fishes	32	30.5	0.325	2.5	18	22.5	0.498	1.3
Commensal taxa	13	12.4	0.16	1.2	12	15.0	0.051	0.1
Total	105		12.866		80		38.654	

[a] Meeting House Field columns combine data from all four mounds. Data from Reitz and Dukes (2008).

subsistence pattern might reflect creolization within the pueblo but with very limited use of Spanish animal husbandry practices. The Fallen Tree collection appears, in some respects, to be similar to the collection from the pre-Hispanic Irene-period South End Mound I mortuary site (9Li3; Larsen, 2002; Reitz and Dukes, 2008; Thomas, 2008b: 698–701) as compared with the Meeting House Field collections (fig. 6.1; see chap. 3).

Although similar animals are present in both the Mission Santa Catalina de Guale and Fallen Tree assemblages (Reitz and Dukes, 2008; see chap. 5), Fallen Tree is but one section of a large Guale village associated with the mission. At the time of the original study, it was not known if Fallen Tree was typical or atypical of Guale responses to the Eurasian animals and other aspects of the Spanish presence. The people living in the Fallen Tree sector might have adopted more, or fewer, Spanish customs when compared to people living in other parts of the pueblo. In particular, we did not know if the use of domestic animals was considered prestigious, admirable, benign, or reprehensible by the Guale people living in the pueblo or elsewhere on the island. The residents of Fallen Tree might have been members of the social elite favored by Spanish friars; or perhaps they were more favorably disposed to a creole lifestyle and, therefore, they made greater use of Eurasian animals then did the rest of the community. Alternatively, the residents of Fallen Tree may have been more conservative and made less use of domestic animals than was typical of people elsewhere in the pueblo. Other social dynamics may have limited access to Eurasian animals by people living in the Fallen Tree area. Given the limited amount of data, all of these questions were left unresolved.

PUEBLOS SOUTH AND NORTH

Work elsewhere in Pueblo Santa Catalina de Guale permits alternative interpretations of the Fallen Tree collection that can be tested using vertebrate remains from the Pueblo South and Pueblo North sectors (fig. 5.1). With the addition of these data, it is possible to explore variability within the Guale pueblo. In particular, data from Pueblo South and Pueblo North enable us to assess the degree to which the Guale people incorporated Eurasian animals into their diet while contributing meats, especially venison, to Spaniards in the mission compound and to the

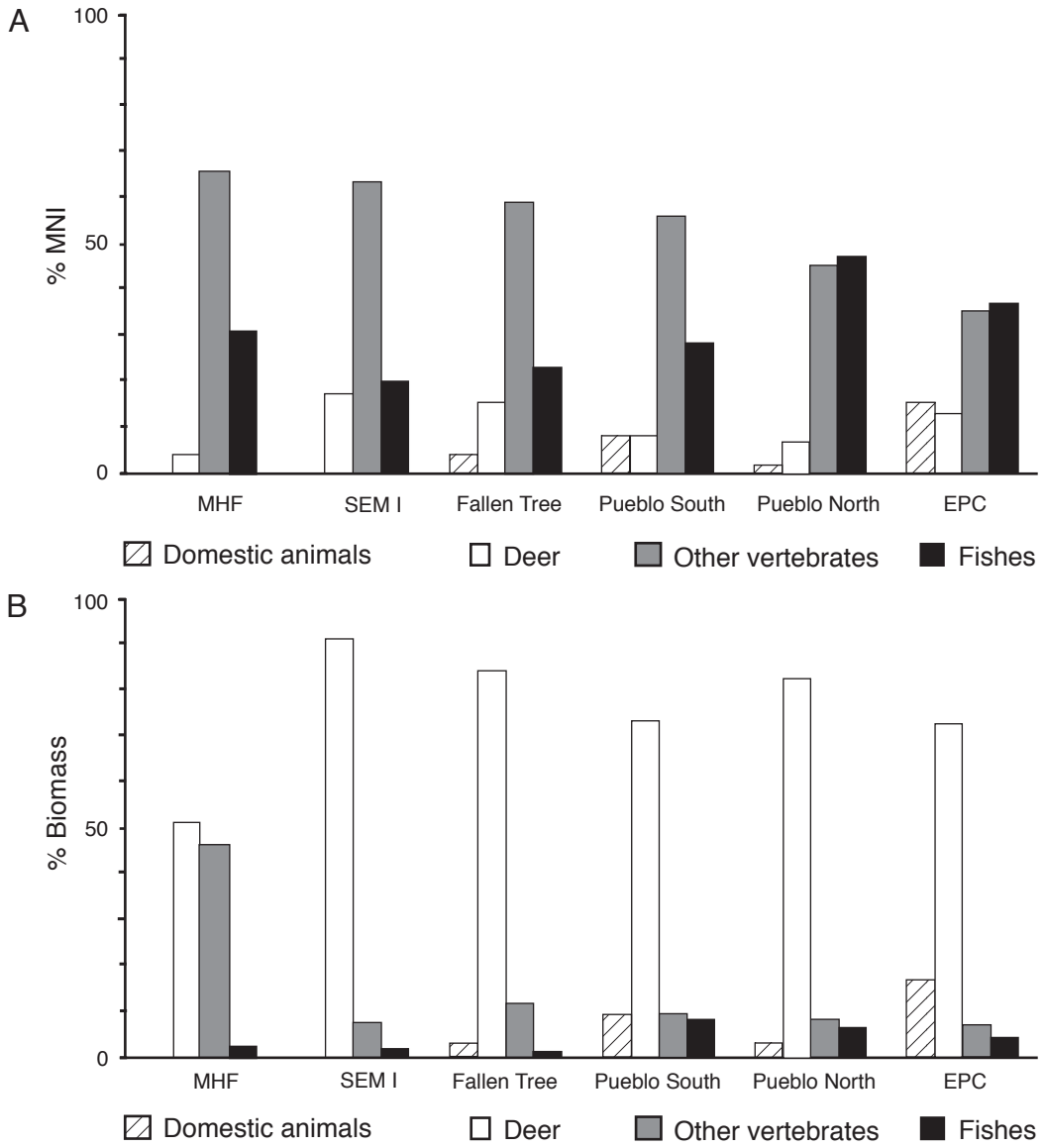

Fig. 6.1. Bar graph of animal use: (**A**) MNI and (**B**) biomass. Other vertebrates include birds, reptiles, amphibians, and wild mammals other than deer. **MHF**, Irene-period Meeting House Field (all mounds combined); **SEM I**, Irene-period South End Mound I; and **EPC**, Eastern Plaza Complex.

broader economy. These data, in combination with those from Fallen Tree, support the argument that the minor use of domestic animals was typical of the pueblo and not limited to a single activity area within the pueblo. These data also contain evidence for a high degree of variability in all aspects of animal use within the pueblo.

Vertebrate Use in the Pueblo South Sector

The collection from the Pueblo South sector contains 1158 specimens (NISP), representing the remains of an estimated 25 Minimum Number of Individuals (MNI), and weighing 1312.24 g (table 6.3). MNI is estimated for 19 taxa. The collection is small and preservation was fair. Indeterminate

TABLE 6.2
Diversity, Equitability, and Mean Trophic Level (TL) for Pueblo Santa Catalina de Guale

	Fallen Tree	Pueblo South	Pueblo North	Pueblo, combined
MNI	80	25	62	167
MNI diversity	3.183	2.786	2.678	3.377
MNI equitability	0.888	0.946	0.813	0.863
MNI richness	36	19	27	50
Fish MNI diversity	1.903	1.946	1.301	2.157
Fish MNI equitability	0.866	1.0	0.565	0.817
Fish MNI richness	9	7	10	14
Fish MNI TL	3.269	3.3	3.232	3.253
Biomass diversity	0.738	1.116	0.889	0.88
Biomass equitability	0.209	0.394	0.273	0.228
Biomass richness	34	17	26	47
Fish biomass diversity	1.608	1.074	1.684	2.147
Fish biomass equitability	0.732	0.552	0.731	0.814
Fish biomass richness	9	7	10	14
Fish biomass TL	3.315	3.705	3.379	3.457

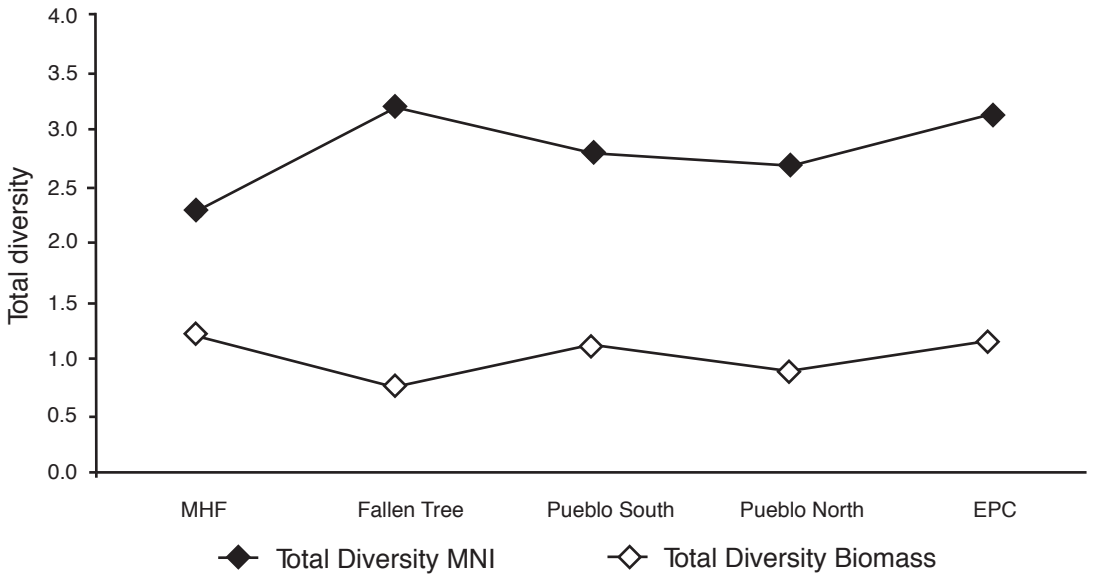

Fig. 6.2. Total collection diversity based on MNI and biomass. **MHF**, Irene-period Meeting House Field (all mounds combined); and **EPC**, Eastern Plaza Complex.

TABLE 6.3
Pueblo Santa Catalina de Guale South: Species List

			MNI			
Scientific name	Vernacular name	NISP	No.	%	Wt. (g)	Biomass (kg)
Indeterminate mammal		662	—	—	417.77	6.01
Scalopus aquaticus	Mole	30	5	20.0	1.98	0.05
Sylvilagus spp.	Rabbit	6	1	4.0	2.23	0.05
Rattus sp.	Old World rat	1	1	4.0	0.15	0.005
Indeterminate carnivore		3	—	—	0.58	0.02
Procyon lotor	Raccoon	17	2	8.0	7.52	0.16
Artiodactyla	Even-toed ungulate	20	—	—	6.93	0.15
Sus scrofa	Pig	11	1	4.0	23.66	0.45
Odocoileus virginianus	White-tailed deer	101	2	8.0	245.73	3.73
Indeterminate bird		25	—	—	16.69	0.26
Anatidae	Ducks	6	1	4.0	2.5	0.05
Gallus gallus	Chicken	1	1	4.0	1.61	0.03
Indeterminate reptile		1	—	—	0.05	—
Alligator mississippiensis	Alligator	1	1	4.0	0.28	—
Indeterminate turtle		34	—	—	7.81	0.13
Emydidae	Pond turtles	10	—	—	4.05	0.08
Malaclemys terrapin	Diamondback terrapin	14	1	4.0	9.82	0.15
Colubridae	Nonvenomous snakes	6	1	4.0	0.3	0.001
Indeterminate toad/frog		12	1	4.0	0.49	—
Carcharhinidae	Requiem sharks	3	1	4.0	2.5	0.28
Dasyatus spp.	Stingray	2	1	4.0	0.03	0.01
Indeterminate fish		97	—	—	4.58	0.1
Siluriformes	Catfishes	1	—	—	0.04	0.001
Ariidae	Sea catfishes	1	—	—	0.23	0.005
Ariopsis felis	Hardhead catfish	24	1	4.0	1.51	0.03
Bagre marinus	Gafftopsail catfish	32	1	4.0	2.92	0.05
Archosargus probatocephalus	Sheepshead	3	1	4.0	0.72	0.01
Sciaenidae	Drums	23	—	—	2.32	0.07
Cynoscion spp.	Seatrout	9	1	4.0	0.42	0.02
Mugil spp.	Mullet	2	1	4.0	0.07	0.003
Indeterminate vertebrate		—	—	—	546.75	—
Total		1158	25		1312.24	11.905

mammal and Indeterminate vertebrate specimens contribute 73% of the specimen weight. Deer, other wild mammals, wild birds, turtles, and an alligator (*Alligator mississippiensis*) contribute 32% of the estimated MNI and 81% of the estimated biomass (table 6.4; fig. 6.1).

The only direct evidence of Spanish influence is the presence of two Eurasian domestic animals. Domestic animals (pigs and chickens) contribute 8% of the MNI and 9% of the biomass in the collection (table 6.4). Most of the pig specimens (NISP = 8) are teeth (table 6.5). A small permanent canine and an unfused distal metapodial fragment indicate that one pig was a subadult female (table 6.6). The chicken was a rooster, represented by a tarsometatarsus with a spur.

Specimens from the entire deer skeleton are present in the collection, but 80% of these specimens are from the head, dominated by 66 teeth (table 6.5; fig. 6.3). Specimens from the head are substantially overrepresented compared to the standard deer, and specimens from the body and foot are substantially underrepresented (fig. 6.4). This suggests that portions of the carcass other than the head tended to be discarded elsewhere. In terms of food utility, high- and medium-value parts of the carcass are underrepresented compared to what would be expected in an undisturbed deer skeleton (table 6.7; fig. 6.5). In particular, specimens from the femur are rare. Low-utility specimens are more abundant than they are in the standard skeleton primarily because of the large number of teeth.

TABLE 6.4
Pueblo Santa Catalina de Guale South: Summary

	MNI		Biomass	
	No.	%	kg	%
Domestic mammals	1	4.0	0.45	8.9
Domestic birds	1	4.0	0.03	0.6
Deer	2	8.0	3.73	73.4
Other wild mammals	3	12.0	0.21	4.1
Wild birds	1	4.0	0.05	1.0
Turtles/alligators	2	8.0	0.15	3.0
Sharks, rays, & fishes	7	28.0	0.403	7.9
Commensal taxa	8	32.0	0.056	1.1
Total	25		5.079	

TABLE 6.5
Pueblo Santa Catalina de Guale South: Summary of Elements

Skeletal elements	Pig	Deer
Head	8	81
Vertebra/rib/sternum	—	3
Forequarter	1	4
Forefoot	—	2
Foot	—	5
Hindfoot	2	3
Hindquarter	—	3
Total	11	101

Epiphyseal fusion and antlers provide some evidence for age and sex of the deer (table 6.8). One deer was a juvenile and the other was a subadult. The attached antler fragment usually would be interpreted as evidence that the subadult was a male killed in the fall or winter. The antler cycle on Georgia sea islands, however, is prolonged and complicated by individual and annual growth variations. Antler development begins approximately in mid-April and antlers are shed as late as January (Goss, 1983; Gwynn, 1986; Halls, 1984: 94; Jacobson and Griffin, 1983: 10; Miller, 1989: 26; Warren et al., 1990: 53). Thus, the individual from Pueblo South could have been killed during the summer.

Fishes contribute 28% of the individuals and 8% of the biomass (table 6.4). Fish equitability is 1.0 because each of the seven fish taxa is represented by a single individual (table 6.3). Cartilaginous fishes include both a requiem shark (Carcharhinidae) and a stingray (*Dasyatis* spp.). These two taxa comprise 29% of the fish taxa, 29% of the fish individuals, and 72% of the fish biomass in the Pueblo South collection. Sea catfishes (Ariidae, *Ariopsis felis*, *Bagre marinus*) comprise 29% of the fish individuals and 20% of the fish biomass.

Commensal taxa contribute 32% of the individuals (table 6.4; see appendix A for a discussion of commensal taxa and other methods).

One of these is an Old World rat (*Rattus* spp.), one of the unfortunate consequences of the European expansion (Crosby, 1972, 1986). Five of the commensal taxa are moles (*Scalopus aquaticus*).

Modifications to the faunal specimens from Pueblo South include cutting, burning, working, and carnivore gnawing (table 6.9). Only 10% of specimens (NISP = 119) identified at some level other than Indeterminate vertebrate are modified and 630 Indeterminate vertebrate specimens also are modified. The most common modification is burning, which constitutes 96% of the modifications observed. None of the bird specimens and very few of the turtle and fish specimens are burned. Carnivore gnawing indicates that a portion of this collection was accessible to scavengers before being buried. The interior of one deer phalanx is hollowed out. The reason for this modification is unclear, but it appears to have been intentional.

TABLE 6.6
Pueblo Santa Catalina de Guale South: Pig Epiphyseal Fusion

Skeletal elements	Unfused	Fused	Total
Early fusing			
Humerus, distal	—	—	—
Scapula, distal	—	—	—
Radius, proximal	—	—	—
Acetabulum	—	—	—
Metapodials, proximal	—	—	—
1st/2nd phalanx, proximal	—	—	—
Middle fusing			
Tibia, distal	—	—	—
Calcaneus, proximal	—	—	—
Metapodials, distal	1	—	1
Late fusing			
Humerus, proximal	—	—	—
Radius, distal	—	—	—
Ulna, proximal	—	—	—
Ulna, distal	—	—	—
Femur, proximal	—	—	—
Femur, distal	—	—	—
Tibia, proximal	—	—	—
Total	1	—	1

Vertebrate Use in the Pueblo North Sector

The Pueblo North collection consists of 4968 vertebrate specimens (NISP) weighing 3707.70 g and containing the remains of at least 62 individuals (MNI; table 6.10). MNI is estimated for 27 taxa. Indeterminate mammal and Indeterminate vertebrate specimens contribute 60% of the total specimen weight. The only Eurasian domestic animal identified in the Pueblo North collection is a pig, which contributes 2% of the individuals and 3% of the biomass (table 6.11). Most of the pig specimens are teeth (NISP = 15; table 6.12). Based on the characteristics of a fused first phalanx, deciduous premolars, and a permanent canine, this individual was probably a subadult female (table 6.13). Deer, wild mammals, wild birds, and turtles contribute 34% of the individuals and 90% of the biomass in the Pueblo North collection (table 6.11; fig. 6.1). The most abundant of these animals are raccoons (*Procyon lotor*), which contribute 10% of the individuals and 3% of the biomass.

All parts of the deer skeleton are represented (table 6.12; fig. 6.6). Cranial specimens constitute 64% of the specimens (NISP = 240); 206 of the cranial specimens are teeth. Specimens from the head are overrepresented and specimens from the body and foot are underrepresented compared to an undisturbed deer skeleton (fig. 6.4). High- and medium-utility portions of the carcass are underrepresented in the collection compared to what would be expected in an undisturbed deer skeleton (table 6.7, fig. 6.5). In particular, specimens from the femur are underrepresented. Low-utility specimens are more abundant than they are in the standard skeleton, primarily because of the large number of teeth (fig. 6.6).

Dentition and epiphyseal fusion suggest that one of the four deer individuals was a juvenile when it died, one was at least a subadult, and two were adults (table 6.14). A skull fragment with evidence for a shed antler indicates that one was a male deer killed, perhaps, between February and April.

Fishes contribute 47% of the individuals and 6% of the biomass (table 6.11). The most common fishes are sea catfishes (Ariidae), which

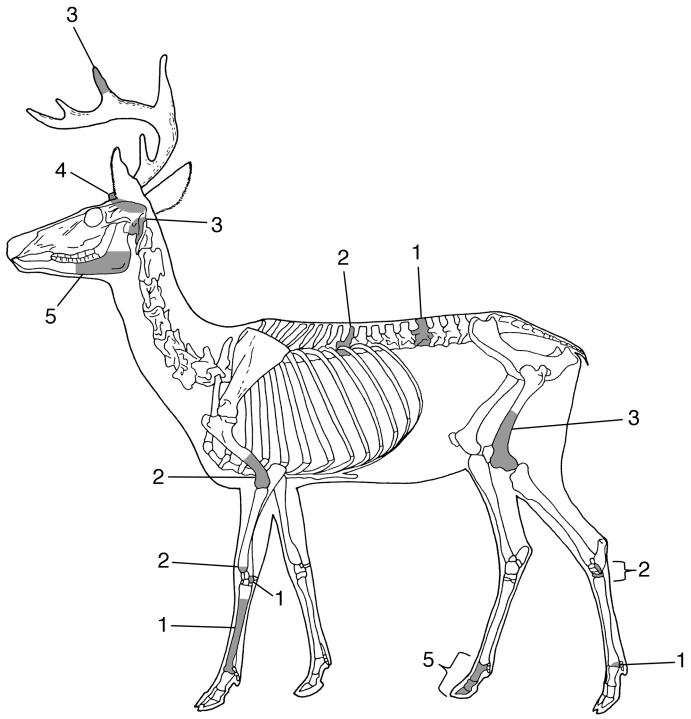

Fig. 6.3. Pueblo South deer elements. NISP = 101 (66 loose teeth not shown). The numbers indicate the number of specimens from that portion of the deer skeleton.

contribute 32% of the individuals. Five sea catfishes are hardhead catfishes (*Ariopsis felis*) and five are gafftopsail catfishes (*Bagre marinus*). The other ten catfish individuals could not be identified beyond the family level. Cartilaginous fishes include both a requiem shark and a stingray (Dasyatidae) and comprise 20% of the fish taxa, 7% of the fish individuals, and 26% of the fish biomass in the Pueblo North collection.

Eighteen percent of the estimated individuals in the Pueblo North collection are commensal taxa, though they contribute less than 1% of the biomass (table 6.11). One is an Old World rat and three are moles. One canid (Canidae) is either a domestic dog or a wild member of this family.

Modifications to the faunal specimens from Pueblo North include cutting, clean-cutting, hacking, burning, working, rodent gnawing, and carnivore gnawing (table 6.15). Only 12% of specimens (NISP = 585) identified at some level other than Indeterminate vertebrate are modified, and 2324 Indeterminate vertebrate specimens also are modified. The most common modification is burning, which is observed on 99% of the modified specimens. Very few of the bird or turtle specimens are burned, but 9% of the fish specimens are burned. In addition to five deer specimens that are cut or hacked, one antler fragment is polished. Minimal carnivore gnawing and rodent gnawing might indicate that most of this collection was inaccessible to scavengers before being buried.

VARIABILITY IN GUALE VERTEBRATE USE DURING THE 17TH CENTURY

These additional data from Pueblo Santa Catalina de Guale demonstrate both change and continuity in the diet and exploitation strategies of people living in the pueblo. Guale households did not maintain their traditional subsistence practices nor did they wholly embrace Spanish practices (figs. 6.1, 6.2, 6.4, and 6.5). Instead, they combined traditional practices with limited use

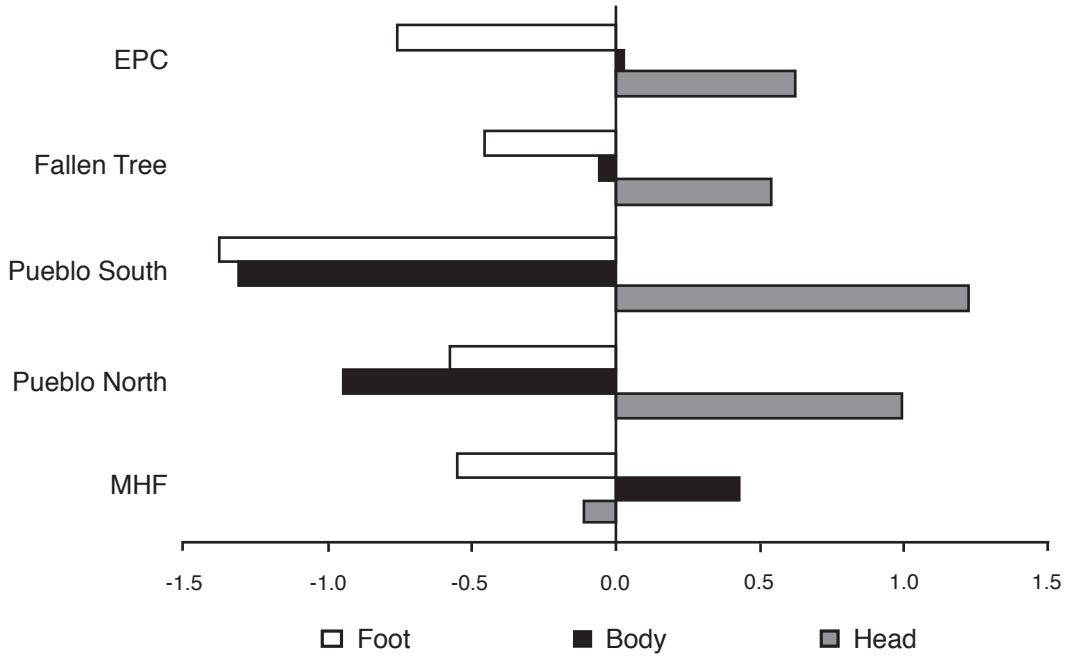

Fig. 6.4. Ratio diagram comparing deer elements from the Eastern Plaza Complex, Fallen Tree, Pueblo South, Pueblo North, and Meeting House Field with a complete standard deer skeleton. Categories with positive values are more abundant than the standard and negative values indicate categories that are less abundant than the standard. **EPC**, Eastern Plaza Complex; and **MHF**, Irene-period Meeting House Field (all mounds combined). Fallen Tree data are from Reitz and Dukes (2008) and Eastern Plaza Complex data are from chapter 5.

of Eurasian animals, creating a new system that relied on locally available estuarine resources and venison but included some pork and chicken. The pre-Hispanic Meeting House Field and the pueblo assemblages represent different ways of making use of the same resource base. Perhaps more significant, however, is the evidence for a high degree of variability in animal use among the three sectors of the pueblo. Several aspects of resource use on the island are discussed below, beginning with evidence for dietary change at the pueblo and concluding with a review of variability within the pueblo as evidence for cultural change and affiliation with the Spanish mission.

The Guale Pueblo Compared to Irene-Period Meeting House Field

Diets within the Guale pueblo incorporated the same suite of animal resources as was found at pre-Hispanic Meeting House Field (fig. 6.7). However, the species recovered from the pueblo indicate a change in the emphasis within this suite that might reflect Spanish influence. Some of the Guale people living at the pueblo shifted their focus from a pre-Hispanic strategy that combined a moderately rich and diverse array of turtles and fishes, along with deer, to one that used a more diverse suite of animals dominated by venison (figs. 6.7 and 6.8).

This transition becomes particularly evident when commensal taxa are excluded from the diversity estimate (see table 6.16 for a list of commensal taxa; see tables 3.9 and 6.2 for diversity estimates that include commensal taxa). Meeting House Field MNI diversity without commensal individuals is 1.95 with a richness of 17; the pueblo MNI diversity without commensal individuals is 3.12 with a richness of 40. Meeting House Field noncommensal biomass diversity is 1.14 compared to a noncommensal biomass diversity of 0.86 for the pueblo assemblage. Clearly 17th-century diet breadth was much greater than that of the Irene period, but the source of most of the meat was more focused.

TABLE 6.7
Number of Deer Specimens (NISP) in Each Food Utility Category (FUI) from Meeting House Field, Guale Pueblo, and Eastern Plaza Complex Compared to the Numbers in a Complete Standard Deer Skeleton[a]

	Meeting House Field	Fallen Tree	Pueblo S	Pueblo N	Eastern Plaza	Standard Deer
Low Utility (< 1000 FUI)						
Antler	2	11	4	10	30	2
Mandible	2	20	5	10	54	2
Tooth	7	191	66	206	544	32
Other skull fragments	5	58	6	14	79	27
Atlas/axis	5	10	—	4	8	2
Metacarpus/carpus	4	35	2	19	60	16
Phalanx/sesamoid	5	56	5	32	87	48
Subtotal	30	381	88	295	862	129
Medium Utility (1000–3000 FUI)						
Other vertebrae	5	43	3	7	107	24
Pelvis/sacrum	4	14	—	5	64	10
Rib	7	69	—	—	24	26
Scapula	—	11	—	1	44	2
Humerus	4	16	2	7	52	2
Radius/ulna	6	22	2	14	113	4
Metatarsus	4	28	1	6	31	2
Subtotal	30	203	8	40	435	70
High Utility (>3000 FUI)						
Sternum	2	1	—	—	9	7
Femur	6	23	3	6	66	2
Tibia/tarsal	6	59	2	24	192	14
Subtotal	14	83	5	30	267	23
Total NISP	74	667	101	365	1564	222

[a] Eastern Plaza Complex data are from chapter 5 and the Meeting House Field and Fallen Tree data are from Reitz and Dukes (2008). Pueblo S is Pueblo South and Pueblo N is Pueblo North. Food utility categories follow Purdue et al. (1989). Some specimens could not be used in this procedure, e.g., the patella and specimens identified only as metapodials.

Other comparisons also are complicated by the presence of commensal animals (see appendix A for a discussion of commensal animals). Although the rodents, snakes, lizards, and amphibians that are classified as commensal taxa could have been food items either regularly or occasionally, they rarely comprise more than a few percentages of the biomass (table 6.16; see also tables 3.4 and 6.2). In terms of individuals, however, these commensal organisms are a substantial portion of the pueblo assemblage. An increase in rodents might suggest increased storage of grains and other foods, but most of the increase in commensal taxa is due to moles and frogs or toads (*Scaphiopus holbrookii*, *Rana* spp., *Bufo* spp.). Given these large percentages, figure 6.1 is recalculated with commensal animals separated from the other mammals, reptiles, and amphibians (table 6.17; fig. 6.7). The following discussion is based on table 6.17, as is figure 6.7.

Indigenous terrestrial mammals and birds contribute 36% of the individuals and 88% of the biomass in the pueblo assemblage compared to 12% of the individuals and 58% of the biomass in the Meeting House Field assemblage (tables 6.1 and 6.17; fig. 6.7). The increase in juvenile and subadult deer, from 25% of the deer individuals in the Meeting House Field assemblage to 56% of the deer individuals in the pueblo assemblage, might reflect changes associated with the role of hunting in mission life (table 6.18). An increase in deer hunting (from 4% to 11% of the individuals), as well as the time and effort needed to master animal husbandry skills while cultivating fields and gardens, suggest that changes occurred in the management of time and labor within the Guale pueblo.

The increase in the percentages of venison and other terrestrial sources of animal protein,

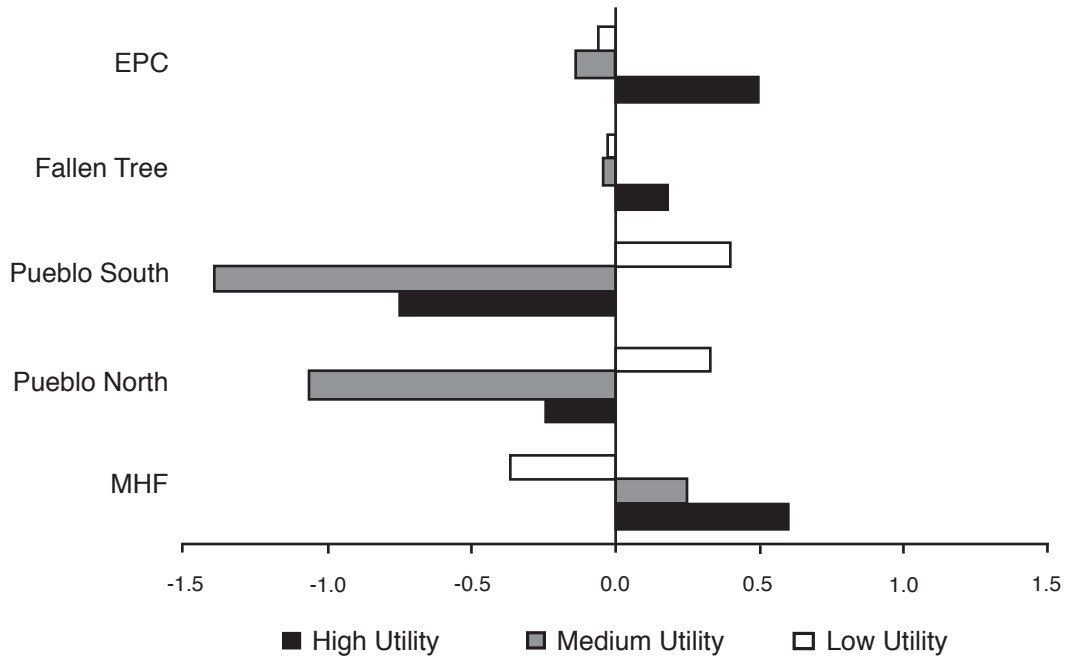

Fig. 6.5. Ratio diagram comparing food utility categories (FUI) for deer from the Eastern Plaza Complex, Fallen Tree, Pueblo South, Pueblo North, and Meeting House Field with food utility categories in a complete standard deer skeleton. Categories with positive values are more abundant than the standard and negative values indicate categories that are less abundant than the standard. **EPC**, Eastern Plaza Complex; and **MHF**, Irene-period Meeting House Field (all mounds combined). Fallen Tree data are from Reitz and Dukes (2008) and the Eastern Plaza Complex data are from chapter 5.

TABLE 6.8
Pueblo Santa Catalina de Guale South: Deer Epiphyseal Fusion

Skeletal elements	Unfused	Fused	Total
Early fusing			
Humerus, distal	—	1	1
Scapula, distal	—	—	—
Radius, proximal	—	—	—
Acetabulum	—	—	—
Metapodials, proximal	—	—	—
1st/2nd phalanx, proximal	1	2	3
Middle fusing			
Tibia, distal	—	—	—
Calcaneus, proximal	—	—	—
Metapodials, distal	1	1	2
Late fusing			
Humerus, proximal	—	—	—
Radius, distal	2	—	2
Ulna, proximal	—	—	—
Ulna, distal	—	—	—
Femur, proximal	—	—	—
Femur, distal	3	—	3
Tibia, proximal	—	—	—
Total	7	4	11

TABLE 6.9
Pueblo Santa Catalina de Guale South: Modifications

Taxa	Cut	Burned	Worked	C.-gnawed[a]
Indeterminate mammal	1	86	—	18
Raccoon	—	2	—	—
Deer	—	2	1	2
Indeterminate turtle	—	2	—	—
Indeterminate fish	—	3	—	—
Hardhead catfish	—	2	—	—
Indeterminate vertebrate	—	622	—	8
Total	1	719	1	28

[a] Key to abbreviation: C.-gnawed, carnivore-gnawed.

TABLE 6.10
Pueblo Santa Catalina de Guale North: Species List

			MNI			
Scientific name	Vernacular name	NISP	No.	%	Wt. (g)	Biomass (kg)
Indeterminate mammal		1830	—	—	913.07	12.15
Didelphis virginiana	Opossum	2	1	1.6	0.24	0.01
Scalopus aquaticus	Mole	34	3	4.8	1.88	0.05
Sylvilagus spp.	Rabbit	24	3	4.8	6.7	0.15
Indeterminate rodent		1	—	—	0.03	0.001
Sciurus spp.	Squirrel	2	1	1.6	0.21	0.01
Rattus spp.	Old World rat	2	1	1.6	0.04	0.001
Indeterminate carnivore		1	—	—	0.22	0.01
Canidae	Dog family	1	1	1.6	0.11	0.004
Ursus americanus	Black bear	1	1	1.6	1.87	0.05
Procyon lotor	Raccoon	48	6	9.7	25.15	0.48
Artiodactyla	Even-toed ungulate	1	—	—	0.09	0.003
Sus scrofa	Pig	17	1	1.6	27.99	0.53
Odocoileus virginianus	White-tailed deer	377	4	6.5	1076.7	14.09
Indeterminate bird		55	—	—	65.17	0.91
Phalacrocorax auritus	Double-crested cormorant	2	1	1.6	0.26	0.01
Passeriformes	Song birds	3	—	—	0.11	0.003
Cardinalis cardinalis	Cardinal	1	1	1.6	0.15	0.004
Indeterminate turtle		570	—	—	65.8	0.52
Kinosternidae	Mud/musk turtles	40	1	1.6	8.43	0.13
Emydidae	Pond turtles	57	2	3.2	49.73	0.43
Malaclemys terrapin	Diamondback terrapin	9	(1)	—	13.79	0.18
Colubridae	Nonvenomous snakes	30	1	1.6	1.08	0.01

TABLE 6.10 — (*Continued*)

			MNI			
Scientific name	Vernacular name	NISP	No.	%	Wt. (g)	Biomass (kg)
Viperidae	Pit vipers	1	1	1.6	2.52	0.03
Indeterminate toad/frog		85	4	6.5	2.7	—
Scaphiopus holbrookii	Spadefoot toad	2	(1)	—	0.05	—
Bufo spp.	Toad	6	(1)	—	0.67	—
Chondrichthyes	Cartilaginous fishes	4	—	—	0.52	0.07
Squaliformes	Cartilaginous fishes	5	—	—	0.17	0.03
Carcharhinidae	Requiem sharks	8	1	1.6	0.41	0.06
Dasyatidae	Stingrays	52	1	1.6	2.01	0.23
Indeterminate fish		1021	—	—	41.89	0.61
Lepisosteus spp.	Gar	8	1	1.6	3.55	0.08
Siluriformes	Catfishes	81	—	—	6.21	0.11
Ariidae	Sea catfishes	72	20	32.3	19.34	0.33
Ariopsis felis	Hardhead catfish	121	(5)	—	10.27	0.18
Bagre marinus	Gafftopsail catfish	69	(5)	—	14.19	0.25
Sparidae	Porgies	1	—	—	0.34	0.01
Archosargus probatocephalus	Sheepshead	6	1	1.6	0.34	0.01
Sciaenidae	Drums	25	—	—	3.85	0.11
Cynoscion sp.	Seatrout	1	1	1.6	0.03	0.003
Micropogonias undulatus	Atlantic croaker	1	1	1.6	0.25	0.01
Pogonias cromis	Black drum	259	1	1.6	16.87	0.31
Sciaenops ocellatus	Red drum	16	1	1.6	1.33	0.05
Mugil spp.	Mullet	16	1	1.6	0.31	0.01
Indeterminate vertebrate		—	—	—	1321.06	—
Total		4968	62		3707.7	32.229

combined with the related decrease in estuarine sources of animal protein, is consistent with the less negative $\delta^{13}C$ and less positive $\delta^{15}N$ values reported for human remains from coastal Georgia during the First Spanish period as compared with the late pre-Hispanic periods (Larsen et al., 2001a, 2001b). The $\delta^{15}N$ signature indicates that some Guale people experienced a dietary decrease in estuarine protein from sources such as molluscs, fishes, and turtles (Larsen et al., 1990a; Schoeninger et al., 1990: 91). This can be attributed to an increase in meat from a single terrestrial source (deer) and a decrease in turtle biomass (tables 6.1 and 6.17; fig. 6.7). Wild birds and other terrestrial mammals also contributed more biomass to the pueblo diet than at Meeting House Field, but this increase probably was not sufficient to produce the substantial isotopic changes. It does not appear that a decline in fish biomass is the cause of the less positive $\delta^{15}N$ signature because the biomass from fishes increased slightly. Without zooarchaeological

TABLE 6.11
Pueblo Santa Catalina de Guale North: Summary

	MNI		Biomass	
Category	No.	%	kg	%
Domestic mammals	1	1.6	0.53	3.1
Domestic birds	—	—	—	—
Deer	4	6.5	14.09	82.5
Other wild mammals	12	19.4	0.7	4.1
Wild birds	2	3.2	0.014	0.1
Turtles	3	4.8	0.56	3.3
Sharks, rays, & fishes	29	46.8	1.093	6.4
Commensal taxa	11	17.7	0.095	0.6
Total	62		17.082	

TABLE 6.12
Pueblo Santa Catalina de Guale North: Summary of Elements

Skeletal elements	Pig	Deer
Head	15	240
Vertebra/rib/sternum	—	11
Forequarter	—	22
Forefoot	—	19
Foot	1	44
Hindfoot	—	20
Hindquarter	1	21
Total	17	377

TABLE 6.13
Pueblo Santa Catalina de Guale North: Pig Epiphyseal Fusion

Skeletal elements	Unfused	Fused	Total
Early fusing			
Humerus, distal	—	—	—
Scapula, distal	—	—	—
Radius, proximal	—	—	—
Acetabulum	—	—	—
Metapodials, proximal	—	—	—
1st/2nd phalanx, proximal	—	1	1
Middle fusing			
Tibia, distal	—	—	—
Calcaneus, proximal	—	—	—
Metapodials, distal	—	—	—
Late fusing			
Humerus, proximal	—	—	—
Radius, distal	—	—	—
Ulna, proximal	—	—	—
Ulna, distal	—	—	—
Femur, proximal	—	—	—
Femur, distal	—	—	—
Tibia, proximal	—	—	—
Total	—	1	1

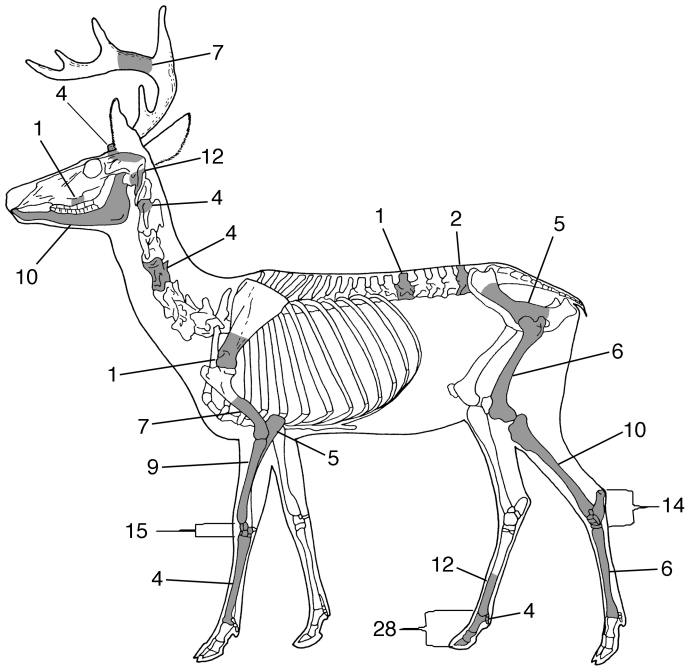

Fig. 6.6. Pueblo North deer elements. NISP = 377 (206 teeth not shown). The numbers indicate the number of specimens from that portion of the deer skeleton.

data from marine invertebrates such as oysters (*Crassostrea virginica*) and clams (*Mercenaria* spp.), the contribution of the full range of estuarine biomass to the diets in the pre-Hispanic and First Spanish periods cannot be assessed. Currently, it appears that changes in stable isotope ratios are caused by an increase in terrestrial dietary sources combined with a decline in estuarine turtle consumption.

Another change in the exploitation strategy is indicated by increased MNI diversity in conjunction with decreased biomass diversity in the pueblo assemblage compared to Meeting House Field (fig. 6.8). The overall richness increased from 23 taxa in the Meeting House Field assemblage to 50 taxa in the pueblo assemblage. The increase in richness is particularly noticeable in wild mammals, which increased from four noncommensal mammalian taxa to seven noncommensal mammalian taxa. Opossums (*Didelphis virginiana*), rabbits (*Sylvilagus* spp.), squirrels (*Sciurus* spp.), bears (*Ursus americanus*), mustelids (e.g., mink, *Mustela vision*), raccoons, and deer are well-known garden and field foragers. Their increased use may have been an outgrowth of expanded farming and opportunities to hunt and trap animals that raid gardens and fields or prey on other animals feeding on crops (e.g., Linares, 1976; Neusius, 2008). Although fishing efforts, measured as percentages of individuals and biomass, remained relatively constant, time and effort spent acquiring turtles declined markedly. In addition, small quantities of pigs and chickens were incorporated into the pueblo diet, further increasing the pueblo MNI diversity. Biomass diversity declined considerably because of the dominance of venison in the pueblo assemblage. In terms of effort, the niche width expanded considerably, but in terms of animal nutrients, the focus was on a single animal: deer.

The increase in deer could be a response to Spanish demands for meat and hides. Deer and maize were important Native American contributions to the economies of the Franciscan mission system and to secular Spanish Florida. Several questions are raised about the high quantity of deer in the Guale pueblo assemblage compared

TABLE 6.14
Pueblo Santa Catalina de Guale North: Deer Epiphyseal Fusion

Skeletal elements	Unfused	Fused	Total
Early fusing			
Humerus, distal	—	5	5
Scapula, distal	—	1	1
Radius, proximal	—	3	3
Acetabulum	—	1	1
Metapodials, proximal	—	3	3
1st/2nd phalanx, proximal	3	13	16
Middle fusing			
Tibia, distal	1	1	2
Calcaneus, proximal	2	1	3
Metapodials, distal	5	2	7
Late fusing			
Humerus, proximal	—	—	—
Radius, distal	2	3	5
Ulna, proximal	1	1	2
Ulna, distal	—	—	—
Femur, proximal	—	1	1
Femur, distal	3	1	4
Tibia, proximal	2	1	3
Total	19	37	56

to the Meeting House Field assemblage. To what extent did the Guale people living in the pueblo retain venison for themselves? To what extent might deer have been given to support people within the mission compound? Does this reflect an optimal foraging strategy or a conservation strategy on the part of Guale hunters?

The Guale people living in the pueblo consumed a great deal of venison compared to their predecessors at Meeting House Field (fig. 6.7B) but retained fewer body, or high-utility, portions of the deer carcass (figs. 6.9 and 6.10). This interpretation is based on differences in specimen frequencies compared to a standard deer skeleton in both the Meeting House Field and the pueblo assemblages. In the Meeting House Field assemblage 19% of the specimens are from high-utility portions and in the pueblo assemblage 10% of the specimens are high-utility (table 6.7). The Meeting House Field assemblage has more forequarter and hindquarter specimens (31% of the deer NISP) and fewer head specimens (21% of the deer NISP) compared to a standard deer and compared to the pueblo (14% and 51% of the deer NISP, respectively; table 6.19; fig. 6.9). Likewise, medium- and high-utility portions of the carcass dominate the Meeting House Field assemblage (fig. 6.10). In the pueblo assemblage, forequarter and hindquarter specimens are underrepresented and specimens from the head are overrepresented compared to a standard deer (fig. 6.9). Only low-utility portions of the carcass are abundant in the pueblo assemblage compared to a standard deer (fig. 6.10). These low-utility portions are primarily from the head (tables 6.7 and 6.19).

Several interpretations can be made of these data. The overrepresentation of head specimens (primarily teeth) in the pueblo assemblage indirectly indicates that skulls were intentionally transported to the pueblo and retained there. Perhaps skulls were brought back as containers for brains, which were needed to cure deer hides, or perhaps the brain was considered good eating. Specimens from the foot may have been discarded at the kill site, retained with hides, or used as tools. In any case, these are underrepresented in the Meeting House Field and pueblo assemblages. Given Spanish demands on the Guale people for food and raw materials, another consideration also may have been involved. The decrease in high- and medium-utility specimens in the pueblo collections compared to Meeting House Field suggests that specimens from valued portions of the carcass were disposed of elsewhere during the 17th century, specifically that the high-utility portions were given to the mission compound (fig. 6.10; see below, this chapter). These suppositions are not mutually exclusive and all need to be considered as factors in deer acquisition, processing, and distribution.

Data on the age at death for deer in the Meeting House Field assemblage are too limited for direct comparison with the pueblo, but some evidence for Guale hunting strategies is found by comparison with the Plaza Complex (table 6.18). Presuming that most of the deer in the Plaza Complex were obtained by Guale hunters, prime-aged deer were used in numbers indicative

TABLE 6.15
Pueblo Santa Catalina de Guale North: Modifications[a]

Taxa	Cut	C.-cut	Hacked	Burned	Worked	R.-gnawed	C.-gnawed
Indeterminate mammal	2	—	1	332	—	1	9
Rabbit	—	—	—	2	—	—	—
Dog family	—	—	—	1	—	—	—
Raccoon	—	—	—	—	—	—	1
Deer	2	2	1	12	1	2	4
Indeterminate bird	—	—	—	1	—	—	—
Cormorant	—	—	—	1	—	—	—
Indeterminate turtle	—	—	—	42	—	—	—
Mud/musk turtles	—	—	—	2	—	—	—
Pond turtles	—	2	—	—	—	—	—
Diamondback terrapin	—	—	1	—	—	—	—
Indeterminate toad/frog	—	—	—	1	—	—	—
Indeterminate fish	—	—	—	43	—	—	—
Stingrays	—	—	—	1	—	—	—
Catfishes	—	—	—	30	—	—	—
Sea catfishes	1	—	—	13	—	—	—
Hardhead catfish	—	—	—	16	—	—	—
Gafftopsail catfish	—	—	—	6	—	—	—
Drums	—	—	—	1	—	—	—
Black drum	—	—	—	51	—	—	—
Indeterminate vertebrate	—	—	—	2323	1	—	—
Total	5	4	3	2878	2	3	14

[a] Key to abbreviations: C.-cut, clean-cut; R.-gnawed, rodent-gnawed; and C.-gnawed, carnivore-gnawed.

of an optimum foraging strategy based on the identification of a greater number of subadult and young-adult deer compared to juveniles or old-aged adults. This conclusion is supported by cementum increments observed in thin-sectioned teeth recovered from the cocina (Structure 2) within the Plaza Complex (see chap. 7) as well as the epiphyseal fusion and tooth eruption data observed in the Plaza Complex (table 5.8) and pueblo (tables 6.8 and 6.18). It is unlikely that tender meat from juveniles was preferentially supplied to the mission compound to such an extent that only older animals were used in the pueblo. It is not known if this is a departure from the pre-Hispanic strategy, though there was a long tradition on the island of emphasizing subadult deer (Reitz, 2008: 630).

This comparison demonstrates that those Guale people living at the pueblo did not maintain their traditional subsistence practices unaltered, nor did they fully adopt Spanish traditions, particularly animal husbandry. Instead, they combined their traditional subsistence practices with some aspects of Spanish animal use to

create a new system that continued to use local estuarine fishes while putting greater emphasis on local wild terrestrial resources, especially deer. Occasionally, they also ate pork and chicken. Changes in Guale subsistence can be seen as efforts to satisfy new social obligations and to take advantage of new opportunities created by the mission system. At the same time, the labor and scheduling demands of supplying goods and services while participating in religious

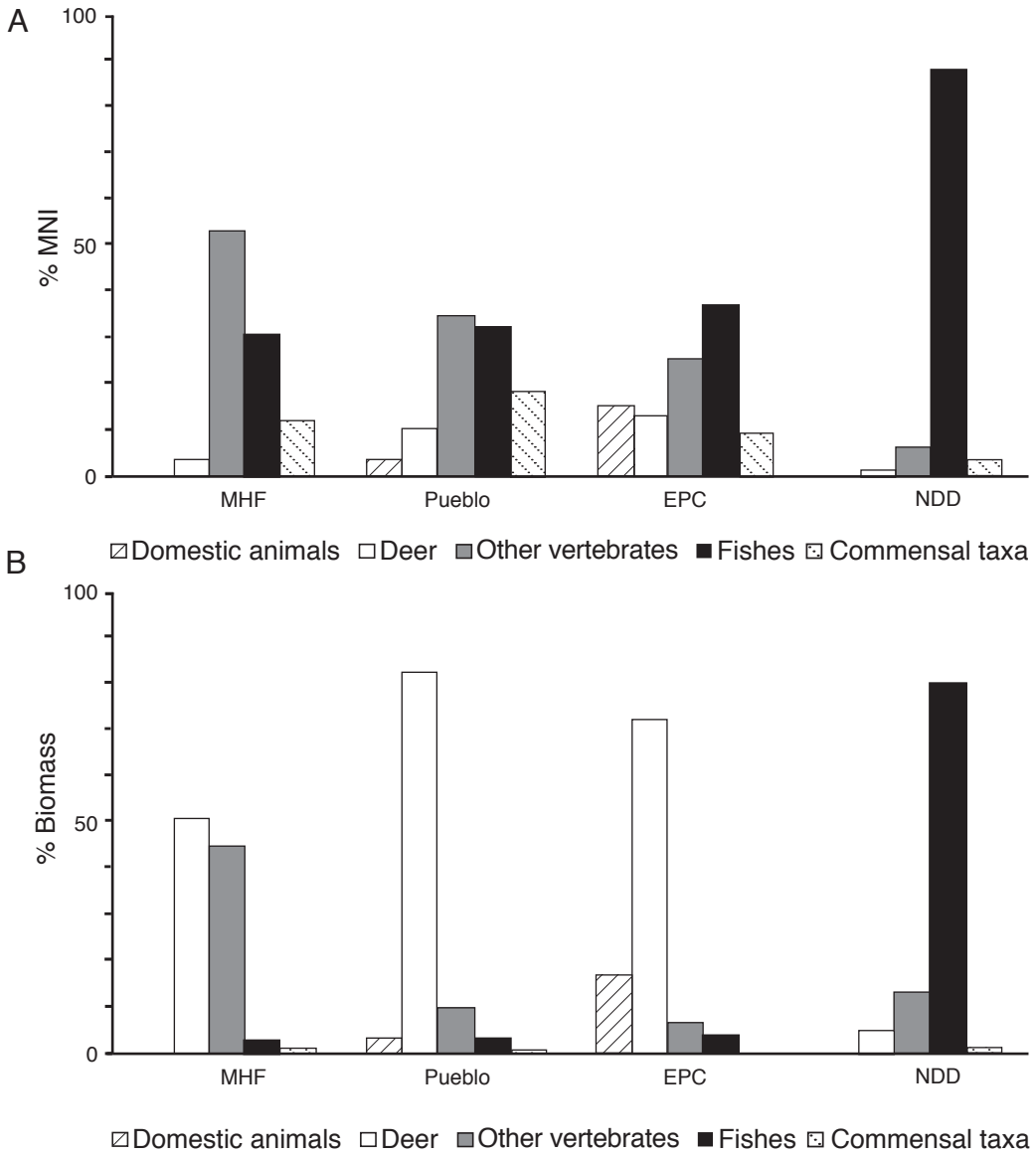

Fig. 6.7. Bar graph of animal use: (**A**) MNI and (**B**) biomass. Other vertebrates include birds, reptiles, amphibians, and wild mammals other than deer. Commensal taxa are listed in table 6.16. **MHF**, Irene-period Meeting House Field (all mounds combined); **Pueblo**, Pueblo Santa Catalina de Guale; **EPC**, Eastern Plaza Complex; and **NDD**, Nombre de Dios, which combines 16th/17th-century and 17th/18th-century mission components from Fountain of Youth.

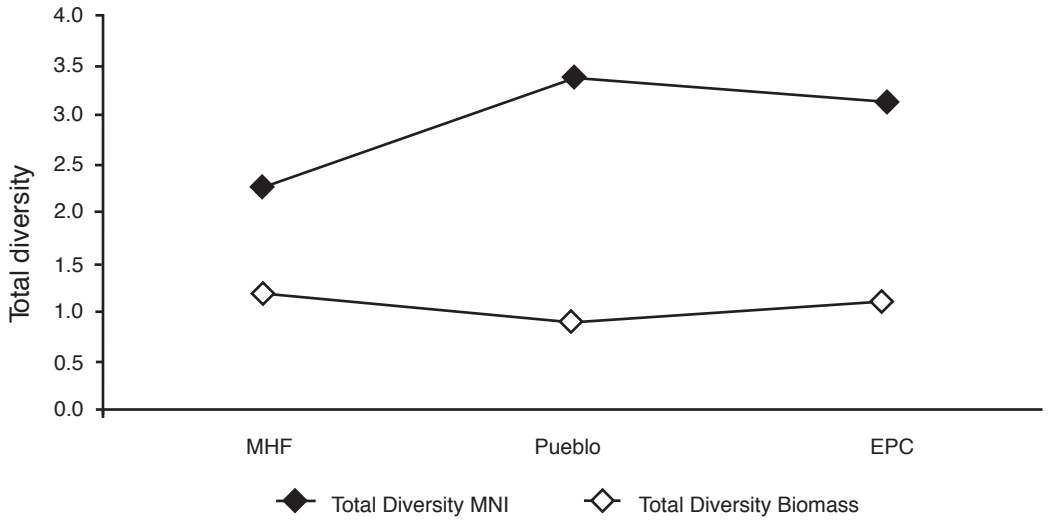

Fig. 6.8. Total collection diversity based on MNI and biomass. **MHF**, Irene-period Meeting House Field (all mounds combined); **Pueblo**, Pueblo Santa Catalina de Guale; and **EPC**, Eastern Plaza Complex. The Eastern Plaza Complex data are from chapter 5.

instruction and devotions (e.g., Bushnell, 1990) diverted time and effort away from activities that formerly characterized the economy of the pre-Hispanic island community. The Spanish presence influenced the choice of resources, emphasizing those with the most value to the mission system. This influence is reflected in the changes in vertebrate use at the pueblo.

Variability Within the Pueblo

The Spanish influence was not homogeneous within the pueblo (figs. 6.1, 6.2, 6.4, and 6.5). In fact, variability in the use of Eurasian animals, deer, and other wild vertebrates may be the most significant aspect of the zooarchaeological study of the animal remains from the pueblo. Given the short lifespan of the mission, less than 100 years, it is likely that the different patterns of animal use found in the collections from Fallen Tree, Pueblo South, and Pueblo North were practiced more or less simultaneously. These pueblo collections share some features that distinguish them from the Meeting House Field collection: (1) some use of domestic animals, albeit minimal; (2) higher use of venison; (3) higher MNI diversity; (4) an absence of small-bodied fishes; and (5) fishes from higher mean trophic levels. Within these parameters, however, responses to the Spanish presence were variable, and in no case as dramatic as might be inferred from historical records.

Animal use at the pueblo is difficult to characterize. For example, the percentages of deer individuals in the Pueblo South and North collections are lower than in the Fallen Tree collection (fig. 6.1). Use of other animals also is variable; for example, fishes range from 22% of the individuals in the Fallen Tree collection to 47% in the Pueblo North collection. As a result, the total MNI diversity ranges from 2.7 to 3.2 (fig. 6.2), but the highest use of fishes (Pueblo North) is not in the sector with the highest overall MNI diversity (Fallen Tree). Similar variability in fishing strategies, fish diversity, and mean trophic levels targeted is present in the collections from these three sectors of the pueblo (figs. 6.11 and 6.12). The higher mean trophic level for biomass for Pueblo South reflects the higher biomass from cartilaginous fishes as does the lower fish biomass diversity, and these measures for Fallen Tree and Pueblo North reflect higher percentages of sea catfishes.

The portions and utility of deer carcasses recovered from each sector is wide-ranging (figs. 6.4 and 6.5). The sector with the highest percentage of deer individuals, Fallen Tree, also has the highest percentage of meaty portions and

TABLE 6.16
Commensal Taxa[a]

	MHF		EPC		Pueblo, combined		Fallen Tree		Pueblo S		Pueblo N	
Taxa	MNI	Biomass	MNI	Biomass	MNI	Biomass	MNI	Biomass	MNI	Biomass	MNI	Biomass
Mammals												
Soricidae	1	0.002	—	—	—	—	—	—	—	—	—	—
Blarina carolinensis	—	—	1	0.001	—	—	—	—	—	—	—	—
Scalopus aquaticus	2	0.008	3	0.024	10	0.110	2	0.010	5	0.05	3	0.05
Sigmodontinae	—	—	—	—	1	0.002	1	0.002	—	—	—	—
Oryzomys sp.	—	—	1	0.004	—	—	—	—	—	—	—	—
Peromyscus sp.	—	—	1	0.01	—	—	—	—	—	—	—	—
Rattus spp.	—	—	—	—	2	0.006	—	—	1	0.005	1	0.001
Canidae	—	—	—	—	1	0.004	—	—	—	—	1	0.004
Canis familiaris	—	—	1	0.182	1	0.019	1	0.019	—	—	—	—
Felis catus	—	—	1	0.0004	—	—	—	—	—	—	—	—
Reptiles												
Anolis carolinensis	6	—	—	—	—	—	—	—	—	—	—	—
cf. *Ophisaurus* sp.	—	—	1	—	—	—	—	—	—	—	—	—
Indeterminate snake	1	0.15	—	—	2	0.020	2	0.020	—	—	—	—
Colubridae	—	—	1	0.017	2	0.011	—	—	1	0.001	1	0.01
Viperidae	—	—	—	—	1	0.03	—	—	—	—	1	0.03
Amphibians		—										
Indeterminate lizard	1	—	—	—	—	—	—	—	—	—	—	—
Indeterminate frog/toad	2	—	—	—	8	—	3	—	1	—	4	—
Rana sp.	—	—	1	—	—	—	—	—	—	—	—	—
Scaphiopus holbrookii	—	—	2	—	3	—	3	—	—	—	—	—
Bufo spp.	—	—	6	—	—	—	—	—	—	—	—	—
Total	13	0.16	19	0.238	31	0.202	12	0.051	8	0.056	11	0.095
% Commensal	12.4	1.2	9.3	0.2	18.6	0.3	15.0	0.1	32.0	1.1	17.7	0.6

[a] Key to abbreviations: MHF, Meeting House Field combines data from all four mounds; EPC, Eastern Plaza Complex; Pueblo, combined, combines data from Fallen Tree, Pueblo South, and Pueblo North; Pueblo S, Pueblo South; Pueblo N, Pueblo North.

TABLE 6.17
Pueblo Santa Catalina de Guale: Summary

	MNI		Biomass	
Category	No.	%	kg	%
Domestic mammals	4	2.4	2.004	3.3
Domestic birds	2	1.2	0.060	0.1
Deer	18	10.8	50.384	82.8
Other wild mammals	30	18.0	2.847	4.7
Wild birds	12	7.2	0.413	0.7
Turtles/alligators	16	9.6	2.911	4.8
Sharks, rays, & fishes	54	32.3	1.994	3.3
Commensal taxa	31	18.6	0.202	0.3
Total	167		60.814	

TABLE 6.18
Comparison of Estimated Deer Ages at Meeting House Field, Pueblo Santa Catalina de Guale, and the Eastern Plaza Complex[a]

Contexts	Juvenile	Subadult	Adult	Indeterminate	Total
Meeting House Field	1	—	1	2	4
Pueblo	4	6	6	2	18
Eastern Plaza Complex	3	14	10	—	27
Total	8	20	17	4	49

[a] The Meeting House Field row combines data from all four mounds.

high-utility portions. Pueblos South and North have both lower percentages of deer individuals and higher percentages of cranial specimens and low-utility portions.

Because heterogeneity among the three pueblo collections is so great, it is difficult to assess change or continuity as a response to the Spanish presence. Although all three pueblo collections are similar to one another in most of the variables measured, and all are different from the Meeting House Field assemblage, there is almost as much variability in animal use within the Guale pueblo as there is between the Irene and First Spanish period Guale occupations.

The variability in the three pueblo collections might be explained in several ways. One explanation is that the excavations at Fallen Tree, Pueblo South, and Pueblo North tested three distinct activity areas within the pueblo using two different screen sizes (see appendix A). In addition to screen size, perhaps each of these sectors was occupied at different times during the 17th century and each reflects different stages in the history of the mission and of the social disparity between Spaniards and specific Guale households.

Spaniards often supported the prerogatives of Native American leaders throughout Spanish Florida (Bushnell, 1981: 28, 99) and this is the most likely explanation for the differences observed here (in addition to screen size). Pre-Hispanic Guale were socially stratified (Thomas,

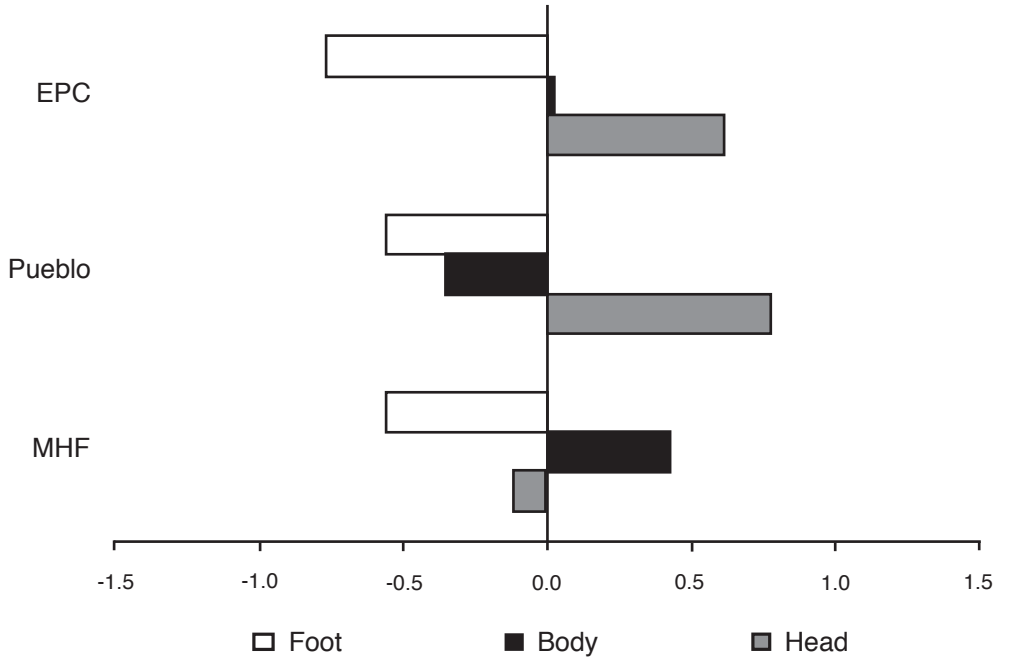

Fig. 6.9. Ratio diagram comparing deer elements from Meeting House Field, Pueblo Santa Catalina de Guale, and the Eastern Plaza Complex with a complete standard deer skeleton. Categories with positive values are more abundant than the standard and negative values are less abundant than the standard. **MHF**, Irene-period Meeting House Field (all mounds combined); **Pueblo**, Pueblo Santa Catalina de Guale; and **EPC**, Eastern Plaza Complex. The Eastern Plaza Complex data are from chapter 5.

2008c: 1080–1090), which may be one of the explanations for the differences among the four pre-Hispanic, Irene-period mounds at Meeting House Field (in addition to screen size). Differences within the First Spanish period pueblo may reflect a continuation of this ranked social structure. These social differences also might be evidence that the pueblo was occupied by distinct ethnic groups, though generally it has been understood that the mission served the Guale population primarily, if not exclusively. It could be that different lineages or status groups occupied the three sectors. Access to Spanish and other nonlocal goods was characteristic of status differences among Native Americans at Baptizing Spring, for example, with elite individuals having greater access to European goods (Loucks, 1993; see also Cusick, 1998a; Deagan, 1985, 1998; Saunders, 1998). The variability among the three pueblo faunal collections as a reflection of social differences within the pueblo is the most interesting of the factors that might underlie the observed variability.

It is difficult to know what traditional Guale community members thought about Eurasian animals, the increase in venison, the higher diversity of their overall animal-use strategy, and changes in their fishing strategies. From this distance, for example, it is not possible to determine whether the amount of domestic meat consumed at Fallen Tree (3%) was a marker of a high status group, of a low status group, or of a household highly assimilated into prevailing Spanish lifestyles and, perhaps, marginal in the native community as a consequence. Does the higher percentage of biomass from domestic sources at Pueblo South (9%) indicate that this location was a lower-status household, a higher-status household, or a marginal one? In terms of access to portions of the deer carcass, it is probably true that all residents of Pueblos South and North would have preferred greater access to higher-utility portions. By this measure, Fallen

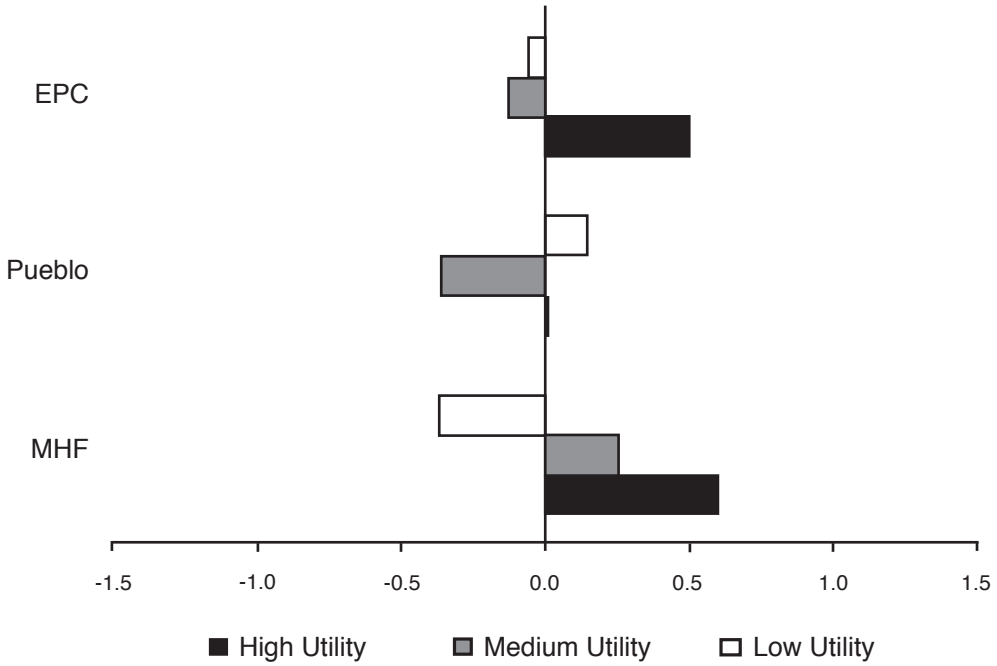

Fig. 6.10. Ratio diagram comparing food utility categories (FUI) for deer from Meeting House Field, Pueblo Santa Catalina de Guale, and the Eastern Plaza Complex with food utility categories in a complete standard deer skeleton. Categories with positive values are more abundant than the standard and negative values indicate categories that are less abundant than the standard. **MHF**, Irene-period Meeting House Field (all mounds combined); **Pueblo**, Pueblo Santa Catalina de Guale; and **EPC**, Eastern Plaza Complex. The Eastern Plaza Complex data are from chapter 5.

TABLE 6.19
Fallen Tree, Meeting House Field, and Pueblo Santa Catalina de Guale: Deer Elements[a]

	Fallen Tree		Meeting House Field		Pueblo Santa Catalina de Guale	
Skeletal elements	No.	%	No.	%	No.	%
Head	280	40.5	16	21.3	601	51.4
Vertebra/rib/sternum	123	17.8	19	25.3	137	11.7
Forequarter	49	7.1	10	13.3	75	6.4
Forefoot	35	5.1	4	5.3	56	4.8
Foot	76	11.0	6	8.0	125	10.7
Hindfoot	61	8.8	7	9.3	84	7.2
Hindquarter	67	9.7	13	17.3	91	7.8
Total	691		75		1169	

[a] The Meeting House Field columns combine data from all four mounds and the Pueblo Santa Catalina de Guale columns combine data from Fallen Tree, Pueblo South, and Pueblo North. Fallen Tree data are from Reitz and Dukes (2008).

Tree may have been occupied by higher-status members of the Guale community, by more assimilated Guale individuals, or by the hunter(s) that supplied the mission compound with venison (for this latter possibility, see Sykes [2007]). If these differences indicate social distinctions prevailed within the pueblo (instead of temporal or analytical ones), these can be equated with spatial segregation within the pueblo.

These differences also may indicate relationships with the neighboring mission compound rather than status differences among the Guale people themselves. Social distinctions within the native community based on pre-Hispanic status and kin group affiliations, as well as new associations with Spanish personnel, are outcomes we might expect during an episode of significant cultural change as individuals, kin groups, and political institutions endeavored to come to terms with the challenges and opportunities the Spanish presence provided.

DIET, EXPLOITATION STRATEGIES, AND ECONOMIC CONTRIBUTIONS AT SANTA CATALINA DE GUALE

Comparing each of the three pueblo sectors with the Plaza Complex provides us with a perspective on differences and similarities within Santa Catalina de Guale. Although animal remains from Spanish contexts at the mission may not reflect Guale cuisine, they undoubtedly represent Guale dietary choices, exploitation strategies, and contributions to the mission's economic goals. Evidence for the importance of status, Guale influence in the decision-making process, and environmental change also are found in these data.

Five criteria suggest which of the pueblo sectors was more heavily influenced by the proximity of the mission compound: (1) the relative abundance of Eurasian domestic animals; (2) the relative abundance of deer; (3) the types of deer elements represented in each location; (4) diversity; and (5) fishing strategies. For the sake of argument, we presume that similarity to the Spanish model was considered more prestigious at Santa Catalina de Guale, at least by Spanish friars engaged in "civilizing" the natives. Some members of the Guale community probably disagreed, but it is unlikely many of these disaffected individuals lived in such close proximity to the Spanish compound given the absence of forced resettlement in Spanish Florida. From the Spanish perspective, having maize, venison, and fish to ship to St. Augustine was desirable, though the appropriate destination for these (the town or the mission headquarters) was a constant source of tension among secular and religious officials (e.g., Bushnell, 1981: 11).

In some aspects the pueblo and Plaza Complex vertebrate assemblages differ only slightly (fig. 6.7). The main difference is that Spaniards inside the mission compound had greater access to Eurasian animals than did residents of the pueblo. Eurasian domestic animals contributed 15% of the individuals and 17% of the biomass in the Plaza Complex assemblage, higher levels than are found in the pueblo assemblage (4% MNI and 3% biomass). Domestic animals are exclusively pigs and chickens in both assemblages. It is likely that some of these animals were raised within the pueblo, but there is no reason to expect that Spaniards did not raise pigs and chickens for themselves. Some Guale neophytes adopted the tasks required for animal husbandry to a greater extent than did others, likely reflecting their own status within the Guale community and the degree to which they identified with Spaniards. In terms of domestic animals, Pueblo South appears to be more similar to the Plaza Complex than are the other pueblo sectors (fig. 6.1).

The extent to which animal remains recovered from the Plaza Complex are from animals obtained by Spanish or by Guale hunters is unresolved. The predominance of high-value and medium-value portions of deer carcasses in the Plaza Complex, and their relatively low proportions in the pueblo collections, suggest that many, if not all, of the deer in the Plaza Complex are animals supplied by Guale hunters. In parts of medieval England and Wales, for example, hunting was a high-prestige activity and often restricted to the nobility, but servants did most of the actual hunting and processing (Sykes, 2007; R. Thomas, 2007). Although the analogy is tenuous, it seems likely that Guale converts hunted for the Spanish friars because Guale converts were expected to provide tithes in kind and service to the mission. The result was that the Spanish diet was greatly influenced by the native inhabitants of St. Catherines Island in terms of the primary source of meat.

Venison dominates the biomass in both assemblages (fig. 6.7B) and Guale hunters were probably the primary source of this meat. Meatier,

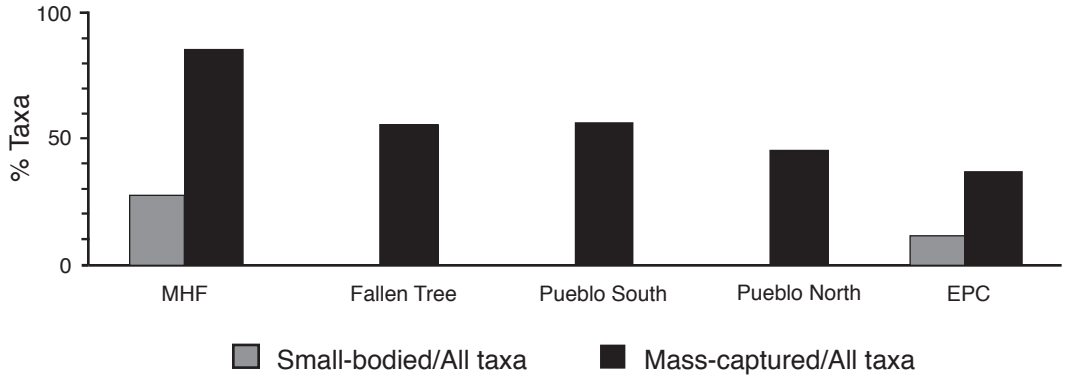

Fig. 6.11. Relationships among small-bodied fish taxa and mass-captured fish taxa. **MHF**, Irene-period Meeting House Field; (all mounds combined); and **EPC**, Eastern Plaza Complex.

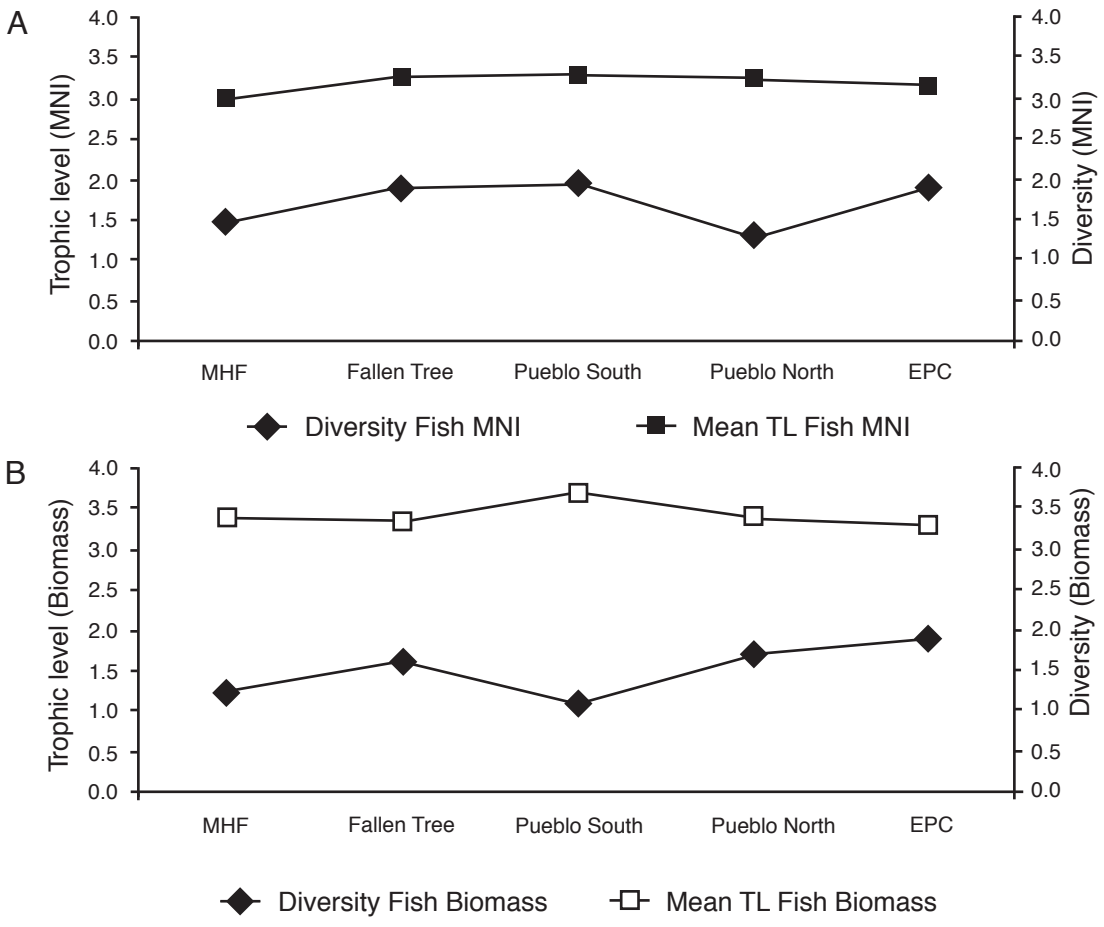

Fig. 6.12. Relationship between mean trophic level and fish diversity: (**A**) MNI and (**B**) biomass. **MHF**, Irene-period Meeting House Field (all mounds combined); and **EPC**, Eastern Plaza Complex.

higher-utility portions of deer carcasses, the forequarters and hindquarters, are more abundant in Spanish contexts than in Guale ones (figs. 6.9 and 6.10). In addition, specimens from the hindquarter and hindfoot are more abundant in the Plaza Complex (22%) than in the pueblo (15%) (tables 5.12 and 6.19), which is a pattern similar to that reported for red deer (*Cervus elaphus*) from high-status sites in later medieval England and Wales (R. Thomas, 2007). This is a pattern that we would expect if Guale converts provided Spaniards with choice hindquarters instead of keeping them for their own consumption. This would acknowledge the "elite" status of Spaniards and might designate high-status Guale individuals or households in the pueblo as well. For example, 18% of the deer specimens in the Fallen Tree collection are from the hindquarter and hindfoot compared to 6% in the Pueblo South collection and 11% in the Pueblo North collection (tables 6.5, 6.12, and 6.19).

Forequarters were gifted to the hunter and the land manager at late medieval sites in England (Sykes, 2007), but a similar gifting pattern is not evident in the Santa Catalina de Guale assemblages. Specimens from the forequarter and forefoot are more abundant in the Plaza Complex (17%) than in the pueblo (11%); however, 12% of the deer specimens in Fallen Tree collection are from the forequarters and forefoot compared to 6% in the Pueblo South and 11% in the Pueblo North collections (tables 6.5, 6.12, and 6.19). If gifting occurred, perhaps it was within the mission compound with senior Spaniards

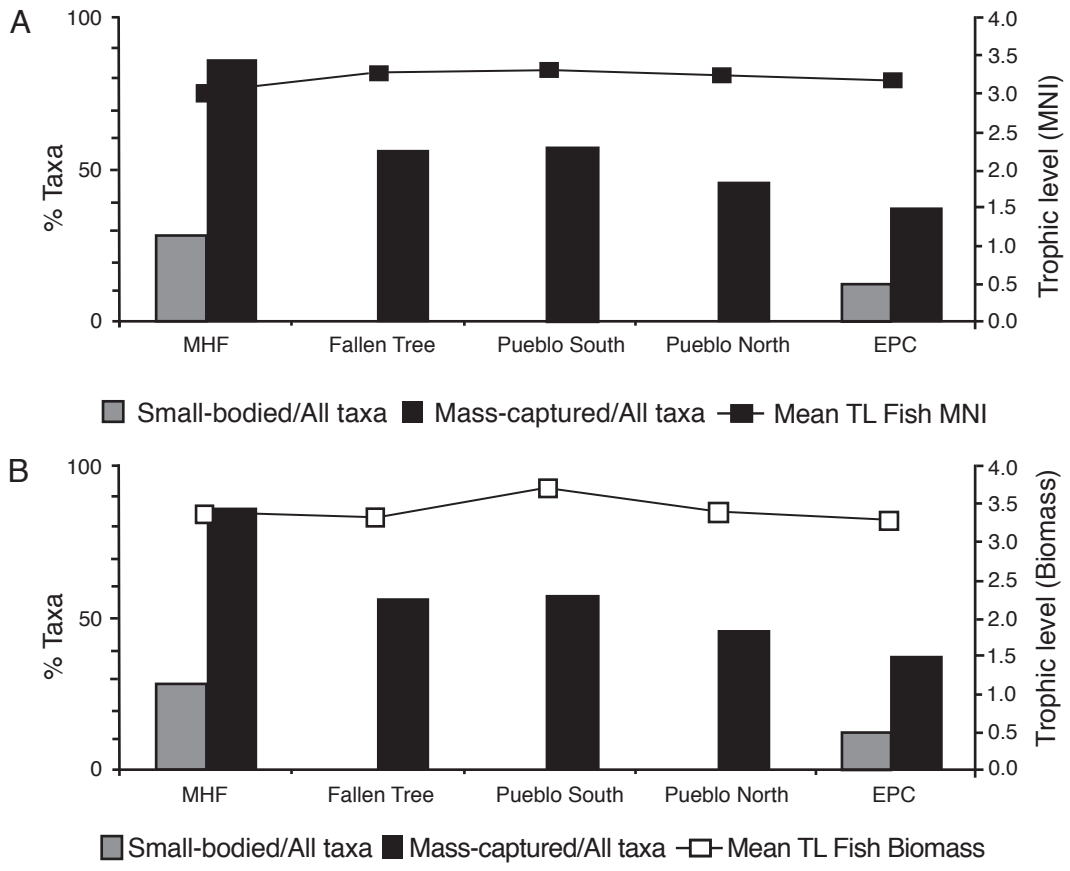

Fig. 6.13. Relationships among small-bodied fish taxa, mass-captured fish taxa, and mean trophic level: (**A**) MNI and (**B**) biomass. **MHF**, Irene-period Meeting House Field (all mounds combined); and **EPC**, Eastern Plaza Complex.

giving forequarter portions to lower-ranked staff members and keeping the hindquarter portions for themselves. Alternatively, forequarter gifts may have been made to Guale hunters and others in the pueblo, but evidence may be diluted by the quantity of deer specimens recovered from the pueblo. The portions of carcasses retained in the pueblo could be mixed with the remains of gifts from the mission compound to favored neophytes or members of the Guale elite (Sykes, 2007). It also is likely that redistribution and reciprocity circulated animal products within the Guale community itself (e.g., Zeder and Arter, 2008). This exchange system might have extended beyond the pueblo to include obligations elsewhere on the island and beyond.

It might be that the systems of redistribution and reciprocity that functioned within Santa Catalina de Guale obscured status distinctions (e.g., McCormick, 2002; Zeder and Arter, 2008). To honor their obligations, individual hunters might have given both high-value and low-value cuts of meat to different people within the community (both Guale and Spanish), thereby ensuring that the entire carcass was used before it spoiled, but also ensuring that most people within the community eventually received portions befitting their status. This type of circulation would ensure that most households had access to similar amounts and quality of meat over time while avoiding meat spoilage that might occur if meat was not used soon after the animal died (e.g., McCormick, 2002).

The abundance of cranial specimens in both Spanish and Guale contexts indicates that more than status is involved (figs. 6.4 and 6.9). Cranial fragments are more abundant in the pueblo (51% of the deer specimens) than in the Plaza Complex (44% of the specimens); and more common in the Pueblo South sector (80% of the specimens) than in the Fallen Tree (40% NISP) or Pueblo North (64% NISP) sectors. Given the pragmatic commercial value of deer hides, the high percentages of cranial fragments may be evidence of skinning waste, that both groups used brains to cure hides, or that skinning waste and hide preparation were combined with a dietary preference for tongue and brains in both the mission compound and in the pueblo. Another possibility is that Spanish and Guale residents of the island all sent choice pieces of venison to the mission's superiors at the Convento de San Francisco in St. Augustine. In the Plaza Complex, only specimens from the foot are underrepresented compared to their frequency in a complete deer skeleton (fig. 6.9). Clearly, people within the mission compound enjoyed access to high-quality portions. In contrast, only five deer specimens were recovered from 17th-century contexts at the Convento de San Francisco (table 4.9). This difference in the number of deer specimens identified in a mission context and at the mission headquarters in St. Augustine may indicate that cured venison and/or deer hides were sent to the Convento from places such as Santa Catalina de Guale, whereas fresh meat was consumed at the mission itself. This possibility should be explored further.

Although skeletal specimens vary among the three sectors of the pueblo, the Fallen Tree collection is more similar to the Plaza Complex than are the other two pueblo sectors in terms of access to both complete deer carcasses and high-utility portions (figs. 6.4 and 6.5). By contrast, the Pueblo South sector appears to have had less access to venison and high-valued portions (figs. 6.1 and 6.5). Although this may be due to the smaller sample size and to poor preservation at Pueblo South, it seems likely that people in the Fallen Tree sector generally had access to more venison and higher-quality meat portions than did people in the other sectors.

Analysis of density-mediated attrition in the auger survey and from miscellaneous contexts assemblages suggests that meaty portions of the skeleton are underrepresented in the mission compound (see appendices D and E). It could be that venison obtained by Guale converts to support the mission was transferred to the mission compound off the bone, or that these elements were later destroyed by secondary processing (such as for marrow or tools) or by similar attritional processes. An equally likely explanation is that the results say more about the effects of fragmentation on different quantitative indices than about transport decisions (see discussion in chap. 5).

The differences between Guale and Spanish assemblages at Santa Catalina de Guale, however, are not so much in diet as in exploitation strategies: how, when, and where resources were obtained and in what proportions. Components of exploitation strategies include: (1) richness, diversity, and equitability of sources of animal-derived nutrients; (2) trophic levels exploited; (3) technology and scheduling decisions; and (4) hunting and fishing strategies.

Higher richness and diversity may be evidence of two distinct, perhaps unrelated phenomena. Access to a wide variety of unusual foods is a symbol of high status. Expanding the variety of resources used also is a mechanism by which to respond to a deteriorating resource base. The ability to routinely use a wide variety of foods, often expanding the diet to include items not enjoyed by lower-status individuals, is a display of the wealth needed to purchase foods or to acquire them through the efforts of servants or slaves (Crabtree, 1990; Reitz, 1987; Reitz and Cumbaa, 1983). At the same time, we might also expect 17th-century diversity to be higher than pre-Hispanic levels as the Guale people expanded their niche to meet Spanish demands for food while meeting their own needs; a challenge compounded by the deteriorating environment associated with the 1627–1667 drought. In the socially fluid environment of the southern Georgia Bight during the First Spanish period, high richness and high diversity could be both a symbol of status and evidence of stress, even within the same household, as people made a virtue out of necessity and coped with changes in both their biogeophysical and cultural landscapes.

The total richness, diversity, and equitability of Guale and Spanish assemblages indicate that exploitation strategies practiced by both communities were similar, but not identical (tables 5.16 and 6.2; figs. 5.9 and 6.8). Although MNI diversity is high in both Spanish and Guale assemblages, biomass diversity is very low; the diversity of meat sources is lower in Guale than in Spanish contexts. Biomass equitability is also low, even though taxonomic richness of both assemblages is high. This indicates that both communities made use of a wide variety of resources, but relied primarily on just one or two of these. In the case of the pueblo, the primary resource was venison; in the case of Spaniards, the primary resources were venison and pork. The Guale reliance on venison was substantially higher than it had been before the 17th century (fig. 6.7B). Likewise, Spanish use of venison was much higher than it was in 17th-century secular St. Augustine or even in the ca. 1650s component at the Convento de San Francisco (fig. 4.3B).

The pueblo and Plaza Complex MNI diversity values are both higher than the Meeting House Field diversity, but biomass diversity is lower (pueblo) or about the same (Plaza Complex) (fig. 6.8). The Fallen Tree collection is more similar to the Plaza Complex assemblage in the diversity of resources used, and the collections from the Pueblo South and Pueblo North sectors are more similar to Meeting House Field, at least in terms of MNI diversity (fig. 6.2). Fallen Tree biomass diversity is remarkably low because of the dominance of venison, a trait shared to a lesser extent with the collection from Pueblo North. These differences within the pueblo may reflect status or identification with the Spanish mission. The contrast between the 17th-century and Meeting House Field assemblages, however, suggests that status differences and Spanish needs were not the only factors influencing Guale decisions.

The broader niche exploited in the 17th century can be attributed to many factors, but one of these is an increase in the use of animals typical of garden hunting and its marine equivalent. The higher percentages of mammals that raid gardens and fields in the Santa Catalina de Guale assemblage, compared to the Meeting House Field assemblage, may be an outgrowth of additional opportunities to hunt and trap animals in conjunction with farming. Using the percentages of other terrestrial mammals as proxy evidence, garden-hunted mammals comprised 18% of the pueblo individuals and 8% of the Plaza Complex individuals, compared to 6% of the individuals in the Meeting House Field assemblage (tables 5.10, 6.1, and 6.17). People in the pueblo may have made use of their gardens and fields to obtain a variety of animals, many of which they kept for themselves.

The prominence of sea catfishes in the Santa Catalina de Guale assemblages could be the estuarine equivalent of garden hunting. Catfishes are considered by many to be trash fishes because they are bottom-feeders associated with trash dumped into estuaries and are readily caught. Catfish individuals comprise half of the pueblo (56%) and Plaza Complex (51%) fish individuals compared to 31% of the Meeting House Field fish individuals. Increasing the use of garden raiders and catfishes would be an effective approach to managing the additional time required to produce maize for local consumption and trade while still obtaining meat from local sources.

Expanded use of deer meant that hunting required more labor than it had before the 17th century. The increase in deer in both the pueblo

and Plaza Complex assemblages compared to the Meeting House Field level may be an adjunct to increased farming if deer also were obtained, at least in part, through garden hunting. Men and women at Santa Catalina de Guale experienced an increase in lower-limb loading during the 17th century compared to the preceding late pre-Hispanic period while upper-limb loading decreased among women but increased among men (Larsen et al., 2001a; Ruff and Larsen, 2001). Some of these biomechanical changes may reflect the requirement that Guale men participate in long-distance portage as part of the repartimiento draft labor system (Bushnell, 1981: 11–13; Larsen et al., 2001a). This burden may have been compounded by an increase in the distance and frequency of carrying deer carcasses over longer distances, as it is clear that complete deer carcasses were carried to Santa Catalina de Guale. Many men at Santa Catalina de Guale were more mobile than their predecessors, which also may reflect, in part, the increased effort required to hunt and transport deer.

Increased farming may have resulted in a decline in one aspect of the pre-Hispanic strategy. Turtles, particularly diamondback terrapins (*Malaclemys terrapin*), dominated at least one portion of the Meeting House Field assemblage (45% of the MNI; Reitz and Dukes, 2008; see chap. 3 for a discussion of the differences among the Meeting House Field collections). In the Santa Catalina de Guale assemblages, turtles were substantially reduced (9% of the pueblo MNI and 10% of the Plaza Complex MNI), though most of the turtles continued to be diamondback terrapins. If women and children were the major procurers of terrapins during the Irene period, perhaps they were busy farming and doing other chores in the 17th century, which precluded them from continuing to collect turtles. The reduction of turtles also may be part of the general reduction in the proportion of estuarine resources in the strategy.

The reduction in total biomass diversity in the 17th-century pueblo compared to the pre-Hispanic Meeting House Field diversity masks an expanded fishing niche. People in the pueblo used a higher diversity of fishes than did their Irene ancestors at Meeting House Field or Spaniards inside the mission compound. This indicates that Guale fishing strategies on the island expanded during the 17th century to include a broader range of fishes. To the extent that the fishing niche expanded, however, it did not extend beyond the estuarine and near-shore waters and seems to have been specifically focused on habitats where catfishes and mullets (*Mugil* spp.) were abundant.

An expansion of niche breadth can be interpreted either as a status marker or as a response to a degraded resource base. In this case, it may be evidence of both as Guale neophytes expanded their resource base to compensate for the time and labor diverted from fishing to hunting deer and producing maize while the estuarine environment itself was impacted by the 1627–1667 drought. The higher fish diversity in both the pueblo and Plaza Complex assemblages (compared to Meeting House Field assemblage) may be evidence of an estuarine resource base that was impacted by increased salinity, and other biogeophysical features, stimulating people to expand their fishing niche. Some of the differences within the Guale pueblo, however, could be evidence of status distinctions among the sectors.

High mean trophic levels distinguish the pueblo and Plaza Complex assemblages from the earlier Meeting House Field assemblage (fig. 6.12). This is largely due to the high trophic-level sharks in the Pueblo South collection compared to low trophic-level mullets in the Plaza Complex assemblage. Although the same fishes were used by both Guale and Spanish residents at Santa Catalina de Guale, the mean MNI and biomass trophic level exploited by the Guale people was generally higher than that of Spaniards because mullets contributed a quarter of the fish individuals and a tenth of the fish biomass in the Spanish diet and much lower percentages in the Guale diet. Spaniards may have made it possible for Guale fishers to catch large quantities of mullets by adding cast nets to the Guale fishing repertoire or Spaniards may have used these cast nets themselves. The high mean trophic level for Pueblo South is due to a single requiem shark, which contributed 69% of the biomass; a cautionary example about analysis using very small samples (fish MNI = 7 and fish taxa = 7).

Figure 6.11 summarizes the number of small-bodied and mass-captured fish taxa as a percentage of all fish taxa at Meeting House Field, in the three sectors of the pueblo, and in the Plaza Complex (see appendix A for a

discussion of these concepts). Few small-bodied taxa (12% of all fish taxa) are present in the Plaza Complex assemblage and none are found in any of the pueblo sectors. This contrasts with the Meeting House Field fishing strategy in which small-bodied taxa comprised 29% of the fish taxa. Compared to Meeting House Field, fewer of the pueblo or Plaza Complex fish taxa are susceptible to mass-capture techniques; nonetheless, at least a third of the fishes in all of the 17th-century assemblages are susceptible to mass capture. This percentage would be even higher if gars (*Lepisosteus* spp.) were added to the mass-capture roster.

Most of the fishes in these assemblages are large-bodied, presumably high-ranking, taxa and, except for gars, they are taxa more likely to be taken using mass-capture techniques (fig. 6.11). Although those Guale neophytes living in the pueblo and those Spaniards living in the Plaza Complex used these fishes in similar proportions, the emphasis was different than it had been before the 17th century. Of the 21 fish taxa in the Meeting House Field, pueblo, and Plaza Complex assemblages, five are 100% ubiquitous: gars, hardhead catfishes, gafftopsail catfishes, seatrouts (*Cynoscion* spp.), and mullets. These five taxa comprise 56% of the individuals and 94% of the fish biomass in the Meeting House Field assemblage. They are 74% of the individuals and 42% of the fish biomass in the pueblo assemblage, and 80% of the individuals and 74% of the fish biomass in the Plaza Complex assemblage. Similar variations are found within the Meeting House Field assemblage, which is a composite of data from four mounds that are markedly different from each other (Reitz and Dukes, 2008; see chap. 3).

Particularly noteworthy among the 17th-century fishes are seven shark and ray taxa. Cartilaginous fishes are not present in the Meeting House Field assemblage. Three cartilaginous fish taxa are present in the pueblo assemblage and contribute 29% of the fish biomass. In the Plaza Complex assemblage, 5 of the 16 fish taxa are sharks and rays and they contribute 7% of the fish biomass. This, too, may be evidence of a response to an estuarine resource base that was impacted by changes in productivity, temperature, dissolved oxygen, salinity, and other biogeophysical parameters associated with the drought.

These measures suggest that traditional fishing strategies were altered during the 17th century. The similarities between the pueblo and the Plaza Complex may be evidence that the same sources of fish were used by both groups, but that Spaniards preferred catfishes and mullets whereas the Guale converts used a wider variety of fishes in addition to catfishes. People at the pueblo used more taxa susceptible to mass-capture methods from higher trophic levels than did people in the Plaza Complex (fig. 6.13). These differences in fishing strategies suggest that Spaniards may have done some fishing for themselves while relying on Guale hunters for venison.

The ability to capture fishes, using a variety of methods, from several different locations, and during more than one part of the seasonal or tidal cycle, is important when determining whether a fish species is one of the suite of taxa common in Georgia Bight collections. Fishes with restricted seasonality, habits, and habitat requirements were largely ignored by pre-Hispanic and Spanish fishing strategies.

Diet and exploitation strategies by Spanish and Guale residents at Santa Catalina de Guale are remarkable more for their similarities than for their differences. The differences between the pueblo and the Plaza Complex are small considering those between 17th-century St. Augustine and Mission Nombre de Dios. Assemblages from secular and religious contexts in St. Augustine and the adjacent Nombre de Dios suggest dissimilar diets and exploitation strategies between the town and Nombre de Dios. Furthermore, the exploitation strategy at Nombre de Dios was markedly different from that practiced on St. Catherines Island both before, and during, the 17th century. These differences will be explored further in chapter 8.

CONCLUSIONS

Subsistence systems are remarkably stable once established, presuming that the resource base and cultural contexts are relatively unchanged. Flexibility and variability should be found when former adaptations no longer meet biological and cultural needs and desires. In addition, diets and exploitation strategies are important status and ethnic markers and we should find that different social units in a society responded to Spanish colonization in different

ways. In the 17th century, both the resource base and the cultural context changed.

Spanish missionaries encouraged some cultural changes throughout Spanish Florida while discouraging others. To the extent that their aim was to mold natives of Spanish Florida into European peasant farmers, they failed. To the extent that they wanted to maximize the participation of the mission system in the local economy or in the world's markets, they may have been more successful with commodities such as beef from Apalachee province, venison from Guale province, or fish from any of the coastal locations. In terms of their personal diets and exploitation strategies, the Spanish patterns changed markedly.

Native Americans in Spanish Florida responded to the First Spanish period environment in a variety of ways, all of which built on their pre-Hispanic heritages. On St. Catherines Island, high degrees of variability in animal use within the pueblo demonstrate that the Guale people associated with the mission responded to these changes using pre-Hispanic traditions. Changes in animal use were subtle; masked by the variability in diet and exploitation strategies typical of the southern Georgia Bight heritage, generally, and the pre-Hispanic St. Catherines Island tradition in particular. This study of the Guale pueblo provides evidence that the use of animals varied within the pueblo, perhaps because different activities took place in each sector, the sectors were occupied at different times during the lifespan of the pueblo, they were occupied by distinct ethnic groups or social strata within the Guale community, or they were occupied by people with different relationships with the Spanish friars, administrators, and military personnel stationed at the mission. Some aspects of the pueblo assemblage are related to supplying venison to Spaniards and others may be associated with the dynamic climate of the 17th century and the accompanying biological and cultural stresses. If Native Americans interacting on a daily basis with Spaniards did not universally adopt Spanish foodways, then it is unlikely that neophytes did so at smaller, more remote missions that did not have resident Spanish friars.

We interpret these data as evidence of Guale resilience in the face of Spanish attempts to encourage animal husbandry. Despite Spanish pressure to contribute livestock, domestic animal products, and other commodities to the economy of Spanish Florida, this Guale resilience resulted in far more continuity than change.