

**FAUNA AT THE CROSSROADS:
FOOD CONSUMPTION AT THE CARRIZO CREEK OVERLAND STAGE STOP**

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Excavation of Butterfield Stage Line's mid-1800s Carrizo stop, situated in southern California's Anza-Borrego Desert, produced 28 species of domestic and wild fauna. Bone weights indicate a reliance on cattle and sheep, yet over half of the identified specimens are from wild species. Small mammals and birds, including yellow-headed blackbird, meadowlark, willet, white-faced ibis, 14 species of ducks and geese, and wood stork reflect hunting, as well as a wetland more substantial than today's small remnant. Bones of three coastal rockfish imply food was carried east from the southwestern terminus of the trail at San Diego. Faunal diversity and butchering scars reflect Euro-American, Hispanic, and native Indian foods and meat processing techniques.

Remnants of the two-room adobe that housed the Carrizo Creek Stage Station are situated on the Southern Overland Trail in the southeast corner of California's Anza-Borrego Desert State Park. Excavations were conducted on site from 2001 to 2002 by the California Department of Parks and Recreation, under the direction of Associate State Archaeologist Sue Wade and State Historian and Archaeologist Steve Van Wormer. Their efforts revealed three structures, three hearths, a large refuse pit, thin sheet trash deposits, a feed bin, and numerous artifacts. Zooarchaeological remains were recovered from two structures, various features, and 6-by-6-ft. squares plotted across the site. Over half were associated with clean stage stop deposits, most from Feature B4, a large trash pit.

First built in 1855 as a U.S. military station, the adobe was strategically located adjacent to small, spring-fed Carrizo Creek, the region's first reliable water source west of the Colorado River. Shortly thereafter, the site served as one of many swing stations that stabled four to five fresh horses and mules for use by incoming stagecoaches. During its first year of operation, the Carrizo stage stop serviced the San Antonio and San Diego Mail line from July 1857 to August 1858. The Butterfield Overland Mail Company ran the line from September 1858 to June 1861 (Van Wormer et al. 2012:40). In addition to mail, the coaches also transported passengers. Those who stopped at the station long enough to eat, and sometimes overnight, likely helped to generate the animal bone food scraps recovered there.

PROVISIONING

The Butterfield Company employed section agents responsible for provisioning stage stops with food and other supplies. The Carrizo station was in Section 8, which ran from Yuma, Arizona to Los Angeles. Agent Warren G. Hall managed this section and arranged for delivery of all livestock and general foodstuffs to the Carrizo station. Historical references indicate that from the 1850s to the 1870s, sheep and cattle were driven by the hundreds and thousands in both directions along the Carrizo coach route (Van Wormer, personal communication 2013). Mail-line agents likely tapped into this convenient supply of meat on the hoof.

Not surprisingly, the data indicate cattle and sheep provided the major source of meat consumed at Carrizo. However, provisioned domesticates were not the only available meat source. Among 28 animals identified to the taxonomic level of family or better, all but five were wild game. The quantity of wild fauna recovered is striking. From terrestrial desert mammals, marsh birds, migratory waterfowl, and Pacific Ocean fish to domestic livestock and fowl, the range of species reflects both the variety of foods consumed and the geographic interface between 90 mi. of desert to the east, a series of elevated valleys leading to reliable pasturage 50 mi. to the northwest, and the Pacific Ocean.

THE DATA

Site-wide, recovered vertebrate remains totaled 5,779 specimens and weighed 18,408 g (Table 1). Of these, close to 3,400 specimens came from contextually secure stage station proveniences that are tightly dated from 1857 to 1861, most from Feature B4, the large refuse pit (Tables 2 and 3). Specimens from these deposits, the top three listed on Table 2, form the basis of this study, as discussed below.

Taphonomic data indicate that the specimens were moderately affected by postdepositional burning but insignificantly altered by rodents or scavenging animals. Only 1 percent was affected by carnivores, and even fewer were rodent-gnawed. Few were surface-weathered or cracked from exposure to the elements or boiling. Among 3,316 bones from the refuse pit, only 262 were ashed or carbonized, likely from burning prior to discard within the pit.

Species Representation

Following the initial bone analysis in 2005, a second, more intensive effort to further speciate bird remains, particularly ducks and geese, was completed in 2014. Nine additional species were confirmed, elevating the total number of domestic and wild taxa to 28. The number of specimens identified to the taxonomic level of family or better (NISP) totaled 742 and weighed 5,899 g (Table 4). Relative proportions of these fauna are shown in Figure 1, with domesticates accounting for 38 percent of identifiable fauna by count, 95 percent by weight.

Among domesticates, sheep and indeterminate sheep/goat bones predominate by count (Figure 2). (Site-wide, the only identifiable goat bone came from a mixed deposit.) However, cattle remains are predominant by weight. Based on the greater meat mass associated with the skeletal elements of cattle as compared to sheep, bone weights indicate that the relative proportion of beef consumed on site far outweighed that of lamb or pork. This inference is clearly supported by the unidentified large-size (cattle) and medium-size (sheep/goat/pig) mammal remains shown in Figure 3, where the weight of large mammal bones is close to 90 percent of the total, compared to medium mammals at just over 10 percent. In addition to livestock, chicken remains account for 23 percent of the NISP for domesticates. Recovery of fused and unfused chicken bones suggests that these fowl were raised on site and that both adults and subadults were consumed.

Wild Fauna

The diversity of wild fauna is striking. Though minimal by weight, game specimens total 734 and account for 62 percent of identifiable specimens by count. While black-tailed jackrabbit and desert cottontail account for nearly all terrestrial species, the variety of avifauna is remarkable. Relative proportions of identifiable specimens illustrated in Figure 4 (left) are consistent with the larger sample shown in Figure 4 (right), which incorporates specimens identified only to class and/or size. The range and quantity of wild game consumed reflects active pursuit of supplemental meat sources.

Birds

A minimum of 436 wild bird bones were recovered (Table 5). Specimens identified to the taxonomic level of genus or better indicate the presence of 19 bird species. Water birds, particularly ducks (35 percent) and geese (10 percent), account for the majority (Figure 5). Among nine species of ducks identified from the assemblage, most are shallow-feeding dabblers that tip down to reach aquatic plants and subsurface invertebrates. They spring into the air to take flight. Included are large-, medium-, and small-size dabblers, the latter most plentiful. Lesser scaup and hooded mergansers represent the only diving ducks identified. They dive and swim underwater to feed, and require a running start on water to get airborne.

In addition to ducks, five species of geese are represented in the Carrizo bone assemblage. Included are two specimens: a complete right carpometacarpus and the proximal end of a left radius of a lesser Canada goose (*Branta canadensis parvipes* or *B. hutchinsii taverneri*) or Aleutian cackling goose

Table 1. Total number of specimens site-wide, by count and weight.

SCIENTIFIC NAME	COMMON NAME	COUNT	WEIGHT (G)
<i>Bos taurus</i>	Cow	81	4,820
<i>Ovis aries</i>	Sheep	30	225
<i>Capra hircus</i>	Goat	2	8
<i>Ovis/Capra</i>	Sheep/Goat	121	791
<i>Sus scrota</i>	Pig	11	186
<i>Equus</i> sp.	Unidentified Horse or Mule	10	90
<i>Vulpes macrotis</i>	Kit Fox	3	2
<i>Lepus californicus</i>	Black-tailed Jackrabbit	100	108
<i>Sylvilagus</i> sp.	Rabbit	105	33
Lagomorph	Rabbit/Hare	1	0.2
<i>Thomomys bottae</i>	Botta's Pocket Gopher	2	0.2
<i>Dipodomys</i> sp.	Kangaroo Rat	10	0.5
Rodentia	Unidentified Rodent	9	0.3
Large Mammal	Cattle or Horse-sized	2,149	9,826
Medium Mammal	Sheep to Pig-sized	1,186	1,325
Small Mammal	Fox to Rodent-sized	115	27
Medium/Large Mammal	Pig to Horse-sized	901	557
<i>Gallus gallus</i>	Chicken	77	60
<i>Meleagris gallopavo</i>	Turkey	1	2
<i>Xanthocephalus xanthoceph.</i>	Yellow-headed Blackbird	17	2.1
<i>Sturnella neglecta</i>	Meadow Lark	2	0.4
<i>Catoptrophorus semipalmatus</i>	Willet	6	1.9
<i>Lophodytes cucullatus</i>	Hooded Merganser	3	1.3
<i>Plegadis chihi</i>	White-faced Ibis	1	0.2
<i>Aythya affinis</i>	Lesser Scaup	1	0.43
<i>Aythya</i> sp.	Unidentified Scaup	1	1.7
<i>Anas crecca</i>	Green-winged Teal	20	6.83
<i>Anas discors</i>	Blue-winged Teal	3	0.5
<i>Anas cyanoptera</i>	Cinnamon Teal	14	5.71
<i>Anas americana</i>	American Wigeon	2	1.24
<i>Anas acuta</i>	Northern Pintail	4	5.9
<i>Anas platyrhynchos</i>	Mallard	2	0.96
<i>Anas strepera</i>	Gadwall	2	1
<i>Branta bernicla</i>	Brant Goose	2	2
<i>Chen caerulescens</i>	Snow Goose	2	1
<i>Branta canadensis moffitti</i>	Canada Goose	1	11
<i>Branta c. parvipes</i> or <i>Branta hutchinsii</i> sp.	Lesser Canada Goose or Cackling Goose	2	5
<i>Anser albifrons</i>	Greater White-fronted Goose	9	28
<i>Mycteria americana</i>	Wood Stork	38	58
<i>Anas</i> sp. (Anatini Tribe)	Unidentified Duck	117	42
<i>Anser</i> sp. (Anserini Tribe)	Unidentified Goose	36	49
Small Bird	Unidentified Songbird	8	0
Medium Bird	Chicken to Willet-sized	203	32
Large Bird	Stork to Goose-sized	184	51
Medium/Large Bird	Willet to Stork-sized	133	25
<i>Sebastes</i> sp.	Rock Fish	19	4
Pisces	Unidentified Fish	25	6
Indeterminate	Indeterminate Animal Class	8	2
Total		5,779	18,408

Table 2. Vertebrate specimen distribution, by provenience.

PROVENIENCE	DATES	COUNT	WEIGHT (G)	BURNT	BUTCHERED	GNAWED BY		DESCRIPTION
						CARNIVORE	RODENT	
Structure C	ca. 1857-1861	1	1	--	--	--	1	Stage station
Feature A1 and A2	1857-1861	79	186	--	10	--	1	Trash pit and scatter
Feature B4	1857-1861	3,316	14,493	262	718	33	4	Large refuse pit
Structure A Wall	1857-1861	12	7	--	--	--	--	Adobe blocks
Feature B2	1857-1861	167	364	116	--	--	--	Feed bin
Subtotal		3,575	15,051	378	728	33	6	
Structure A - East Room	1855-ca. 1880	54	49	11	4	--	--	Bedroom
Structure A - West Room	1855-ca. 1880	689	1,097	637	10	--	3	Kitchen/dining
Structure B	1857-ca. 1880	337	628	43	4	--	3	Kitchen
Feature B1	1857-ca. 1880	62	80	41	4	--	--	Ash outside Structure B
Feature B5	1857-ca. 1880	6	2	6	--	--	--	Hearth in Structure B
Structure A/B Hallway	1855-ca. 1880	50	67	--	3	--	3	7 ft. wide
Subtotal		1,198	1,923	738	25	--	9	
Feature B3	1880-1914	431	388	430	--	--	--	Small ash lens
Late Deposits*	1880-2002	575	1,046	295	39	1	2	Late or mixed
Subtotal		1,006	1,434	725	39	1	2	
Grand Total		5,779	18,408	1,841	792	34	17	

* Includes overburden, north gully, Trench B2, mixed deposit above Feature B4, and northern extension of site.

(*B. hutchinsii leucopareia*). These specimens are notable, as they confirm the presence of the significantly smaller subspecies of the Canada goose or one of the larger subspecies of the cackling goose.

In the 45th supplement to the American Ornithologists' Union checklist (Banks et al. 2004), the highly variable Canada goose was split into two species, *Branta canadensis* and *B. hutchinsii*, on the basis of DNA sequencing studies. But the split based on this evidence cuts through populations that are nearly homogeneous in size and plumage pattern, so specimens of intermediate size, such as the two specimens from Carrizo, could represent certain subspecies of either species under the latest classification.

Notable was the recovery of 26 wood stork remains representing a minimum of four individuals. Ten specimens retained butchering scars that typify dismemberment for consumption. Their presence indicates summer hunting activity, since these birds fly north from southern latitudes during their summer migration (Unitt, personal communication 2014). They may have been shot overhead on the desert floor, or within the Carrizo marsh. Buckshot was recovered from the trash pit, along with an unidentified goose or stork humerus with three gunshot holes, two of which measured approximately 0.2 in. in diameter.

Prior to habitat destruction associated with damming of the Colorado River, wood storks wintered in abundance at the head of the Gulf of California (Unitt, personal communication 2012). Though their numbers were further decimated by hunting, 396 wood storks were counted in Brawley within Imperial Valley in the fall of 2000.

Bones of yellow-headed blackbirds represent a minimum of four individuals of both sexes, implying a former colony at the marsh where none exists today. The Carrizo marsh may have attracted migratory birds like the white-faced ibis. These birds forage in shallow water and within wet grasses, and nest in freshwater marshes.

Table 3. Stage station specimen counts, weights, MNI, burning, and butchering.

SCIENTIFIC NAME	COMMON NAME	COUNT	WEIGHT (G)	MNI	BURNT	BUTCHERED
<i>Bos taurus</i>	Cow	74	4,374	3	3	40
<i>Ovis aries</i>	Sheep	27	202	3	--	8
Capridae	Sheep/Goat	104	723	2	9	39
<i>Sus scrofa</i>	Pig	8	182	1	--	8
Equidae	Horse/Mule	4	35	1	2	1
<i>Lepus californicus</i>	Black-tailed Jackrabbit	85	98	6	0	10
<i>Sylvilagus audubonii</i>	Desert Cottontail	96	29.3	3	1	5
<i>Dipodomys agilis</i>	Agile Kangaroo Rat	1	0.04	1	--	--
<i>Gallus gallus</i>	Chicken	65	50	6	--	13
<i>Xanthocephalus xanthocephalus</i>	Yellow-headed Blackbird	17	2.12	4	--	--
<i>Sturnella neglecta</i>	Meadow Lark	2	0.4	2	--	--
<i>Catoptrophorus semipalmatus</i>	Willet	6	2	1	--	1
<i>Plegadis chihi</i>	White-faced Ibis	1	0.2	1	--	--
<i>Aythya affinis</i>	Lesser Scaup	1	0.43	1	--	--
<i>Lophodytes cucullatus</i>	Hooded Merganser	3	1.3	2	--	--
<i>Anas crecca</i>	Green-winged Teal	20	6.83	4	--	7
<i>Anas discors</i>	Blue-winged Teal	3	0.5	1	--	3
<i>Anas cyanoptera</i>	Cinnamon Teal	14	5.71	4	--	2
<i>Anas crecca, discors or cyanoptera</i>	Green/Blue/Cinnamon Teal	45	9.93	--	--	15
<i>Anas americana</i>	American Wigeon	2	1.24	1	--	--
<i>Anas acuta</i>	Northern Pintail	4	5.9	2	--	2
<i>Anas platyrhynchos</i>	Mallard	2	0.96	1	--	2
<i>Anas strepera</i>	Gadwall	2	1.2	1	--	1
<i>Branta bernicla</i>	Brant Goose	2	1.9	1	--	2
<i>Chen caerulescens</i>	Snow Goose	2	1.1	1	--	--
<i>Branta canadensis moffitti</i>	Canada Goose	1	10.6	1	--	--
<i>Branta c.parvipes or Branta hutchinsii sp.</i>	Lesser Canada or Cackling Goose	2	5.1	1	--	2
<i>Anser albifrons</i>	Greater White-fronted Goose	6	24.8	2	--	1
<i>Mycteria americana</i>	Wood Stork	37	56.6	4	--	10
<i>Sebastes sp.</i>	Rockfish	19	4	3	--	--
Mammalia (Large-size)	Equid to Cow-size	1,056	7,446	--	131	288
Mammalia (Indeterminate Medium/Large-size)	Equid to Sheep-size	82	113	--	9	8
Mammalia (Medium-size)	Sheep to Pig-size	942	1,091	--	103	208
Mammalia (Small-size)	Unidentified Small Mammal	93	23	--	--	--
Anatidae	Unidentified Ducks	56	24.47	--	--	21
Anatidae	Unidentified Geese	31	38	--	--	6
Passerine	Unidentified Songbird	5	0.22	--	1	--
Aves (Medium-size)	Chicken to Willet-sized	161	23.76	--	2	11
Aves (Large-size)	Stork to Goose-sized	172	46	--	1	5
Aves (Indeterminate Medium/Large-size)	Willet to Stork-sized	131	25	--	--	--
Pisces	Unidentified Fish	4	2	--	--	--
Unidentified	Indeterminate Animal Class	8	2.4	--	--	--
Total		3,396	14,671	64	262	719

Table 4. Number of identifiable specimens (NISP) from stage station deposits.

SCIENTIFIC NAME	COMMON NAME	COUNT	WEIGHT (G)	MNI	BURNT	BUTCHERED
<i>Bos taurus</i>	Cow	74	4,374	3	3	40
<i>Ovis aries</i>	Sheep	27	202	3	--	8
Capridae	Sheep/Goat	104	723	2	9	39
<i>Sus scrofa</i>	Pig	8	182	1	--	8
Equidae	Horse/Mule	4	35	1	2	1
<i>Lepus californicus</i>	Black-tailed Jackrabbit	85	98	6	--	10
<i>Sylvilagus audubonii</i>	Desert Cottontail	96	29	3	1	5
<i>Dipodomys agilis</i>	Agile Kangaroo Rat	1	0.04	1	--	--
<i>Gallus gallus</i>	Chicken	65	50	6	--	13
<i>Xanthocephalus xanthocephalus</i>	Yellow-headed Blackbird	17	2	4	--	--
<i>Sturnella neglecta</i>	Meadow Lark	2	0.4	2	--	--
<i>Catoptrophorus semipalmatus</i>	Willet	6	2	1	--	1
<i>Plegadis chihi</i>	White-faced Ibis	1	0.2	1	--	--
<i>Aythya affinis</i>	Lesser Scaup	1	0.4	1	--	--
<i>Lophodytes cucullatus</i>	Hooded Merganser	3	1	2	--	--
<i>Anas crecca</i>	Green-winged Teal	20	7	4	--	7
<i>Anas discors</i>	Blue-winged Teal	3	1	1	--	3
<i>Anas cyanoptera</i>	Cinnamon Teal	14	6	4	--	2
<i>Anas crecca, discors or cyanoptera</i>	Green/Blue/Cinnamon Teal	45	10	--	--	15
<i>Anas americana</i>	American Wigeon	2	1	1	--	--
<i>Anas acuta</i>	Northern Pintail	4	6	2	--	2
<i>Anas platyrhynchos</i>	Mallard	2	1	1	--	2
<i>Anas strepera</i>	Gadwall	2	1	1	--	1
<i>Branta bernicla</i>	Brant Goose	2	2	1	--	2
<i>Chen caerulescens</i>	Snow Goose	2	1	1	--	--
<i>Branta canadensis moffitti</i>	Canada Goose	1	11	1	--	--
<i>Branta c. parvipes or Branta hutchinsii sp.</i>	Lesser Canada or Cackling Goose	2	5	1	--	2
<i>Anser albifrons</i>	Greater White-fronted Goose	6	25	2	--	1
<i>Mycteria americana</i>	Wood Stork	37	57	4	--	10
<i>Sebastes sp.</i>	Rockfish	19	4	3	--	--
Anatidae	Ducks	56	24	--	--	21
Anatidae	Geese	31	38	--	--	6
Total		742	5,899	64	15	199

Willetts are an abundant coastal shorebird. They are also found in a variety of watery environments ranging from salt marshes to freshwater ponds. Though rarely found inland, migrating willets have been recorded in the desert, including sightings in the Anza-Borrego Desert and near the Imperial County line (Unitt 2004:208).

Lesser scaups are common winter visitors to San Diego. They occur in vast numbers on San Diego Bay and Mission Bay, and in small numbers on most inland lakes. As with other coastal birds described above, lesser scaup have been sighted, albeit rarely, within Borrego Valley, where they were identified in six of 19 Christmas bird counts from 1984 to 2002, in numbers of three or fewer (Unitt 2004:74).

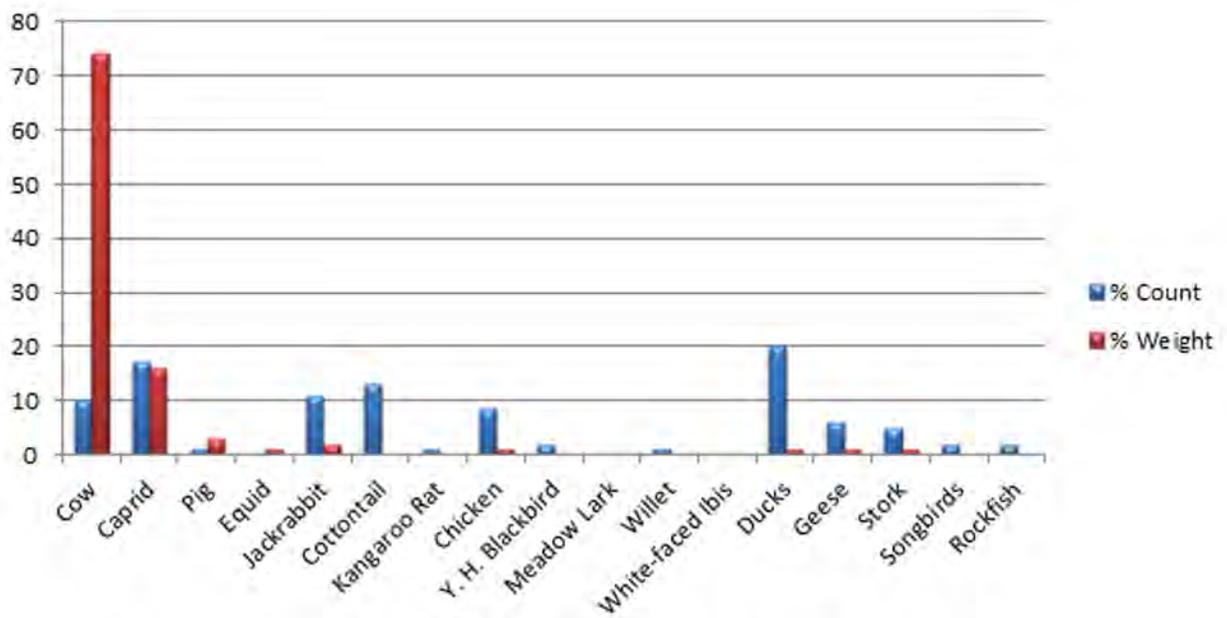


Figure 1. Relative proportions of identifiable fauna, by count and weight.

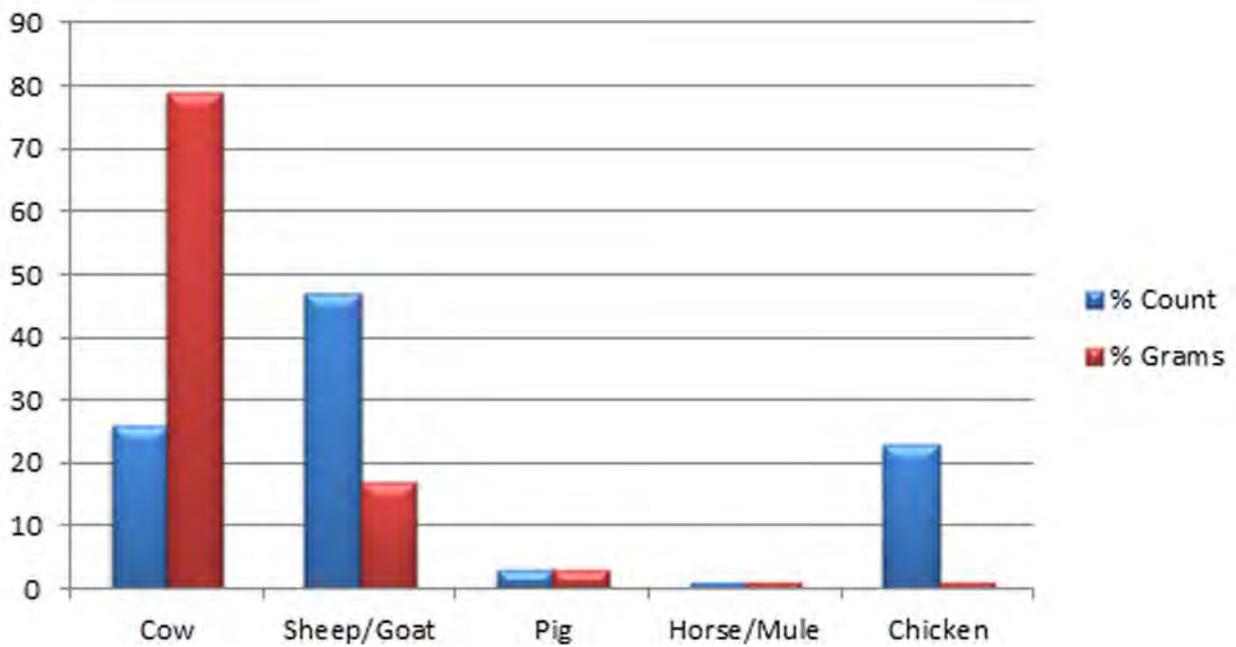


Figure 2. Relative proportions of domesticates, by count and weight.

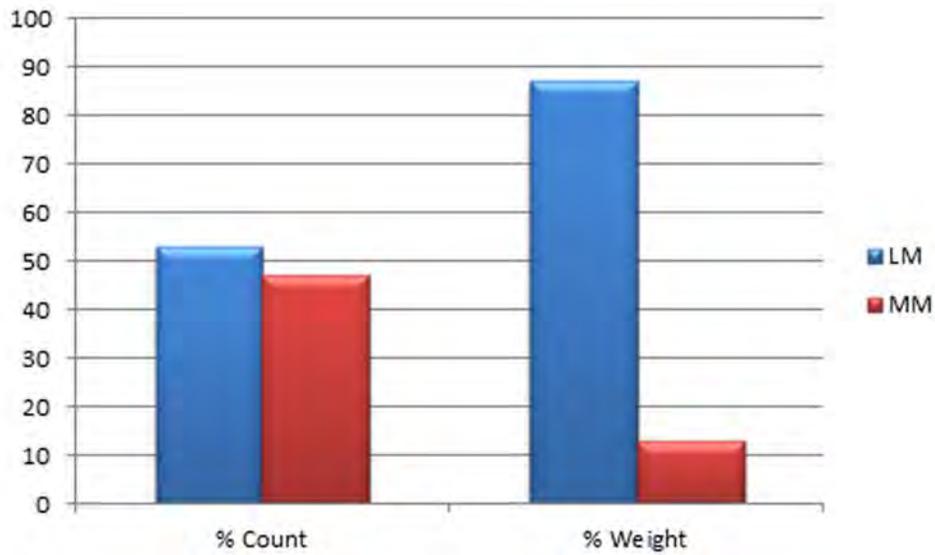


Figure 3. Relative proportions of unidentified large mammal and medium mammal, by weight.

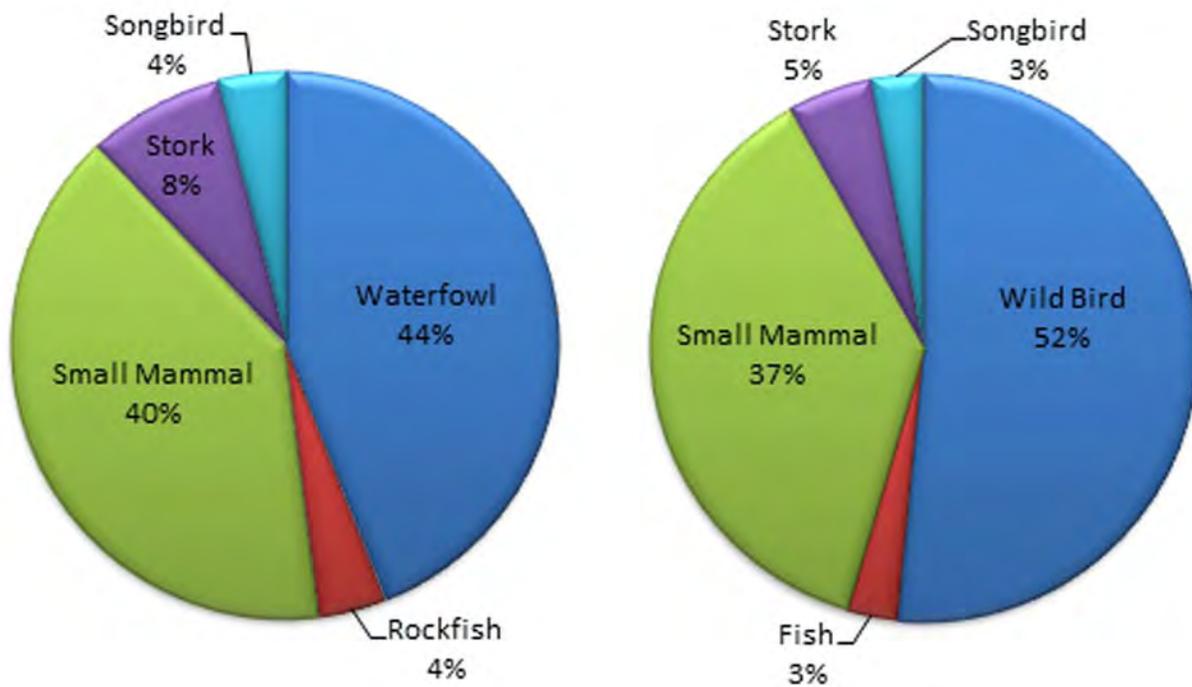


Figure 4. Relative proportions of identifiable wild fauna (n = 460) (left) and of identifiable and unidentifiable wild fauna (n = 734) (right).

Table 5. Wild bird bones.

SCIENTIFIC NAME	COMMON NAME	COUNT	MNI	BUTCHERED
<i>Xanthocephalus xanthoceph.</i>	Yellow-headed Blackbird	17	4	-
<i>Sturnella neglecta</i>	Meadow Lark	2	2	-
<i>Catoptrophorus semipalmatus</i>	Willet	6	1	1
<i>Plegadis chihi</i>	White-faced Ibis	1	1	-
<i>Aythya affinis</i>	Lesser Scaup	1	1	-
<i>Lophodytes cucullatus</i>	Hooded Merganser	3	2	-
<i>Anas crecca</i>	Green-winged Teal	20	4	7
<i>Anas discors</i>	Blue-winged Teal	3	1	3
<i>Anas cyanoptera</i>	Cinnamon Teal	14	4	2
<i>Anas crecca, discors or cyanoptera</i>	Green/Blue/Cinnamon Teal	45	-	15
<i>Anas americana</i>	American Wigeon	2	1	-
<i>Anas acuta</i>	Northern Pintail	4	2	2
<i>Anas platyrynchos</i>	Mallard	2	1	2
<i>Anas strepera</i>	Gadwall	2	1	1
<i>Branta bernicla</i>	Brant Goose	2	1	2
<i>Chen caerulescens</i>	Snow Goose	2	1	-
<i>Branta canadensis moffitti</i>	Canada Goose	1	1	-
<i>B. c. parvipes or B. c. leucopareia</i>	Lesser Canada Goose or Cackling Goose	2	1	2
<i>Anser albifrons</i>	Greater White-fronted Goose	6	2	1
<i>Mycteria americana</i>	Wood Stork	37	4	10
Anatidae (Anatini Tribe)	Duck	56	-	25
Anatidae (Anserini Tribe)	Goose	31	-	5
Aves - Small	Unidentified Songbirds	5	-	--
Aves - Large	Unidentified Large Birds	172	-	5
Total		436	35	83

Note: 161 unidentified medium-size birds and 131 indeterminate medium/large birds are excluded (as some may be chicken).

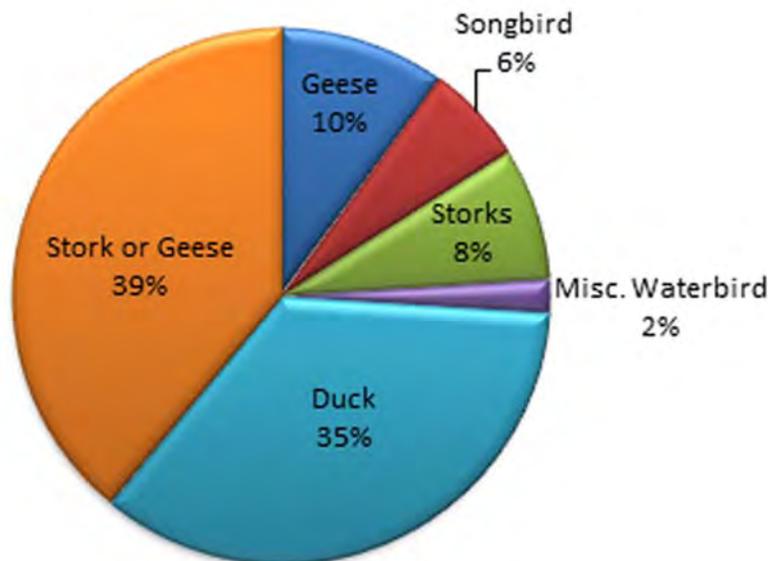


Figure 5. Identifiable birds and large birds (storks and geese) grouped by type (n = 436).

Hooded mergansers prefer small freshwater ponds. They are documented on ponds throughout San Diego County in numbers of 40 or less per year. Only four records document their presence on ponds in Borrego Valley.

The presence of so many water-dependent birds within the Colorado Desert region might possibly have occurred as a result of a phenomenon similar to one documented in the winter of 1848-1849, when exceedingly heavy Rocky Mountain snowfall melt caused the Colorado River to overflow the banks of the delta (Van Wormer et al. 2012:29). The resulting rush of water northward along the course of the New River toward modern-day Imperial Valley caused a transformation from desert to oasis. For a distance of more than 20 mi. west of Alamo Mochó, streams, lakes, and grass pastures formed on the desert floor. A particularly rainy winter season might also cause ponding on the desert floor, providing suitable if temporary habitats for migrating water birds. Stagecoaches heading west could have transported waterfowl taken along the route to Carrizo.

The Carrizo waterfowl might also have been transported from the delta by way of Yuma, Arizona. The Butterfield coaches were serviced and horses shod at repair and blacksmith shops in Yuma (Van Wormer, personal communication 2013). The U.S. Army's main supply depot, also located in Yuma during this period, was stocked by riverboats that traveled up the Gulf of California to the Colorado River delta. Supplies were then off-loaded onto boats heading up the Colorado River to Yuma.

If waterfowl were taken from the delta, where they are found in great abundance, they would likely have been salted before travel by boat to Yuma and by stagecoach from Yuma to Carrizo. They could also have been transported from San Diego Bay, Pacific Coast estuaries, or lagoons. The presence of Pacific Coast rockfish supports this idea, though, as noted, only two diving ducks were identified, and no sea ducks were found.

Alternatively, the remains of so many ducks and geese, together with the blackbirds, meadowlarks, willets, ibis, and wood storks, suggest that the Carrizo spring afforded a more substantial wetland than today's small remnant, and that these water birds may well have been hunted on site.

Numerous references to the Carrizo Marsh during the decade leading up to the U.S. construction of the Carrizo adobe describe alternate extremes ranging from a flowing spring 20 to 30 ft. in diameter to a dry bed of a spring with only a rivulet at its head, formed by oozing from the ground, to a spring-fed stream 3-9 in. deep and 3 in. to 6 yd. wide that flowed for a distance of up to 1 mi. before being absorbed back into the desert floor. In 1849, a traveler noted hearing frogs just prior to reaching Carrizo Creek. In June 1855, Carrizo's station keeper told a chief engineer of the Pacific Railroad Survey that there had been no rain for eight months and that temperatures were over 100°. He indicated that the Carrizo stream stopped flowing late in the morning and resumed in the late afternoon (Van Wormer et al. 2012:37-39). In 1857, a letter published in the *Sacramento Union* described the water at Carrizo as a beautiful stream, running all seasons of the year.

A 1914 description of the Carrizo station indicates the presence of a number of springs, two of which supplied fairly good water. A tule swamp noted around the station was described as rather large, out of which a strong stream of alkaline water was said to have flowed (California State Legislature 1917:722). Despite its inconsistencies, the brutally hot weather that accompanied the worst conditions, and reports of dead animal carcasses sometimes spoiling the water, Carrizo Creek remained the first reliable permanent water source west of the Colorado River; although sulfuric, it was frequently used by people and their animal stock.

Recovery of Pacific Coast rockfish remains is somewhat surprising. A minimum of three individuals from the genus *Sebastes* were identified by Mark Roeder. This genus is not found in the northern Gulf of California (Roeder, personal communication 2005). It appears the fish arrived whole and were processed on site. One approached 1 ft. in length, with an estimated live-weight of 1,500 g. The other two were approximately 6-8 in. long, weighing close to 750 g each. The heads were apparently cut off and thrown into the refuse pit; ribs and vertebrae were evidently discarded elsewhere.

The rockfish were undoubtedly transported to Carrizo on an east-bound coach, perhaps by way of the Antonio and San Diego Mail line during the first year of coach service. Lesser scaup and hooded merganser, the only diving ducks identified, may have arrived in the same manner.

MEAT PROCESSING

Body Part Representation

The Carrizo bone debris included meat-bearing body elements as well as head and foot bones associated with butchering waste, an indication that both domesticates and wild fauna were processed on site. Sheep remains from the refuse pit are pictured in Figure 6, and illustrate that consumption and butchering waste was discarded there. Medium-size mammal ribs and vertebrae were also well represented, though they are not illustrated.

Among the beef bones, consumption debris was far more abundant than butchering waste, as evidenced by the near absence of skull and foot bones (Figure 7). It is unclear if this had to do with provisioning of meat-bearing portions or differential disposal of the large-animal butchering waste.

Butchery Data

Butchering scars were observed on 199 stage stop specimens identified to the taxonomic level of family or better, and on 520 unidentified bird and mammal specimens. Among the 600 butchered livestock remains from the stage station, 109 identifiable beef, lamb, and pork bones and 388 large- and medium-size mammal bone fragments retained distinct scar marks. Cleave scars account for the most frequent butchering mark recorded on the Carrizo specimens (Figures 8 and 9) and resulted largely from carcass dismemberment. Knife cuts account for the second most prevalent butchering scar, a result of muscle detachment, meat removal, and, less frequently, consumption. Less frequent knife-generated skip-cuts were made during removal of meat from the bone prior to cooking. Saw cuts were consistently recorded, though not in large numbers. They occur primarily on finished saw cuts. A number of specimens exhibit bone-shattering percussion blows or hacks associated with marrow extraction.

The prevalence of cleave scars is further reflected in Figures 10 and 11, where they account for the greatest quantity of butchering incidents. In a number of cases, a single bone might exhibit multiple incidents of the same scar type and/or more than one type of butchering scar; hence the elevated quantity of butchering incidents compared to butchered elements. This is particularly evident in Figure 11 among the pig remains, where the small number of elements, coupled with a single specimen that received 20 knife cuts during meat removal, belie the fact that cleave scars were found on three times more pig bones than were knife cuts.

ETHNICITY

Livestock

The tools and butchering techniques that produced the Carrizo butchering scars reflect Euro-American and Hispanic meat processing methods. Hispanic butchering methods and meat processing techniques involve the use of knives, axes, and cleavers to dismember joints, strip meat from bones, and smash shafts and articular ends of major limb bones to extract marrow from bone cavities. Dismemberment cleaves, meat stripping cuts, and highly fractured limb fragments are documented on cattle remains from on-site butchering activities at the San Diego and Santa Barbara presidios (Benté 1980:69; Cheever 1983:172-181). These dismemberment and reduction processes are described by Wessel (1980) and Schulz et al. (1987) as standard in early Hispanic California.

The Euro-American butchering tradition is characterized by use of handsaws and large cleavers or axes to halve suspended livestock longitudinally down the center of the spine and transversely to

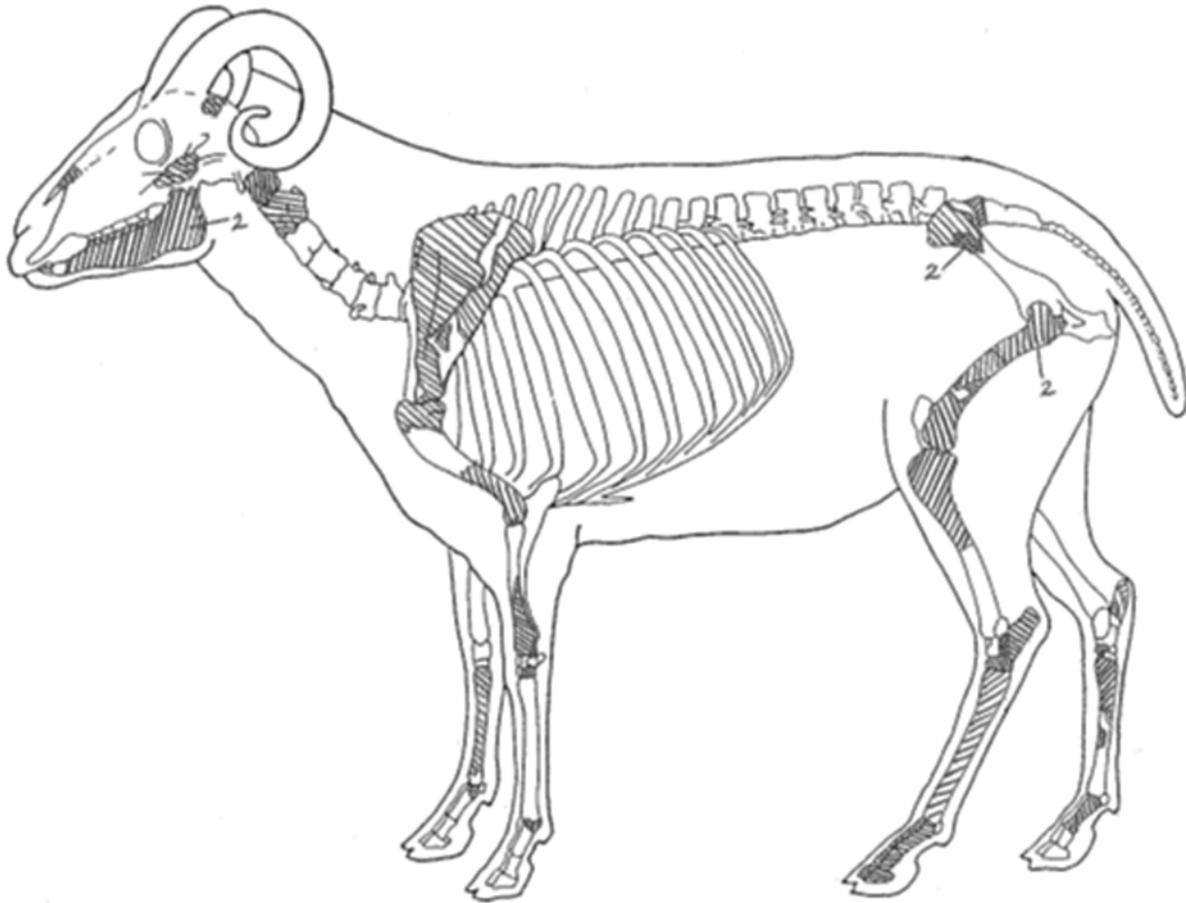


Figure 6. Identifiable caprine elements: butchered and non-butchered specimens.

quarter them across the spine into primary sections. Knives were used to aid in skeletal dismemberment during primary processing. Meat-bearing elements were secondarily cross-sawn into finished bone-in steaks and roasts (Maddox, in Flower et al. 1982:201; Schulz et al. 1987:39).

Among the Carrizo fauna, Euro-American butchering techniques are evidenced by handsaw, axe, and knife cuts resulting from primary carcass dismemberment, secondary meat processing, kitchen preparation, and consumption. Sawn finished beef cuts total 41 and include chuck, rump, and ham roast cuts. The majority are shortribs and longrib steaks cuts.

Hispanic butchering methods are mainly represented by large mammal and to a lesser extent medium mammal limb shatter from longbone fracturing for marrow extraction. A number of larger identifiable limb shafts show evidence of destructive percussion blows that produce bone shatter. Though less evident, meat removal is indicated by several skip-cuts and scrapes along the blade of a cow scapula, and by four short, deep cuts along the shaft of a caprine (sheep/goat) scapula.

Two of the finished sawn beef bones are akin to blade steak cuts from the scapula in the shoulder. However, unlike traditional Euro-American blade steaks, these cuts are three-sided, wedge-shaped chunks, ranging in size and width from 0 to 3 in. and ¼ to 5 in., respectively. They may reflect a Euro-American adaptation of Hispanic-style bone-in meat chunks cleaved on three to four sides for use in soups or stews. Similar sawn chunks were identified among bone debris from the mid-nineteenth-century Jolly Boy Saloon in Old Town San Diego (Arter 2008:17). In her discussion of the Ontiveros cattle remains from a nineteenth-century rancho in Alta California, Gust describes examples of Hispanic meat

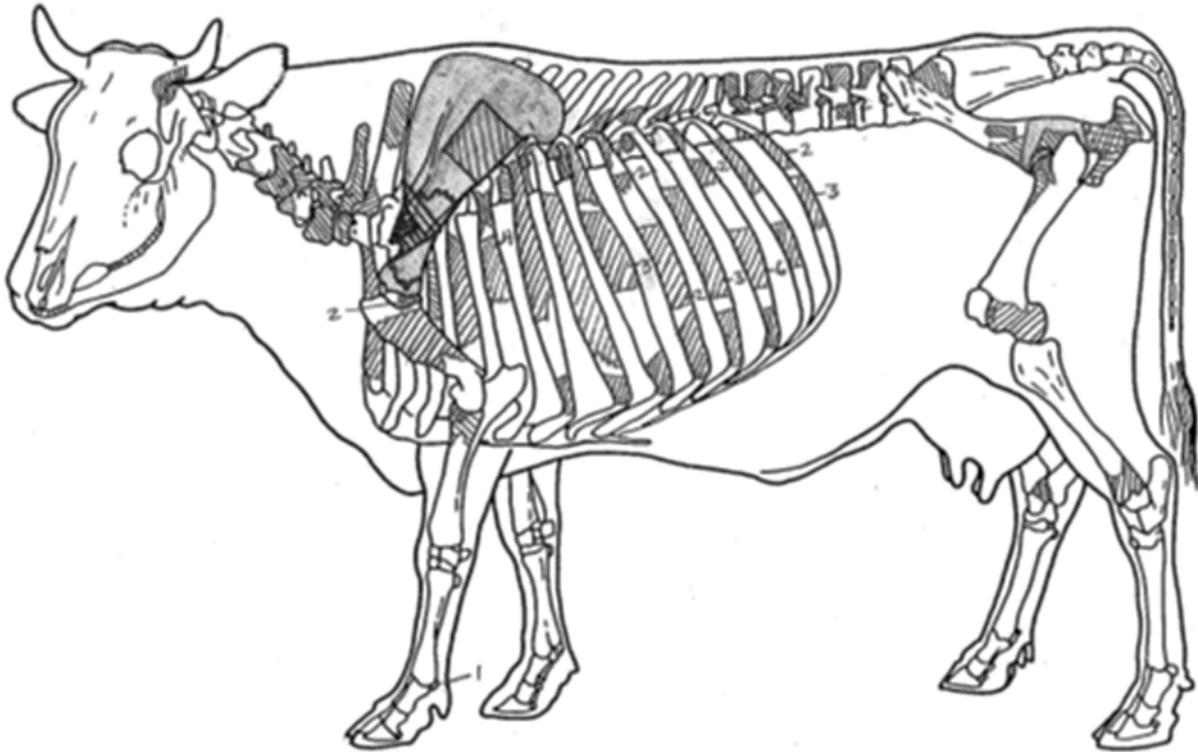


Figure 7. Identifiable cattle and large mammal ribs and vertebrae: includes butchered and non-butchered identifiable specimens and butchered large mammal specimens only.

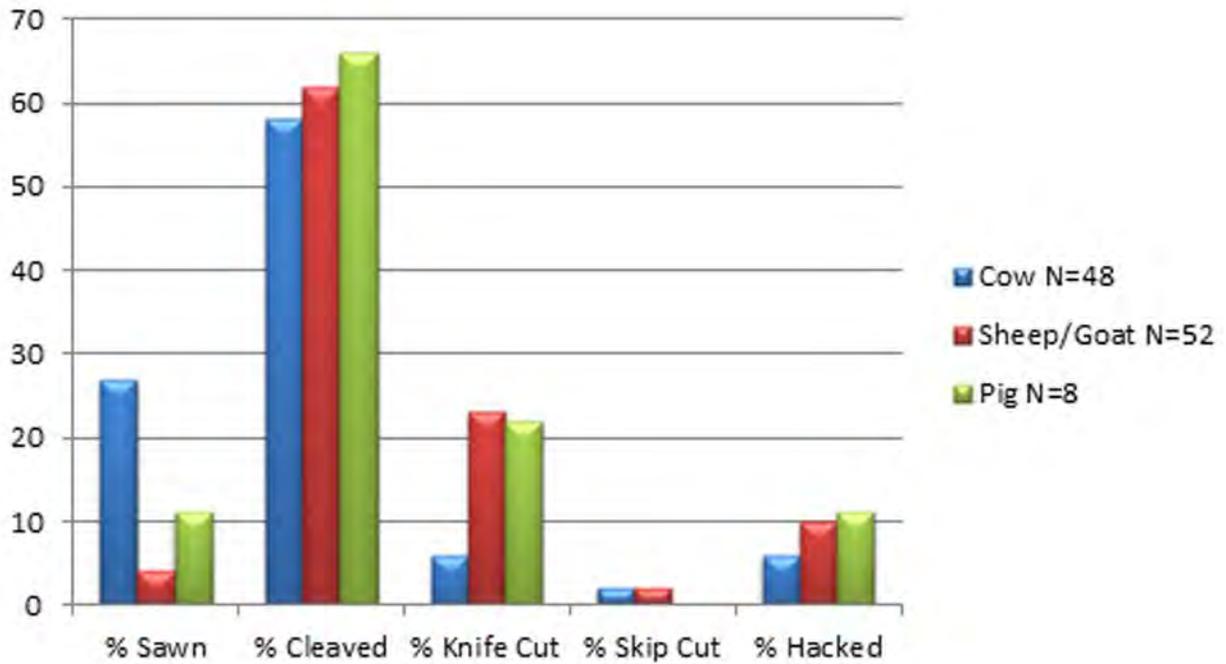


Figure 8. Relative proportions of identifiable elements with butchering scars.

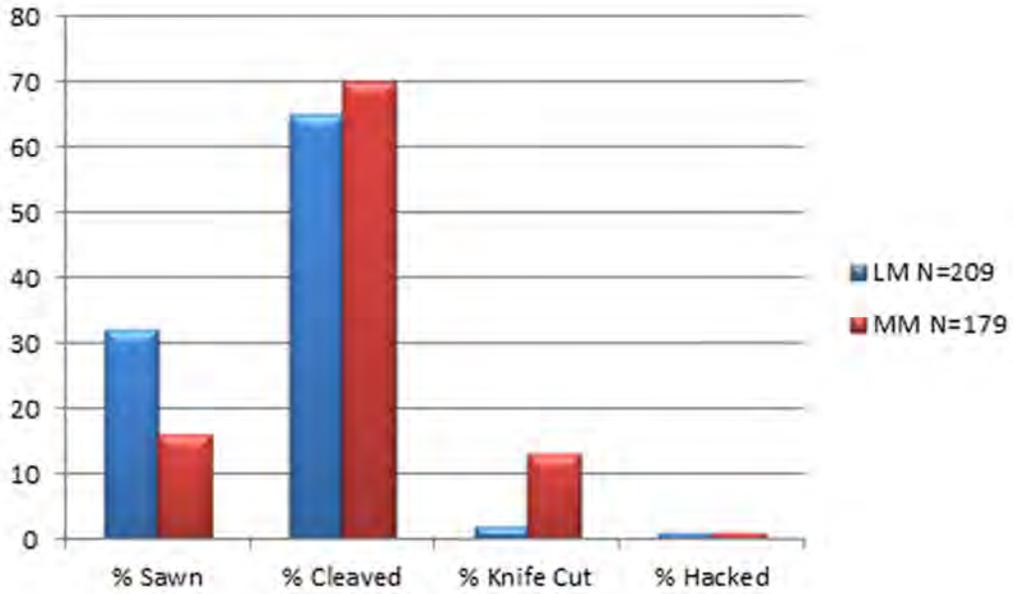


Figure 9. Relative proportions of unidentifiable elements with butchering scars.

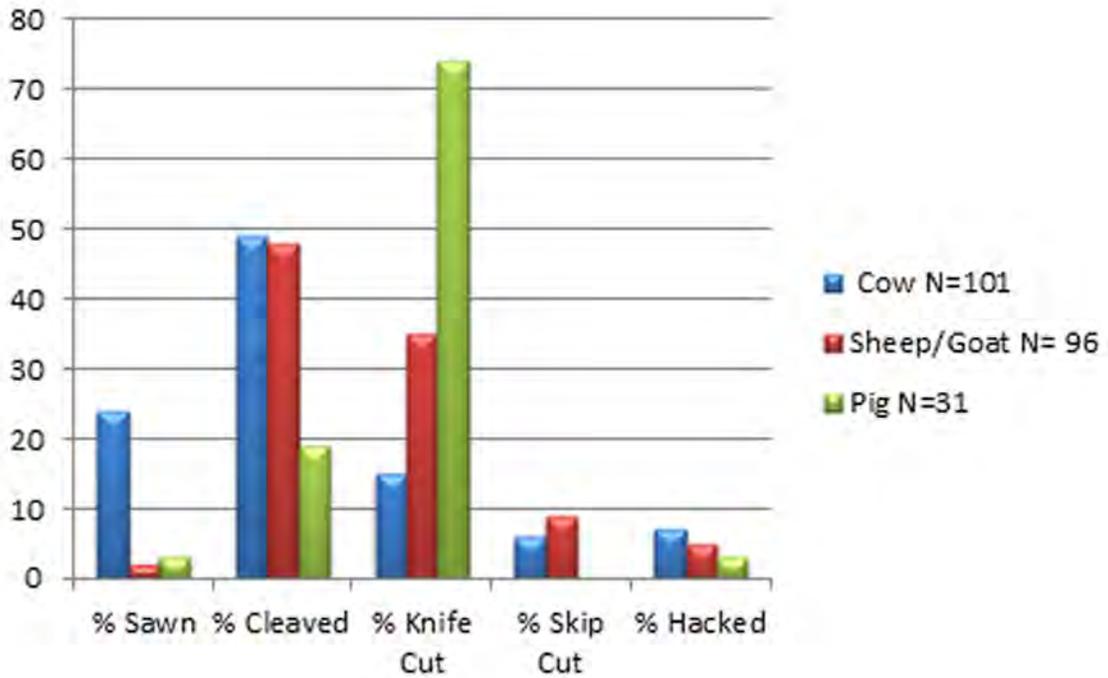


Figure 10. Relative proportions of butchering incidents on identifiable specimens.

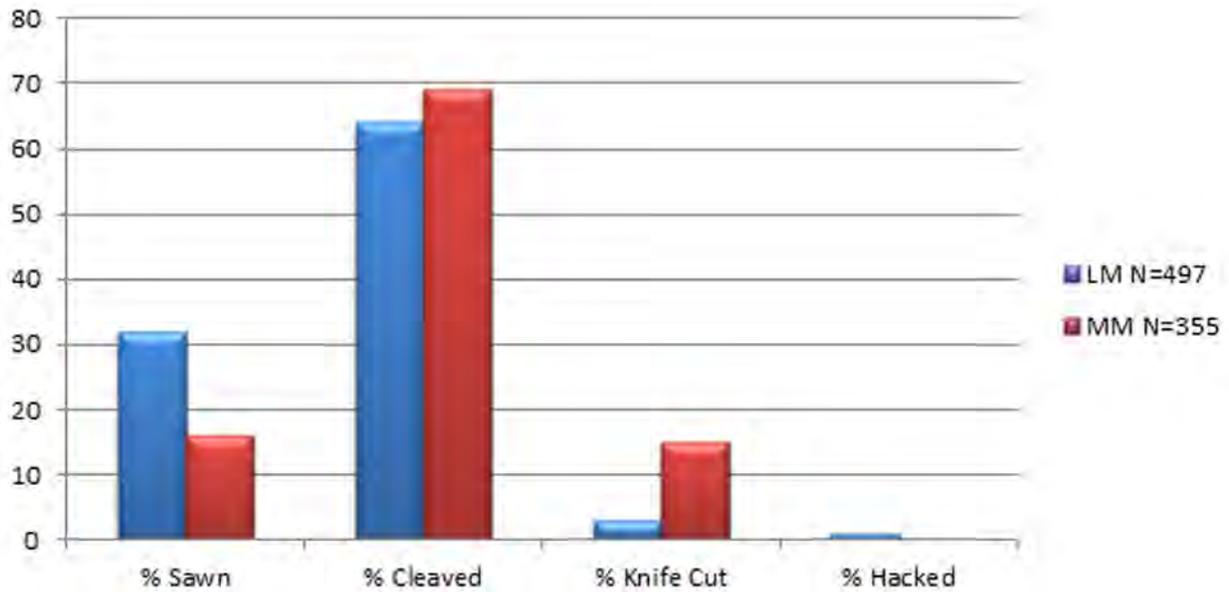


Figure 11. Relative proportions of butchering incidents on unidentifiable elements.

processing techniques involving segmentation of the vertebral column into several chunks (Gust 1982:138).

Small Mammals and Birds

The relative proportions of sawn, cleaved, and knife-cut small mammal and bird remains are shown in Figure 12. These data reflect fairly intensive preparation of chickens and wild fauna for consumption. Most scars on the bird remains resulted from muscle halving or dismembering, the latter associated with removal of meat-bearing wing and drumstick portions, and non-meat-bearing lower hind limbs and/or feet. Among 85 jackrabbit remains, only 10 were butchered. Of these, eight bore cleave scars and two had retained cut marks. All were associated with the dismemberment or detachment of the hips or the hip and thigh bones. Among 96 cottontail elements, four were cleaved and one was cut. As with the jackrabbits, these scars resulted from dismemberment of the hips and/or the hip and thigh bone.

Body part data and evidence of butchering tools and techniques on domestic livestock suggest the Carrizo fauna were largely processed on the premises according to Euro-American and Hispanic butchering tradition. Skeletal halving, dismemberment, and muscle detachment cuts identified on cottontail and jackrabbit remains also reflect Euro-American practices. These ethnic attributes are consistent with the presence of European manufactured ceramics as well as spice-pepper sauce and olive oil bottles indicative of Hispanic dietary influences (VanWormer et al. 2012:171).

Native American consumption practices are also evidenced at the stage station by the abundance of wild fauna and the condition of small mammal remains. The majority of small mammal bones were highly fragmented, likely the result of pulverization, a treatment commonly documented among southern California prehistoric faunal assemblages. The process of pounding whole rodents into a gruel-like consistency is described in an ethnohistoric account by Kumeyaay Delfina Cuero (Shipek 1991:33). Native American activities are also evidenced by brown ware recovered from trash pits A1 and B4, among other deposits. Those from B4, the large refuse pit, were heavily sooted from cooking. Ground stone implements including a pestle, manos, and metates, were also found (VanWormer et al. 2012:140-145). These items may have been produced and/or used by the Native Indian woman married to station manager Mailland. She lived on site in 1857 during the first year of coach service. *San Francisco*

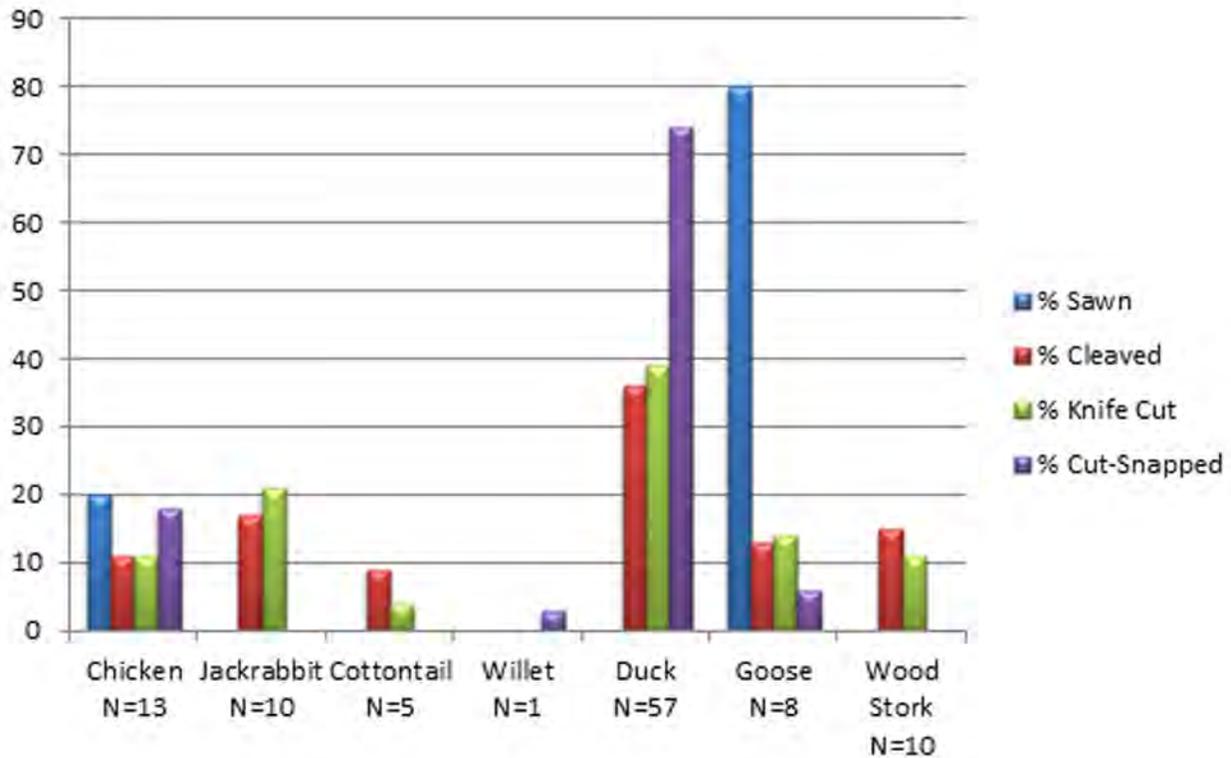


Figure 12. Relative proportion of sawn, cleaved, and cut elements among small mammals and birds.

Chronicle mail correspondent Charles F. Running mentions supper served at the stage stop by a Native American woman that same year (Van Wormer et al. 2012:171).

CONCLUSION

Vertebrate remains from the Carrizo stage stop reflect a reliance on cattle and sheep, animals commonly driven along the overland stage route. Cattle provided the bulk of the meat, followed by sheep and to a lesser extent pigs and chickens. These animals were processed on-site with saws, axes, and knives according to Euro-American and Hispanic butchering traditions. And while some of the rabbit and hare bones also reflect Euro-American butchering methods, the Native American woman who lived at the station for a time likely had a hand in procuring and processing wild fauna identified in the assemblage.

The broad range and quantity of wild fauna consumed on site include desert cottontails, jackrabbits, kangaroo rats, waterfowl, and wood storks. They account for two-thirds of the identifiable fauna. Though they provided less substantial quantities of meat relative to cattle and sheep, wild game were clearly a desirable food source at the Carrizo stage stop. Together with domestic livestock and fowl, they reflect the variety of species afforded at the crossroad between the inland desert, elevated pasturage to the northwest, and the Pacific Ocean to the west.

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