7. FISH, AMPHIBIAN, REPTILE, AND BIRD REMAINS

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Introduction

The archaeological investigation of Scattered Village (32MO31), located north of the confluence of the Heart and Missouri Rivers in south central North Dakota (Figure 1.1, Chapter 1), yielded a large and diverse assemblage of animal bone. By any measure, the Scattered Village assemblage is dominated by the remains of a single large mammal, the American bison. Nonetheless, many smaller mammal and non-mammal species are present. For example, nearly 25,000 pieces of non-mammal bone are contained in the Priority 1 waterscreen and flotation samples processed following the 1998 excavation. This chapter provides summary description and partial analysis of unmodified fish, amphibian, and bird materials. Mammal remains are presented in Chapters 6 and 8, while modified bone and antler are described in Chapter 13.

Following sections review laboratory procedures pertinent to the study, summarize identified vertebrate remains, consider the origin and cultural association of these remains, and provide analysis directed toward defining aspects of spatial and temporal variability within the recovered sample. Consistent with the general orientation of coordinated studies presented in this volume, several basic questions are addressed.

1. What taxa are represented in the Scattered Village sample, and in what general proportions are they represented?
2. Do patterns of representation vary as a function of context within the portions of the site investigated?
3. Do relative proportions of culturally significant taxa change through time? More specifically, does the relative importance of fish and/or bird increase (decrease, or remain stable) from the earliest Precontact village period occupations (AD 1550-1600) through the earliest Postcontact (AD 1600–1650) and later Postcontact (AD 1650-1700) occupations?
4. How do patterns of faunal representation observed at Scattered Village compare to those reported from archeological contexts within the general region?

Laboratory Procedures

Detailed discussions of the 1998 investigation at Scattered Village, including consideration of field methods, sampling strategies, collection processing methods and rationale, application of standardized size-grading procedures, and selection of samples for analysis are offered elsewhere in this volume. Here comments are directed specifically to preparation of the bone assemblage. Vertebrate remains were first sorted from screen residues by PCRG laboratory staff in Flagstaff, Arizona following generally standardized protocols. All size grade G1-G3 bone and potentially identifiable size grade G4 and G5 specimens were forwarded to the author in Sevierville, Tennessee for further processing. Upon receipt, modified bone and antler pieces

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were separated from each catalog lot for all size grades. After collection of basic taxonomic and element data, modified remains were returned to Flagstaff for more detailed analysis; modified bone and antler are fully described in Chapter 13.

Grade 1-3 unmodified bone samples were closely examined for the presence of burning and subsequently quantified by weight (g) for both burned and unburned fractions for each size grade. Over 350 kg of bone were processed. Weight data were stored in a Paradox 3.5 data file. Following collection of weight data, materials from G3, G4 and G5 were separated into two categories: potentially identifiable specimens and debris judged to be unidentifiable in the present analysis. The latter materials were packaged and organized for permanent storage. Identifiable specimens from each size grade, including G4-5 materials initially selected by PCRG staff, were sorted by Class in preparation for more intensive study. All G1 and G2 specimens were initially treated as potentially identifiable. Mammals were further divided by separating large artiodactyl elements and element fragments from those of smaller taxa. With the exception of micromammal specimens, all mammal remains were forwarded to Dr. Kathryn Cruz-Uribe, Department of Anthropology and Quaternary Sciences Program, Northern Arizona University for her examination (see Chapter 6). Micromammal specimens were divided into cranial and non-cranial categories. A select sample of cranial specimens from 17 features representing each Plains Village time period was forwarded to Dr. Holmes A. Semken, Jr., Department of Geoscience, University of Iowa, for further analysis (see Chapter 8). The remaining micromammal cranial remains and all post-cranial specimens were packaged for storage and possible future study. The non-mammal bone was retained for examination by the author and forms the basis of this chapter.

The non-mammal sample is comprised of a mix of specimens recognized by lab personnel as fish, amphibian, reptile, or bird; however, not all specimens are easily identified beyond initial Class separation. In this study, a bone is considered 'identifiable' if the anatomical element, or element group (e.g., vertebral group) can be determined. Specimen identifications are recorded by catalog number and size grade on laboratory work sheets and are entered into Paradox 3.5 data files maintained for each Class. The following information is recorded for each item: specimen number (composed of a taxon code and sequential specimen number within each taxon), taxon, skeletal element or element group, anatomical side (left, right, axial), element part or portion (e.g., complete, proximal, distal, dorsal, ventral, etc.), burning (present/absent), tool marks (present/absent), and non-human modification (absent, carnivore gnawing, rodent gnawing, partial digestion). Additional comments and clarifying remarks are recorded in open column format as appropriate. Identified specimens, organized by catalog lot and Class, are packaged in white-front plastic storage bags. A full record of all identified remains is stored on electronic media and is available with permanent site records. Counts for unidentified specimens are also recorded by Class, size grade and catalog lot. In addition, literally thousands of complete and fragmented fish scales are included in the collection, primarily within the G3 and G4 fractions. These materials are not quantified in the present study but are packaged by size grade and catalog lot for use by future researchers.

All identifications were completed with the aid of modern skeletons in the possession of the author and supplemented by materials from an extensive vertebrate reference collection maintained by the Department of Anthropology, University of Tennessee-Knoxville. Adequate

comparative examples were readily available for nearly all fish, amphibian, reptile, and bird species that might be anticipated in a Middle Missouri faunal assemblage. In those few cases where comparative materials were lacking, identifications were generalized to an appropriate taxonomic level. For fish, common and scientific names follow the American Fisheries Society (1991). Element nomenclature generally conforms to Rojo (1991). Additional sources were consulted to clarify element identification and terminology for select fish groups including minnows and chubs (Coburn 1982; Harrington 1955), catfishes (Grizzle and Rogers 1976; Krause 1977; Mundell 1975; Paloumpis 1963, 1964), suckers (Branson 1962; Weisel 1960), mooneyes (Ridewood 1904), and freshwater drum (Green 1941). A recent Peterson Field Guide was useful for amphibian and reptile systematics (Conant and Collins 1991). Element terminology for herps generally follows Duellman and Trueb (1994) and Romer (1956). Published checklists were consulted for common and scientific bird nomenclature (e.g., American Ornithologists' Union 1983; Bismarck-Mandan Bird Club 1986) and bird element terminology follows Cohen and Serjeantson (1996) and Gilbert et al. (1981).

Fish

A total of 21,365 pieces of fish bone was sorted from G1-5 samples. Grade 5 specimens (n=7,305) are excluded from the present study. The choice to omit these remains was based on one primary factor: recognition that budgeted time and funds were insufficient to complete the full analysis if G5 specimens were included. This decision was reinforced following a preliminary inventory of the G5 sample that suggested detailed analysis of these remains was unlikely to significantly impact final results – beyond increasing total numbers of identified specimens. Also, with the exception of one or two small cyprinids, G5 specimens appeared to reflect taxonomic groups well represented in G1-4 fractions. As noted earlier, fish scales were recovered in large numbers from virtually all excavation units but were also excluded from this study given available resources. However, virtually all scales appear to be from suckers, cyprinids, and goldeye; each of these groups are common in the identified sample.

Only G1-4 fish bone from Priority 1 contexts is considered here. The sample is comprised of 14,060 specimens. Over half of these (n=8,380, or 59.6%) are ribs, rib fragments, fin support elements (i.e., rays, radials, pterygiophores, etc.), broken vertebrae and other bony fragments not considered 'identifiable' for this study. Slightly over 90 percent of these are G4 specimens. The remaining 5,680 specimens were identified following procedures outlined above and are the focus of this section.

Fish bone is found in all site areas and excavation blocks. Areas 1 (n=2,047) and 3 (n=1,742) yielded the highest frequencies, but areas 2 (n=1,102) and 4 (n=789) also produced substantial numbers. Fish bones are also well distributed across excavation blocks as follows: 1 (n=540), 2 (n=831), 3 (n=1,102), 4 (n=257), 5 (n=462), 6 (n=1,096), 7 (n=70), 8 (n=624), and 9 (n=698). While none of these values are adjusted to reflect partially sorted G4 fractions, the raw counts attest to the ubiquitous character of fish remains.

Fish bone was found in 59 excavated features. Just over half (n=2,926, or 51.5%) of the identified sample was recovered from pits while general level excavations contributed an

additional 42.7% (n=2,423). The remaining 331 specimens (5.8%) were found scattered through various small features (hearths, postholes), roof materials, and natural/organic layers. Identified fish bone is organized by taxon and size grade in Table 7.1. A total of 1,385 elements are listed under the Class heading, Osteichthyes. Nearly all (n=1,376) of the pieces grouped here are vertebrae that could not be assigned with certainty to more specific taxonomic units. The remaining 4,295 specimens are referred to varying taxonomic groupings representing nine Families. Three family groups, the bullhead catfishes (Ictaluridae, n=1,635), mooneyes (Hiodontidae, n=1,411), and suckers (Catostomidae, n=737) contribute 88.1% of the sample identified beyond the Class level. A more detailed accounting of identified remains is provided below.

Grade 4 specimens are dominant (n=4,040), comprising 71.1% of the identified sample. The G1 sample is limited to a single specimen while 83 G2 specimens (1.5%) and 1556 G3 pieces (27.4%) complete the collection. With two exceptions (gar and bigmouth buffalo), all identified taxa are represented in the G3 and G4 fractions and most of these taxa are also present in the G2 fraction. The relative proportion of identified specimens within each size grade varies by taxon. As discussed elsewhere (Falk 1997:142), these differences can be ascribed in part to differing body sizes among the various taxa represented. Larger fish, such as sturgeon, carpsucker, buffalo sucker, channel catfish, burbot, and freshwater drum are well represented in the coarse-screen fractions. Fish with generally smaller body sizes, including goldeye, minnow and chub, white sucker, black bullhead, and stonecat, are more common in the in the fine-screen fraction. The relative maturity of individual fish is also a factor and developmental stages of larger fish are to be expected in the fine-screen residues.

A total of 479 pieces of fish bone is burned, representing 8.4% percent of the total (Table 7.1). Burned fish bone is more common in features as compared to general level excavations. Of the burned total, 317 pieces (66.2%) are from features and 162 pieces (33.8%) are from the general excavation. The relative proportion of burned bone also varies somewhat by taxon with both burbot (20.4%) and the combined sucker group (105 of 737 specimens are burned, or 14.2%) showing the highest percentage values. The significance of these differences among taxa is unclear but may simply reflect varying contexts of recovery. For example, eight of ten burned burbot elements are from F26; 23% of all F26 fish bone is burned.

The recovery of large numbers of fish bone from excavated pits and midden deposits, the occurrence of significant numbers of burned specimens, and the occasional tool-marked element (see below) clearly argue for the presence of these remains due to human action. This conclusion is strongly supported by available ethnohistoric and ethnographic accounts that describe many aspects of well-developed fishery traditions, especially surrounding catfish (e.g., Gilmore 1924; Weitzner 1979; see also Falk 1997:132-134).

Table 7.1. Numbers of identified specimens (NISP) for fish organized by taxon and size grade, Scattered Village (32MO31), 1998 excavation.

Taxon (Common Names)	Size Grade 1	2	3	4	Total NISP	Burned NISP	Burned %
Osteichthyes (bony fish)			58	1,327	1,385	162	*11.7*
Scaphirhynchus platorynchus/*albus* (shovelnose/pallidsturgeon)		6	26	17	49	1	*2.0*
Lepisosteus sp. (gar)			1		1		
Hiodon alosoides (goldeye)			204	1,207	1,411	99	*7.0*
Cyprinidae (carps and minnows)			43	201	244	7	*2.9*
Catostomidae (suckers)		3	160	316	479	83	*17.3*
Ictiobus bubalus/cyprinellus (smallmouth/bigmouth buffalo)		2	36	5	43	1	*2.3*
Ictiobus cf. *I. bubalus* (smallmouth buffalo)			5	1	6		
Ictiobus cf. *I cyprinellus* (bigmouth buffalo)		1			1		
Carpiodes cf. *C. carpio* (river carpsucker)		2	19	11	32	3	*9.4*
Ictiobus/Carpiodes (buffalo/carpsucker)			11	3	14	3	*20.*
Moxostoma sp. (redhorse sucker)		1	43	59	103	11	*10.7*
Catostomus cf. *C. commersoni* (white sucker)			15	44	59	4	*6.8*
Ictaluridae (bullhead catfishes)		4	247	512	763	51	*6.7*
Ameiurus sp. (bullhead)			5	8	13	1	*7.7*
Ictalurus cf. *I. punctatus* (channel catfish)	1	53	575	183	812	32	*3.9*
Noturus flavus (stonecat)			8	39	47		
Lota lota (burbot)		1	22	26	49	10	*20.4*
Percidae (perches)			1	22	23	4	*17.4*
Stizostedion canadense/*vitreum* (sauger/walleye)			39	57	96	5	*5.2*
Aplodinotus grunniens (freshwater drum)		5	42	3	50	2	*4.0*
Total	1	83	1,556	4,040	5,680	479	*8.4*
%	*0.0*	*1.5*	*27.4*	*71.1*	*100.0*		

Identified Taxa

Acipenseridae (sturgeons). Forty-nine elements are referred to the genus *Scaphirhynchus*. Most specimens are fragments of unidentified cranial and body plates, easily recognized by their distinctive sculptured appearance. None of the specimens are considered sufficiently complete to permit assignment to lower taxonomic levels, although one parietal compares well with shovelnose sturgeon (*S. platorynchus*) based on available reference materials. One piece shows characteristics (corroded appearance with surface pitting and/or rounded edges) suggesting partial digestion and may have passed through the digestive system of a large carnivore (domestic dog?). Sturgeon bone is not commonly reported from sites in the general region but specimens are recorded from nearby Slant Village (Falk 1997:142), as well as Lower Hidatsa and Sakakawea in the Knife River area (Falk et al. 1991:21, 421).

Lepisosteidae (gars). A parietal fragment is the only gar element included in the identified sample; this specimen is referred to genus only. A single example is included in the Slant Village collection, one ganoid scale is reported from Big Hidatsa (Falk et al. 1991:133), and gar bones and scales are reported from sites in the Mobridge area (Alex 1982:459; Falk and Ahler 1988:172).

Hiodontidae (mooneyes). The mooneye family is represented by one species in the northern Missouri basin (Lee et al. 1980:74), the goldeye, a moderate sized fish well adapted to the turbid waters of major rivers. Goldeye elements (including vertebrae) are readily identifiable and are plentiful (NISP=1,411) in the Scattered Village sample, comprising 24.8% of the identified total. At least ten specimens appear to be partially digested. Archaeological evidence suggests that this species was commonly taken by villagers throughout the Missouri basin in both North and South Dakota from late prehistoric through historic periods (e.g., Ahler et al. 1993:267; Falk 1997:143-144; Falk and Ahler 1988:172; Falk et al. 1980:570; Snyder 1988:197).

Cyprinidae (minnows and carps). Cyprinids are well represented in the Scattered Village sample with a total of 244 specimens (4.3%). The decision to exclude G5 materials from this analysis most certainly lowers the total NISP for this family. One cyprinid element is partially digested. Based on examination of 77 lower pharyngeal elements (distinctive branchial bones bearing one or two rows of falcate teeth), at least two species are present in the collection: flathead chub (*Platygobio gracilis*) and creek chub (*Semotilus atromaculatus*). Flathead chubs, with a distinctive '2,4-4,2' dental pattern, appear to be most plentiful. This species is well represented in pre-reservoir survey data (Falk 1997:131, Table 30) and is reported from a number of archaeological sites in both North and South Dakota (Miller 1964:236-237), especially where fine-screen recovery is employed (e.g., Falk 1997; Falk and Ahler 1988:172; Falk et al. 1991; Snyder 1988:182). The presence of creek chub is based on identification of a single left pharyngeal element with a characteristic "2,5-" dental pattern. Archaeologically, creek chub is reported at Deapolis (Lehmer et al. 1978:290) and is included in the Slant Village sample (Falk 1997:144).

Catostomidae (suckers). Pre-reservoir studies suggest that at least three species of sucker – river carpsucker (*Carpiodes carpio*), white sucker (*C. commersoni*) and shorthead redhorse (*Moxostoma macrolepidotum*) – might be expected in archaeological collections from the area (Falk 1997). A total of 737 catostomid bones are included in the Scattered Village assemblage, comprising 13.0% of the identified sample. Of this total, 479 pieces (primarily vertebra) are referred to the family level. One of the sucker vertebra exhibits tool marks, probable evidence of butchering. Five elements assigned to the Family level are partially digested. One hundred ninety-nine specimens represent various large-bodied suckers including largemouth buffalo (*Ictiobus bubalus*), smallmouth buffalo (*I. cyprinellus*), river carpsucker, and redhorse sucker (*Moxostoma* sp.). The redhorse remains are most likely those of the shorthead redhorse. An additional 58 elements are referred to the genus *Catostomus* and, based on morphological comparisons with modern specimens, are almost certainly white sucker (*C. commersoni*), a smaller-bodied species found throughout the Missouri basin. Bones of large-bodied suckers (carpsucker, buffalo sucker, redhorse) are commonly reported from archaeological sites in the region, usually in low frequency (e.g., Ahler et al. 1993:267; Falk 1997:145; Falk and Ahler 1988:172; Snyder 1988:182). White suckers are well represented in the Slant Village sample (Falk 1997:145).

Ictaluridae (bullhead catfishes). Bullhead catfish are the most common fish in Plains Village period assemblages, reflecting the wide geographic distribution and availability of ictalurids, and the obvious fact that these fish were a consistent target of native fishery. Three

members of the family are known from the project area on the basis of pre-reservoir surveys (Falk 1997): black bullhead (*Ameiurus melas*), channel catfish (*Ictalurus punctatus*) and stonecat (*Noturus flavus*). The Scattered Village assemblage includes 1,635 ictalurid elements. A total of 763 specimens are referred simply to the Family, Ictaluridae. Most of these specimens are small, degraded fragments or incomplete pieces that cannot be identified with reasonable certainty. Eight hundred twelve specimens are referable to the genus *Ictalurus*; virtually all of these appear to be the remains of channel catfish. The collection also includes 13 specimens referable to the genus *Ameiurus*. One of these (a supraethmoid from a Block 2 general excavation unit) is identifiable as black bullhead but is lumped with other bullhead remains. Finally, 47 elements are identifiable as stonecat. Tool marks were recorded on one vertebra assigned to the Family level, as well as on two cleithra and one vertebra identified as channel catfish. One large channel catfish vertebra shows clear carnivore tooth marks; four additional bones show distinctive grooving characteristic of rodent gnawing. Seventeen elements identified as Ictaluridae and two channel catfish elements are partially digested. As noted, catfish bones are commonly found and reported from archaeological sites throughout the region (e.g., Ahler et al. 1993:267; Alex 1982; Falk 1997:145-146; Falk et al. 1991, 2000:95; Metcalf et al. 2000: 258; Snyder 1988).

Gadidae (cods). The burbot is monotypic for the region and most skeletal elements are easily recognized. A total of 49 specimens are recorded for Scattered Village. Burbot are not commonly reported from archaeological sites in the region; specimens are documented for Slant Village (Falk 1997) and Sakakawea (Falk et al. 1991).

Percidae (perches). Four members of the perch family are recorded in pre-reservoir surveys summarized by Falk (1997): Iowa darter (*Etheostomoa exile*), yellow perch (*Perca flavescens*), sauger (*Stizostedion canadense*), and walleye (*S. vitreum*). Ninety-six Scattered Village specimens are referred to the genus *Stizostedion* and represent sauger and/or walleye. A Block 6 general level specimen (vomer) compares well with walleye. Twenty-three specimens are assigned to the family level. Several of these may be yellow perch but identifications are not certain. Walleye and/or sauger are known from a number of archaeological sites in the region including Slant Village (Falk 1997:147) and several locations in the upper Knife-Heart region (e.g., Falk et al. 1980:570; Falk et al. 1991). Yellow perch are tentatively reported from Slant Village (Falk 1997:147).

Sciaenidae (drums). The freshwater drum (*Aplodinotus grunniens*) is the only freshwater representative of the Sciaenidae in North America. A total of 50 freshwater drum bones were recovered from Scattered Village. Two of these, one vertebra and an anal spine, show clear tool marks. Drums are reported from Slant Village (Falk 1997:147), a late prehistoric village site near Mobridge (Falk and Ahler 1988:172) and also from sites in the Knife River area (Falk et al. 1991).

Temporal Patterning of Fish Remains

Table 7.2 organizes identified fish remains by taxon and time period. Counts of identified specimens (NISP), as well as estimates of minimum numbers of individuals (MNI) are presented.

Table 7.2. Numbers of identified specimens (NISP) and minimum numbers of individuals (MNI) organized by taxon and time period, Scattered Village (32MO31), 1998 excavation.

Taxon (Common Names)	Time Period 1	2	3	4	Unass.	Totals NISP / MNI
Osteichthyes (bony fish)	301/-	746/-	127/-	165/-	45/-	1,384 /-
Scaphirhynchus platorynchus/albus (shovelnose/pallid sturgeon)	30/4	16/6	3/2	-	-	49 / 12
Lepisosteus sp. (gar)	-	1/1	-	-	-	1 / 1
Hiodon alosoides (goldeye)	394/18	604/27	132/12	251/10	30/-	1,411 / 67
Cyprinidae (carps and minnows)	73/15	145/28	9/5	15/5	2/-	244 / 53
Catostomidae (suckers)	86/-	167/-	148/-	58/-	20/-	479/-
Ictiobus bubalus/cyprinellus (smallmouth/bigmouthbuffalo)	14/3	11/4	9/3	9/2	-	43 / 12
Ictiobus cf. *I. bubalus* (smallmouthbuffalo)	-	-	1/1	5/1	-	6 / 2
Ictiobus cf. *I cyprinellus* (bigmouthbuffalo)	1/1	-	-	-	-	1 / 1
Carpiodes cf. *C. carpio* (rivercarpsucker)	6/2	7/4	11/2	8/3	-	32 / 11
Ictiobus/Carpiodes (buffalo/carpsucker)	1/-	5/-	4/-	3/-	1/-	14/-
Moxostoma sp. (redhorse sucker)	44/7	36/8	17/5	4/3	2/-	103 / 23
Catostomus cf. *C. commersoni* (white sucker)	20/5	26/7	5/2	8/3	-	59 / 17
Ictaluridae (bullhead catfishes)	150/-	404/-	87/-	100/-	22/-	763/-
Ameiurus sp. (bullhead)	6/4	1/1	1/1	5/3	-	13 / 9
Ictalurus cf. *I. punctatus* (channel catfish)	261/17	404/26	63/11	53/6	31/-	812 / 60
Noturus flavus (stonecat)	36/4	9/5	2/1	-	-	47 / 10
Lota lota (burbot)	31/2	16/4	-	-	2/-	49 / 6
Percidae (perches)	1/-	16/-	1/-	4/-	1/-	23/-
Stizostedion canadense/vitreum (sauger/walleye)	19/5	62/12	3/3	12/3	-	96 / 23
Aplodinotus grunniens (freshwater drum)	38/4	6/3	2/2	3/3	1/-	50 / 12
Total NISP	1,512	2,682	625	703	157	5,679
Total MNI	91	136	50	42	-	319

The NISP values, as well as the MNI estimates on which they are based, are not adjusted to account for partial sampling of some G4 fraction samples. MNI estimates provide general perspective on the relative numbers of animals that may be represented within each subset of the sample but are only estimates. These values are highly dependent on the frame of reference and may be calculated site-wide or on the basis of more restricted spatial and/or temporal units. Here the assumption is made that individual fish were in all likelihood processed and consumed within relatively restricted spatial units (e.g., household). Use of more restrictive spatial units (e.g., individual features, or natural layers within specific features) may yield more 'accurate' estimates but excavation blocks are selected as the basic unit for this study. Thus, MNI values for each taxon are based on the minimum number of animals necessary to account for recorded elements/element fragments recovered from each of the nine excavation blocks for each time period. The totals from each block were combined separately for time period. Also, an attempt was made to consider gross size differences between specimens but these variations were not systematically quantified or measured. Finally, it is noted that a single vertebra (Osteichthyes) recovered from deposits associated with Period 5 (Middle to Late Plains Archaic) is not included in Table 7.2.

Seven hundred three identified specimens are from units assigned to the earliest Precontact occupation (Period 4, AD 1550-1600). Goldeye are most numerous in terms of NISP, but taken as a group, suckers contribute the highest MNI value (12). Catfish are also well represented. Period 3 (AD 1550-1600) is largely contemporaneous with Period 4; total NISP is similar and the pattern of MNI representation is also similar with combined MNI values of 13 for both suckers and catfish, and 12 for goldeye. The Period 3 sample also includes sturgeon and stonecat, both absent in Period 4 deposits. Cyprinids, perches, and freshwater drum are present in both periods; burbot is absent.

The early Postcontact Period 2 (AD 1600-1650) sample shows a total NISP of 2,682, a marked increase over the earlier periods. This increase is reflected in a higher MNI total. Catfish are most common in Period 2 deposits, both in terms of combined NISP (818) and MNI (32) values. Goldeye (MNI=28), cyprinids (MNI=27) and suckers (MNI=23) are also well represented, as are perches (MNI=12), sturgeon (MNI=6), and burbot (MNI=4). Freshwater drum and gar are also present.

Overall, the size of the later Postcontact Period 1 (AD 1650-1700) fish sample also shows a decrease when compared to Period 2, but NISP and MNI values are markedly higher than recorded for the Precontact deposits. With variations, the general pattern of NISP and MNI representation follows that seen in earlier periods: comparatively high values for goldeye and catfish, as well as cyprinids and suckers. As in the earlier periods, sturgeon, burbot, perches and freshwater drum are present, but lower frequencies are noted.

Table 7.3 presents a summary of adjusted fish NISP values and specimen density data organized by time period. For this presentation, G4 NISP values have been adjusted to provide more realistic estimates for those catalog lots 'sample sorted' during the initial laboratory processing (see Chapter 4). The G4 NISP total is increased from 4,040 specimens to 5854 specimens. Table 7.3 shows a clear increase in density (NISP/m^3) values through time. Density increases from 131.4 specimens per m^3 of excavated fill in the combined Period 3-4 sample to 233.5 specimens per m^3 in Period 1 deposits. The Period 2 density value is near, though slightly higher than, that of Period 3 and 4 -- despite much higher raw counts.

Table 7.3. Adjusted NISP values for fish and specimen density data organized by time period, Scattered Village (32MO31), 1998 excavation.

	Time Period	NISP	Excavated Volume (m^3)	Density (NISP/m^3)
1	AD 1650-1700	2,247	9.625	233.5
2	AD. 1600-1650	2,682	18.830	142.4
3-4	AD 1550-1600	1,328	10.102	131.4
	Totals	6,257	38.554	162.3

Amphibians

The class Amphibia includes, in part, salamanders (Order Caudata), and frogs and toads (Order Anura). Historic and contemporary records (Seabloom et al. 1978; Wheeler and Wheeler

1966) indicate that neither group is well represented in central North Dakota -- at least with respect to numbers of species. The tiger salamander (*Ambystoma tigrinum*) is common throughout North Dakota and is documented in Morton County (Seabloom et al. 1978:12; Wheeler and Wheeler 1966:35). Five species of toad are found in North Dakota. Included are the plains spadefoot toad (*Scaphiopus bombifrons*) and four members of the family Bufonidae. Spadefoot toads are generally restricted to the southwestern quarter of the state but are reported from the Missouri River valley (McLean County) north of the project area (Wheeler and Wheeler 1966:36). North Dakota members of the genus *Bufo* (true toads) include the American toad (*Bufo americanus*), Great Plains toad (*Bufo cognatus*), Canadian (Dakota) toad (*Bufo hemiophrys*), and Woodhouse's (rocky mountain) toad (*Bufo woodhousei*). Published range data suggest that both the Great Plains toad and Woodhouse's toad might be expected in the project area (Wheeler and Wheeler 1966:41, 43-44). Four frog species are found in North Dakota (Wheeler and Wheeler 1966) but only two might be expected in the Mandan area. The chorus frog (*Pseudacris triseriata*) is a small-bodied member of the Family Hylidae found throughout much of the State. Recorded specimens are few in Morton and surrounding counties (Seabloom et al. 1978:20 Wheeler and Wheeler (1966:46-48). The much larger northern leopard frog (*Rana pipiens*), a member of the Family Ranidae, is also common throughout the State. Both Seabloom et al. (1978:21) and Wheeler and Wheeler (1966:51) list Morton County records.

Identified Taxa and Distribution of Identified Remains

A total of 529 amphibian bones are included in the identified Priority 1 sample (Table 7.4). Ten specimens (1.9%) are from the G3 fraction. The combined G4-5 sample totals 519 specimens (98.1%). Twenty specimens (3.8%) appear to have been partially digested. This total includes tiger salamander, toad, frog, and indeterminate anuran specimens. One toad vertebra (atlas) from the upper level of F144 (Block 6) is burned.

Tiger salamanders are well represented in the identified sample; 150 specimens account for 28.4% of all amphibians. Toads and frogs are also well represented. Toads (NISP=162) comprise 30.6% of the total and frogs (NISP=193) make-up 36.5% of the total. The remaining 24 specimens (4.5%) consist of indeterminate anuran specimens that represent unidentified frogs and/or toads. The majority of the toad bones are referred to the genus *Bufo*. Ten ilia are identified as Woodhouse's toad. The dorsal prominence on each specimen shows a pronounced ridged character; available *B. cognatus* ilia also show a high prominence but lack the ridged character. A total of 166 specimens are northern leopard frog and an additional ten specimens represent chorus frogs. Amphibian remains are commonly recovered from archeological deposits, often in significant numbers, when fine-screen recovery is consistently employed (e.g., Davis 1982; Falk 2000; Falk and Ahler 1988:172; Falk et al. 1980:570; Snyder 1988).

Table 7.5 summarizes amphibian NISP counts and MNI estimates by time period. Periods 3 and 4 are combined to increase sample size. As with the fish, MNI estimates are generated independently for each excavation block and combined in the manner described above. With the exception of the chorus frog, which is restricted to Period 2, all taxa are found in consistent numbers in deposits associated with each time period.

Table 7.4. Numbers of identified specimens (NISP) for amphibians organized by taxon and size grade, Scattered Village (32MO31), 1998 excavation.

Taxon (Common Name)	Size Grade 3	4	5	Total NISP	Partially Digested
Ambystoma tigrinum (tiger salamander)		121	29	150	11
Anura (indet. toads and frogs)		6	18	24	4
Bufo sp. (true toads)	6	80	64	150	3
Bufo cf. *B. woodhousii* (Woodhouse's Toad)	1	10	1	12	
Anura (indet. frogs)		5	12	17	
Pseudarcis triseriata (chorus frog)		1	9	10	
Rana cf. *R. pipiens* (northern leopard frog)	3	101	62	166	2
Total Amphibians	10	324	195	529	20

Table 7.5. Numbers of identified specimens (NISP) and minimum numbers of individuals (MNI) for amphibians organized by taxon and time period, Scattered Village (32MO31), 1998 excavation.

Taxon	Time Period 1	2	3/4	5	Indet.	NISP/ MNI
Ambystoma tigrinum (tiger salamander)	31/2	73/6	38/4		8	150/12
Anura (indet. toads and frogs)	9	14	1			24
Bufo sp. (true toads)	17/4	24/4	109/6			150/14
Bufo cf. *B. woodhousii* (Woodhouse's Toad)	3/2	2/2	7/5			12/9
Anura (indet. frogs)	3	8	3		3	17
Pseudarcis triseriata (chorus frog)		10/3				10/3
Rana cf. *R. pipiens* (northern leopard frog)	65/12	67/6	33/1		1	166/19
Total Amphibians	128/20	198/21	191/16		12	529/57

Amphibian remains were found in each excavation block, from within and outside identified structures and from both features and general level contexts. However, over three-quarters (NISP=409) of the amphibian sample is from 27 features – primarily cache pits. Of this total, 384 specimens are from features assigned to specific time periods. Table 7.6 presents combined NISP and MNI values for salamanders, toads, and frogs; indeterminate toad and/or frog specimens are excluded. By count, tiger salamanders are represented throughout the deposit with notable concentrations in Features 14 (Period 1), 47 (Period 2) and 101 (Period 3). Forty-five elements in F47 are assignable to a single individual. Toads are also present in features assigned to each time period. For toads, NISP and MNI values are highest in the combined Period 3 and Period 4 sample with F119 yielding the highest values for both measures. Frogs are found in Period 1 and Period 2 features in near-equal numbers but are absent from Period 3 and 4 features. Notable concentrations of frog bone are found in Features 26 (Period 1), 132 (Period 1), and 178 (Period 2).

One burned toad element in F144 may suggest a temporal association with Period 2 site use. However, none of the recovered amphibian remains appear to represent animals

Table 7.6. Counts (NISP) and minimum number of individual estimates (MNI) for amphibians organized by time period and feature, Scattered Village (32MO31), 1998 excavation.

Time Period	Feature Number	Taxa			Total NISP
		Ambystoma	*Bufo*sp., *Bufo* cf. *B. woodhousii*	*Pseudarcis triseriata, Rana* cf. *R. pipiens*	
1	14	16/3		1/1	17
	26		2/1	24/3	26
	30	5/1			5
	106			13/1	13
	120	2/1			2
	124		3/1		3
	127			4/2	4
	130	6/1	10/2		16
	132	1/1	4/2	20/4	25
	175	1/1			1
	Subtotals	31/8	19/6	62/11	112
2	8				
	47	45/1	3/1	5/2	53
	108	5/1	11/2	9/2	25
	144		1/1		1
	155			2/1	2
	178	1/1		54/3	55
	Subtotals	51/3	15/4	70/8	136
3, 4	66	2/1	5/1		7
	68		9/1		9
	101	25/2			25
	104	4/1			4
	119		57/5		57
	133		9/1		9
	173		25/2		25
	Subtotals	31/3	105/10	0/0	136
Totals		113/14	139/20	132/19	384

purposefully collected by occupants of the site, despite recovery from what are clearly cultural deposits. It is more likely that most specimens represent animals introduced into site deposits as a result of natural processes, though local conditions created by site occupation may have served to attract some animals. This is particularly true of toads and salamanders. Both are common inhabitants of rodent burrows and toads are relatively efficient burrowers. Further, the likelihood that some toad and/or frog elements represent animals that burrowed and/or fell into open or partially open pits cannot be ignored (e.g., Parmalee and Klippel 1983:263; Snyder 1988:194). For example, toad bones are concentrated in the lower levels of F119, a comparative deep, bell-shaped pit located in Block 6.

Reptiles

North Dakota reptiles include a modest variety of turtles, lizards, and snakes (Wheeler and Wheeler 1966). Three turtle species are recognized: common snapping turtle (*Chelydra serpentina*), painted turtle (*Chrysemys picta*) and smooth soft-shelled turtle (*Apalone mutica*). Snapping turtles and painted turtles are found throughout the northern Plains and might be expected in the project area. Smooth soft-shell turtles appear to be restricted to the immediate environs of the Missouri River in both North and South Dakota. Wheeler and Wheeler (1966:61) list a single example from Emmons County in North Dakota and Seabloom et al. (1978: 23) report a specimen from the north branch of the Little Heart River in Morton County. Three lizard species are reported but modern ranges are restricted to the western and southeastern extremes of the state. Finally, North Dakota's modern snake fauna includes at least eight species, several of which -- based on historic and recent records (Seabloom et al. 1978; Wheeler and Wheeler 1966) -- are possible in the general Mandan area. These taxa include plains garter snake (*Thamnophis radix*), red-sided-garter snake (*Thamnophis sirtalis*), western hog-nosed snake (*Heterodon nasicus*), eastern yellow-bellied racer (*Coluber constrictor*), bullsnake (*Pituophis melanoleucus*), and prairie rattlesnake (*Crotalus viridis*).

Identified Taxa and Distribution of Identified Remains

Seventy-one reptile bones are included in the Priority 1 sample. Of this total, 66 specimens (93%) are from the combined G4-5 fraction (Table 7.7); the remaining five pieces are G3 specimens. Four snake elements show characteristics consistent with partial digestion. The sample of turtle bone includes fourteen specimens. Thirteen of these represent painted turtle. Eleven of the painted turtle bones are from F144, a basin pit located within a Block 6 structure. Prefrontals and a mix of lower limb elements are all from a single individual. Additional painted turtle remains include a pubis from F130 (Block 9) and a metapodial from a Block 6 general level. The final piece of turtle bone is an unidentified shell fragment, also from Block 6. This specimen is probably painted turtle but identification is uncertain. None of the recovered turtle bone is burned and none shows tool marks or other evidence of human modification.

Table 7.7. Numbers of identified specimens (NISP) for reptiles organized by taxon and size grade, Scattered Village (32MO31), 1998 excavation.

	Size Grade			Total	Partially
Taxon (Common Names)	3	4	5	NISP	Digested
Testudines (turtle)	1			1	
Chrysemys picta (painted turtle)	1	5	7	13	
Serpentes (snakes)		1	4	5	1
Colubridae (colubrids)	3	24	25	52	3
Total Reptiles	5	30	36	71	4

Table 7.8 summarizes NISP and MNI estimates by time period. Feature 144 accounts for the high proportion of specimens recorded for Period 2, though none of these remains can be directly associated with human use of the site. Painted turtle is reported from numerous sites

throughout the region, though generally in low frequency (Falk and Ahler 1988:172; Falk et al. 1980:570; Falk et al. 1984:269; Falk et al. 1991).

Table 7.8. Numbers of identified specimens (NISP) and minimum numbers of individuals (MNI) for reptiles organized by taxon and time period, Scattered Village (32MO31), 1998 excavation.

	Time Period					Total
Taxon (Common Names)	1	2	3/4	5	Indet.	NISP
Testudines (turtle)		1				1
Chrysemys picta (painted turtle)	1/1	12/1				13/2
Serpentes (snakes)	1	3		1/1		5
Colubridae (colubrids)	15/3	31/5	3/1		3	52/9
Total Reptiles	17/4	47/6	3/1	1/1	3	71/12

A total of 57 snake elements, 54 vertebrae and three ribs, are recorded (Table 7.7). Nearly all specimens represent the family Colubridae (colubrids), although two vertebrae and two ribs were identified simply as snake. Variability in size for identified vertebrae suggests that both large and comparatively small snakes are represented. Prairie rattlesnake is absent. More detailed examination of the colubrid vertebrae suggests that bullsnake, garter and/or racer, and possibly hog-nosed snake are represented but more definitive identifications are not attempted. As with amphibians, snake bone is relatively common in archeological samples collected with the use of fine-mesh screens (e.g., Falk et al. 1980; Davis 1982; Falk and Ahler 1988:172; Snyder 1988).

Unlike turtle remains, most of which were found in a single feature, snake bone was found scattered throughout much of the deposit (Blocks 1, 2, 3, 4, 6, 8 and 9) in both general excavation (NISP=22) and feature (NISP=35) contexts. The feature sample is concentrated in two units: F108 (17 specimens) and F124 (8 specimens). The F108 sample represents one or more small snakes scattered through seven of 14 feature levels. The F124 specimens also appear to represent a single small snake. A single colubrid vertebra from F120 (Block 9) is burned, perhaps suggesting contemporaneity with Period 1 use of the site. Table 7.8 provides a distributional summary of NISP and MNI values by time period; a single specimen from Period 5 (Middle to Late Plains Archaic) is included. However, as with identified turtle, none of the snake materials are judged to be of cultural significance in the present analysis.

Birds

A total of 2,909 pieces of bird bone are included in Priority 1 sample. Of this total, 333 pieces, primarily long bone diaphysis fragments, are considered unidentifiable with respect to element. The remaining 2,576 specimens are discussed here.

As with fish, bird bones were found in comparatively large numbers in all areas of the site. Area 1 (n=1,067) yielded the highest number of identified specimens followed by Areas 2 (n=672), 3 (n=531), and 4 (n=306). Bird remains were also recovered from each of the

excavation blocks with totals ranging between a high of 672 and a low of 7. Frequencies by block are: 1 (n=180), 2 (n=521), 3 (n=672), 4 (n=118), 5 (n=172), 6 (n=333), 7 (n=16), 8 (n=185), and 9 (n=379). Bird bones were found in 59 features, midden dump, and sheet midden deposits. Over half of the identified sample is from excavated pits (n=1,314, or 51%). General level excavations produced 42.5% of the total (n=1,095). An additional 167 specimens (6.5%) were found in a number of minor features (artifact concentrations, hearths, postmolds), roof materials and natural/organic layers.

Identified bird materials are organized by taxon and size grade in Table 7.9. A total of 790 specimens are identified to the Class (Aves). The majority of identified specimens (n=1,786) are referred to taxonomic units representing ten Orders and a minimum of 15 Families. Specimens referred to the Order Passeriformes (including the corvid Family) total 1,019 and comprise 57.0% of materials identified beyond Class. The Galliformes (fowl-like birds, including grouse) contribute an additional 25.5% (n=456); the Falconiformes (vultures, hawks, eagles, etc.; n=121) add 6.8% and the Order Anseriformes (waterfowl; n=81) 4.5%. Excluding the indeterminate bird remains, these four groups make-up 93.4% of the identified sample.

Grade 4 specimens comprise just over half (50.7%) of the total. The G1 sample includes only two pieces and only 58 G2 specimens are recorded. Grade 3 is well represented by 723 specimens (28.1%), as is G5 with an additional 487 pieces (18.9%). The G5 sample is comprised largely have identified passerine bone, along with a significant number of specimens referred to Class with passerines and probable grouse heavily represented in the latter group.

Bird remains were recovered from 59 of 175 cultural features, and from both sheet midden and midden dumps. Burned bird bones total 289 and represent 11.2% of the identified total. Burning is more common in feature samples; 14.2% of the bone from feature levels is burned in comparison to only 5.8% of general level specimens. As with recovered fish, the relative proportion of burning varies between taxa. In particular, waterfowl, grouse, and passerines show comparatively high percentage values for burning. Tool marks are recorded for 33 elements, including four referred to the Class level. Specific examples are noted below. Finally, 37 pieces of bird bone are included in the modified sample presented in Chapter (13). For 29 of these specimens taxonomic and element identifications are limited beyond their identification as bird. The remaining eight specimens are noted in the following narrative sections. Contextual association, the presence of modified pieces and elements with butchering and/or other tool marks, together with the consistent occurrence of burned specimens serve to document human procurement and use of local bird resources.

Identified Taxa

Ardeidae (herons, bitterns). This family is represented by a single element (distal radius) that appears to be from a bittern or small heron. Possible candidates include the American bittern (*Botaurus lentiginosus*) and black-crowned night heron (*Nycticorax nycticorax*). Heron and bittern remains are not common in area sites. Parmalee (1977, 1979) reports several taxa from village sites in South Dakota, great blue heron specimens are known

from the upper Knife-Heart region (Falk et al. 1991) and American bittern are reported from the Cannonball region of North Dakota (Falk et al. 1984).

Table 7.9. Numbers of identified specimens (NISP) for birds organized by taxon and size grade, Scattered Village (32MO31), 1998 excavation.

Taxon	Size Grade					Total NISP	Burned NISP (%)
	1	2	3	4	5		
Aves (bird)		3	156	455	176	790	61 (7.7)
Ardeidae (herons, bitterns)			1			1	-
Anserinae (geese)		3	11			14	1 (7.1)
Branta canadensis (Canada goose)		5	9			14	2 (14.3)
Chen caerulescens (snow/blue goose)		1	5			6	1 (16.7)
Anatinae (marsh ducks)		1	2			3	-
Anas crecca/*discors* (green-winged teal/blue-winged teal)				1	2	3	1 (33.3)
Indet. duck		4	21	15	1	41	5 (12.2)
Cathartes aura (turkey vulture)		1	2			3	-
Accipitridae (hawks, eagles, etc.)			4	3		7	-
Buteo sp. (buzzard hawk)			2			2	-
Indet. hawk		3	34	18		55	6 (10.9)
Aquila chrysaetos/*Haliaeetus leucocephalus* (golden/bald eagle)		5	12	1		18	-
Circus cyaneus (northern harrier)		1	14	2		17	-
Falconinae (falcons)			12	7	3	22	1 (4.5)
Tetraonidae (grouse)		16	269	152	3	440	58 (13.2)
Galliformes (fowl-like birds)		3	11	1		15	-
Colinus virginianus (bobwhite)				1		1	-
Gruidae (cranes)		1	11			12	-
Grus canadensis (sandhill crane)	2	8	3			13	-
Rallidae (rails, etc.)				3		3	-
Fulica americana (American coot)			2	1		3	-
Charadriidae (plovers)				2		2	-
Scolopacidae (sandpipers)			9	7		16	1 (6.2)
Zenaida macroura (mourning dove)				3		3	-
Ectopistes migratorius (passenger pigeon)			2	4		6	-
Strigidae (typical owls)		1	5	12		18	3 (16.7)
Bubo virginianus (great horned owl)			2			2	-
Athene cunicularia (burrowing owl)			2			2	-
Asio flammeus/*otus* (short-eared/long-eared owl)			4			4	1 (25.0)
Aegolius acadicus (saw-whet owl)?			1			1	-
Picidae (woodpeckers)				6	14	20	2 (10.0)
Passeriformes (passerines)		1	60	586	304	951	139 (14.6)
Pica pica (black-billed magpie)			7	6		13	2 (15.4)
Corvus sp. (n. raven/Amer. crow)			2	2		4	-
Corvus corax (northern raven)		1	37	8		46	1 (2.2)
Corvus brachyrhynchos (Amer. crow)			4	1		5	2 (40.0)
Total	2	58	723	1,306	487	2,576	289 (11.2)
%	0.0	2.2	28.1	50.7	18.9	99.9	-

Anatidae (swans, geese, and ducks). A variety of waterfowl are found over much of the Northern Plains, attracted, in part, by the Missouri River, one of several major migration corridors running north to south through the American heartland. In addition, many migrating

species breed in suitable habitants throughout the region (see, for example, Johnsgard 1979; Over and Thomas 1946). The Scattered Village sample includes 81 specimens assigned to this Family. Identified species are Canada goose (*Branta canadensis*) and snow goose (*Chen caerulescens*); an additional 14 elements are identified simply as goose but most are probably Canada goose. Three specimens are referred to the subfamily Anatinae, the marsh ducks, and may be mallard (*Anas platyrhynchos*) and/or black duck (*Anas rubripes*). Three pieces are either green-winged (*Anas crecca*) and/or blue-winged teal (*A. discors*). Forty-one additional specimens, many of these small fragments, are listed as indeterminate duck. Based on element size and morphology, several additional species may be represented. Tool marks are recorded for eight waterfowl elements: Canada goose (scapula, ulna), snow goose (carpometacarpus), indeterminate goose (ulnar carpal, furculum, scapula, cervical vertebra), and indeterminate marsh duck (carpometacarpus). The ulna of an indeterminate marsh duck is included in the modified bone sample. Rodent gnawing is recorded for one Canada goose element. Members of this family are common in archeological sites throughout the Middle Missouri subarea (e.g., Ahler et al. 1993; Falk and Ahler 1988: 173; Falk et al. 1991; Parmalee 1977, 1979,1980).

Cathartidae (American vultures). Three specimens represent this family; all three are identified as turkey vulture (*Cathartes aura*). Turkey vultures are not common in archeological assemblages but are reported by Parmalee (1980) at the Bagnell site in the upper Knife-Heart region and from a number of village locations in South Dakota (Parmalee 1977).

Accipitridae (hawks, eagles, etc.) A total of 121 elements represent various taxa within the Family Accipitridae. Two specimens are referred to the genus *Buteo* (buzzard hawks). Eighteen specimens are golden eagle (*Aquila chrysaetos*) and/or bald eagle (*Haliaeetus leucocephalus*). The northern harrier (*Circus cyaneus*) is represented by 17 elements. Twenty-two specimens are assigned to the Subfamily Falconinae. Nearly all of these compare well with modern American kestrel (*Falco sparverius*) but other members of the genus *Falco* could not be completely excluded from consideration. Seven pieces could not be referred beyond the Family and an additional 55 examples are listed simply as indeterminate hawk. Four eagle elements (phalanx 1 digit 2/wing, humerus, ulna, radius) and three indeterminate specimens (humerus, ulna, femur) assigned to the Family level are represented in the modified bone sample. Finally, two eagle specimens show carnivore tooth marks and 3 indeterminate hawk bones are gnawed by rodents. Members of this family are common and widespread throughout the Middle Missouri sub-area and are well represented in archeological sites (Ahler et al. 1993; Artz 1982; Falk and Ahler 1988:173; Falk et al. 1984; Parmalee 1977, 1979, 1980).

Tetraonidae (grouse). The grouse family counts several members in North Dakota (Johnson1964; Wood 1923) including among others the sharp-tailed grouse (*Pedioecetes phasianellus*) and the greater prairie chicken (*Tympanuchus cupido*). Modern and historic range data suggest the sharp-tailed grouse as the most probable candidate in the Mandan area but the two forms are difficult to distinguish solely on morphological grounds – particularly given that much of the recovered sample is comprised of incomplete and fragmented pieces. In any event, 440 specimens are assignable to the grouse family. Seven elements (ulna, carpometacarpus, 2 radii, 2 tibiotarsi, tarsometatarsus) show tool marks. Carnivore tooth marks are noted on seven specimens and an additional ten show rodent gnawing. Sixteen grouse elements appear to be partially digested. Grouse bones, almost always assumed to be sharp-tailed grouse, are common

in archeological deposits throughout the region (Artz 1982; Falk 2000; Falk and Ahler 1988; Falk et al 1984; Parmalee 1977, 1979, 1980; Snyder 1988).

An additional 15 elements are noted here and may represent very large grouse or greater prairie chicken but none compare well with available reference materials. These specimens, some of which may be intrusive domestic chicken (*Gallus gallus*), are referred to the **Order Galliformes**, which includes the grouse family. All fifteen specimens are from either midden dump (Block 1) or sheet midden (Block 4) contexts. None are burned or show tool marks.

Phasianidae (quail, pheasant, partridge). A single specimen represents this family. A mandible from a Block 2 general level excavation is identified as common bobwhite (*Colinus virginianus*). Bobwhites are rare in archaeological contexts within the region.

Gruidae (cranes). A total of 25 elements are referred to this family. Thirteen of these are identified as sandhill crane (*Grus canadensis*). The remaining twelve specimens are probably sandhill crane but the possibility of whooping crane (*G. americana*) cannot be ruled out. Two sandhill crane bones (humerus, synsacrum) show clear tool marks. Carnivore tooth marks are noted for one sandhill crane element and three examples referred to the Family show evidence of partial digestion. Whooping crane (Parmalee 1980) and, more commonly, Sandhill crane (Falk et al. 1984; Falk et al. 1991; Parmalee 1977, 1979) are reported from village sites in the Middle Missouri.

Rallidae (rails, gallinules, and coots). Six specimens are included here. Three specimens are identified as American coot (*Fulica americana*) and three additional pieces are referred to the Family. Two of the latter (carpometacarpus, tarsometatarsus) are similar to Virginia rail (*Rallus limicola*), a small rail that breeds throughout the northern Plains (Johnsgard 1979:134). The third specimen is a distal humerus that compares well to both sora (*Porzana Carolina*) and yellow rail (*Coturnicops noveboracensis*). American coot (Falk et al. 1984; Falk et al. 1991; Parmalee 1977, 1980) is reported, but never common, in area sites. Parmalee (1980) reports a Virginia rail from the Bagnell village site.

Charadriidae (plovers). The plover family is represented by two elements, a premaxilla and mandible. The killdeer (*Charadrius vociferous*) is a possible candidate. Plovers are rarely reported from area sites (Snyder 1988).

Scolopacidae (sandpipers, phalaropes). Sixteen elements are assigned to the sandpiper group. Eleven of these compare well with the upland sandpiper (*Bartramia longicauda*). The remaining five specimens are indeterminate. One of the possible upland sandpiper bones (humerus) show a clear tool mark and another is partially digested. The upland sandpiper (upland plover) is known from a number of village locations in North Dakota (Falk et al. 1991; Parmalee 1980) and South Dakota (Artz 1982; Falk and Ahler 1988; Parmalee 1977).

Columbidae (pigeons, doves). This family is represented in the Scattered Village sample by two species. Three elements (2 phalanx 2 digit 2/wing, ulna) are identified as mourning dove (*Zenaida macroura*). Six additional specimens are passenger pigeon (*Ectopistes migratorius*); one of these is partially digested and a second piece shows evidence of rodent

gnawing. Mourning dove (Falk and Ahler; Parmalee 1977) and passenger pigeon (Falk and Ahler 1988; Falk et al. 1991; Parmalee 1977,1979, 1980) are present, though few, in many regional sites.

Strigidae (typical owls). Twenty-seven elements represent the owl Family. Two specimens are great horned owl (*Bubo virginianus*) and two additional elements represent the burrowing owl (*Athene cunicularia*). Four elements are referred to the genus *Asio*; one of these is almost certainly the short-eared owl (*A. flammeus*) based on measurement data provided by Emslie (1982). The remaining three elements are also likely to be short-eared owl but the long-eared owl (*A. otus*) cannot be excluded on the basis of either size or morphology. A proximal humerus appears identical to comparative examples of the saw-whet owl (*Aegolius acadicus*). The remaining 18 specimens are referred to the Family level. Six of these are most likely great horned owl and the remaining ten may are probably referable to the genus *Asio* but in all instances identifications are not certain. One example (ulna) referred to the Family supports a clear tool mark; this specimen is probably great horned owl but its large size suggests consideration of snowy owl (*Nyctea scandiaca*). The owl Family is consistently represented in Middle Missouri sites, though specimen counts are generally low (e.g., Artz 1982; Falk and Ahler 1988; Falk et al. 1991; Parmalee 1977, 1980; Snyder 1988).

Picidae (woodpeckers). Twenty woodpecker bones are included in the collection and all 20 are referred to the Family for present purposes. Detailed comparison of these pieces with the large University of Tennessee comparative collection reveals more taxonomic detail, however. At least seven specimens are red-headed woodpecker (*Melanerpes erythrocephalus*), a fairly common form that nests within the general area. Four elements are northern (common) flicker (*Colaptes auratus*). Single specimens represent three additional taxa: downy woodpecker (*Picoides pubescens*), hairy woodpecker (*P. villosus*), and the yellow-bellied sapsucker (*Sphyrapicus varius*). Six specimens were unidentifiable beyond Family. Woodpecker bones are relatively common in archeological sites. Reported species include the red-headed woodpecker (Falk and Ahler 1988; Parmalee 1977, 1980), the downy woodpecker (Parmalee 1980), and the common flicker (Falk and Ahler 1988; Falk et al. 1991; Parmalee 1977, 1980).

Passeriformes (passerines). A total of 1,019 specimens represent the Order Passeriformes, the most numerous of North Dakota's birds. The passerines include a number of commonly recognized groups: flycatchers, larks, swallows, jays and crows, titmice, nuthatches, wrens, thrushes, vireos, wood warblers, finches, blackbirds. With the exception of the Corvidae (jays and crows), no attempt is made to further identify the passerine assemblage and a total of 951 elements are referred to the Order level. Preliminary examination suggests, that a relatively large proportion of these remains are assignable to two Families: Icteridae (blackbirds, meadowlarks, grackles, etc.) and Fringillidae (finches, sparrows, etc.). Sixty-nine passerine elements appear to be partially digested; two show rodent tooth marks. Small passerines are also common, particularly where fine-screen recovery techniques are employed (Artz 1982; Falk 2000; Falk and Ahler 1988; Falk et al. 1980, 1991; Parmalee 1980).

Sixty-eight specimens are assignable to one of several taxa within the Family Corvidae. Northern raven (*Corvus corax*) elements are the most numerous; 46 are identified. One of the raven bones (ulna) supports a clear tool mark. The black-billed magpie (*Pica pica*) is

represented by 13 specimens and the American crow (*Corvus brachyrhynchos*) by five additional pieces. One crow bone (tibiotarsus) shows a cut mark; this piece is also burned. An additional crow element supports carnivore tooth marks and a second is rodent gnawed. Four specimens are referred to the genus *Corvus*. These specimens fall between raven and crow in terms of size and could not be further identified on the basis of morphological characters. The remains of corvids are commonly reported from sites throughout the region (e.g., Artz 1982; Falk and Ahler 1988; Falk et al. 1980, 1984, 1991; Parmalee 1977, 1979, 1980; Snyder 1988, etc.).

Temporal Patterning of Bird Remains

Table 7.10 organizes NISP and MNI data by taxon and time period for identified birds. The values presented are not adjusted to account for partial sampling of some G4 fractions. MNI estimates are calculated following the approach outlined above for the identified fish sample. Two indeterminate bird elements, a quadrate from Block 5 and a thoracic vertebra from Block 2, are from deposits assigned to Period 5 (Middle to Late Plains Archaic); these specimens are not included in the discussion.

Period 4 (AD 1550-1600) deposits yielded a total of 230 specimens. The combined passerine materials are most numerous, contributing nearly half of the total NISP and over a third of the MNI total. Accipitridae and grouse are also well represented. The Period 3 (AD 1550-1600) NISP total is 266. The pattern of representation is similar to that for Period 4. Passerines dominate, with Accipitridae, grouse and various waterfowl also present. With only minor variations, this pattern continues into the Postcontact period. Periods 2 (AD 1600-1650) and 1 (AD 1650-1700) show higher NISP and MNI values but passerine dominance continues. Grouse are more heavily represented in terms of bone counts and individuals represented. Hawks, and eagles their allies, are strongly represented, as are waterfowl.

Table 7.11 simplifies these data somewhat. MNI estimates taken from Table 7.10 are combined into generalized grouping and proportional representation within each time period is illustrated through percentage data. Woodpeckers and small perching birds show a marked dominance through all periods with highest values in Period 4 and Period 1. The relative proportion of turkey vulture and various raptors is consistent through Period 4, Period 3 and Period 2 but appears to decline in Period 1. MNI estimates for grouse clearly increase in time in relation to other taxa. Beyond these variations, it is evident that a variety of birds are represented in each time period and use of these avian resources persisted throughout site occupancy.

Finally, Table 7.12 provides a summary of adjusted bird NISP counts together with specimen density data organized by time period. Here both G4 and G5 NISP values have been adjusted in an attempt to present more accurate counts for catalog lots 'sample sorted' during the initial laboratory processing. Excluding specimens unassigned to temporal units, the combined G4-5 specimen count is increased from 1,734 to 3,009. Density values show an increase through time, a pattern also observed for fish bone densities. For birds, density increases from 61.2 specimens per m^3 of excavated fill in the combined Period 3-4 sample to a high of 149.6 specimens per m^3 in the Period 1 deposits. As with fish, Period 2 specimen density (90.8 NISP/m^3) lies between the extremes and somewhat closer to the Period 3-4 value.

Table 7.10. Numbers of identified specimens (NISP) and minimum numbers of individuals (MNI) for birds organized by taxon and time period, Scattered Village (32MO31), 1998 excavation.

Taxon	Time Period					Totals
	1	2	3	4	Unass.	NISP / MNI
Aves (bird)	212	385	91	65	35	788 / -
Ardeidae (herons, bitterns)	1/1					1 / 1
Anserinae (geese)	8	6				14 / -
Branta canadensis (Canada goose)	5/2	4/3	2/1	1/1	2	14 / 7
Chen caerulescens (snow/blue goose)	1/1	3/2	1/1	1/1		6 / 5
Anatinae (marsh ducks)		3/1				3 / 1
Anas crecca/*discors* (green-winged teal/blue-winged teal)		1/1	2/2			3 / 3
Indet. duck	19/3	15/4	3/2	1/1	3	41 / 10
Cathartes aura (turkey vulture)		2/2		1/1		3 / 3
Accipitridae (hawks, eagles, etc.)	1	6				7 / -
Buteo sp. (buzzard hawk)		1/1		1/1		2 / 2
Indet. hawk	13/3	25/3	9/4	7/1	1	55 / 11
Aquila chrysaetos/*Haliaeetus leucocephalus* (golden/bald eagle)	3/1	4/3	2/2	9/2		18 / 8
Circus cyaneus (northern harrier)	2/1	10/5	5/2			17 / 8
Falconinae (falcons)	2/1	14/5	2/1	3/2	1	22 / 9
Tetraonidae (grouse)	184/16	186/16	32/6	20/3	18	440 / 41
Galliformes (fowl-like birds)		15/2				15 / 2
Colinus virginianus (bobwhite)		1/1				1/1
Gruidae (cranes)	2/1	7/1	3/3			12 / 5
Grus canadensis (sandhill crane)	1/1	9/4	3/1			13 / 6
Rallidae (rails, etc.)	2 /1	1/1				3 / 2
Fulica americana (American coot)	1/1	2/2				3 / 3
Charadriidae (plovers)		1/1			1	2 / 1
Scolopacidae (sandpipers)	11/3	3/2	1/1	1/1		16 / 7
Zenaida macroura (mourning dove)	2/1			1/1		3 / 2
Ectopistes migratorius (passenger pigeon)	2/2	2/1		1/1	1	6 / 4
Strigidae (typical owls)	7	6	3	2		18 / -
Bubo virginianus (great horned owl)		2/1				2 / 1
Athene cunicularia (burrowing owl)	1/1					2 / 2
Asio flammeus/*otus* (short-eared/long-eared owl)		2/2	2/1			4 / 3
Aegolius acadicus (saw-whet owl)?	1/1					1 / 1
Picidae (woodpeckers)	4/3	10/5	3/3	3/3		20 / 14
Passeriformes (passerines)	277/24	446/30	81/14	108/9	39	951 / 77
Pica pica (black-billed magpie)	4/2	6/4	1/1	2/1		13 / 8
Corvus sp. (n. raven/Amer. crow)		2	1	1		4 / -
Corvus corax (northern raven)	13/3	14/6	16/4	2/1	1	46 / 14
Corvus brachyrhynchos (Amer. crow)		3/2	2/1			5 / 3
Total NISP	779	1197	266	230	102	2574
Total MNI	73	111	51	30	-	265

Table 7.11. Minimum numbers of individuals (MNI) for combined bird groups organized by time period, Scattered Village (32MO31), 1998 excavation.

	Time Period								
	1		2		3		4		Total
Combined Groups	MNI	%	MNI	%	MNI	%	MNI	%	MNI
Herons, Geese, Ducks, Cranes	10	13.7	18	16.2	10	19.6	3	10.0	41
Vultures, Hawks, Eagles, Falcons, Owls	8	10.9	22	19.8	11	21.6	6	20.0	47
Grouse	16	21.9	16	14.4	6	11.8	3	10.0	41
Woodpeckers, Small Passerines	27	36.9	35	31.5	17	33.3	12	40.0	91
Magpies, Ravens, Crows	5	6.8	12	10.8	6	11.7	2	6.7	25
Other Birds	7	9.6	8	7.2	1	2.0	4	13.3	20
Total MNI	73	99.8	111	99.9	51	100.0	30	100.0	265

Table 7.12. Adjusted NISP values and specimen density data for birds organized by time period, Scattered Village (32MO31), 1998 excavation.

Time Period		NISP	Excavated Volume (m^3)	Density (NISP/m^3)
1	AD 1650-1700	1,440	9.625	149.6
2	AD 1600-1650	1,710	18.830	90.8
3-4	AD 1550-1600	618	10.102	61.2
Totals		3,768	38.557	97.72

External Comparisons and Discussion

Vertebrate remains from Scattered Village are most readily comparable to assemblages collected through the use of similar sampling and recovery techniques. Three data sets are employed here for comparison with fish and bird data from Scattered Village. Amphibians and reptiles are not considered. Comparative materials are drawn from nearby Slant Village (Ahler 1997) and from two sites investigated within the Knife River Indian Villages NHS located in the upper Knife-Heart region to the north (Thiessen 1993). Slant Village is a traditional Mandan site. The G1-5 fish remains from Slant are reported in detail by Falk (1997). The Slant bird assemblage is unreported but NISP data are available for use here (Falk, unpublished notes). Using data taken from Falk et al. (1991), Ahler et al. (1993) provide summary analysis and G1-3 NISP counts for eight archaeological sites in the Knife River area, including Lower Hidatsa and Big Hidatsa. Lower Hidatsa (32ME10) and Big Hidatsa (32ME12) are both traditional Hidatsa sites.

Table 7.13 summarizes density data (NISP per cubic meter of excavated fill) for fish bone assigned to 15 components recognized at the four sites. Component samples at Lower Hidatsa and Big Hidatsa have been combined to increase sample size. As shown earlier in this chapter, fish bone density values increase through time at Scattered Village, particularly from earlier Postcontact (Period 2) to later Postcontact (Period 3). The Slant Village fish sample appears to exhibit a similar pattern with a marked increase in bone density from Period 3 (Early Mandan/Precontact) to Period 2 (Middle Mandan/early Postcontact), followed by a decrease in density for the Period 1 (Late Mandan/late Postcontact) sample. Although G1-3 densities are

relatively low in comparison to Scattered Village and Slant Village, both Hidatsa sites show a general increase in fish bone densities from earliest to latest periods.

Table 7.13. Fish bone density data (NISP per cubic meter) organized by time period within village sites located in the Knife and Heart Regions, North Dakota.

Scattered Village		Slant Village		Lower Hidatsa Village		Big Hidatsa Village	
Period	*Density*	Period	*Density*	Period	*Density*	Period	Density
		1. 1725-1785	*243.2*	72. 1740-1785 71. 1700-1740	*11.8*	72. 1745-1790 71. 1700-1745	*8.0*
1. 1660-1700	*233.5*	2. 1625-1725	*324.7*	62. 1650-1700	*6.0*	62. 1650-1700	*5.3*
2. 1600-1660	*142.4*			61. 1600-1650		61. 1600-1650	
3-4. 1550-1600	*131.4*	3. 1575-1625	*130.9*	50. 1525-1600	*6.8*		

Density data for identified bird bone from each of the four multicomponent sites are presented in Table 7.14. Patterns are similar to those seen in the fish data. Bird bone density increases through time at Scattered Village: from Precontact to Postcontact, and between earlier Postcontact and later Postcontact. The pattern for Slant Village birds mirrors fish densities: a marked increase from Precontact to Postcontact, and a decrease from early Postcontact to later Postcontact. The Lower Hidatsa bird densities show an increase through time that is most evident from combined early Postcontact components (Periods 61 and 62) to the combined later Postcontact components (Periods 71 and 72). An increase from earlier to later Postcontact is also recorded at Big Hidatsa, but the difference is slight.

Table 7.14. Bird bone density data (NISP per cubic meter) organized by time period within village sites located in the Knife and Heart Regions, North Dakota.

Scattered Village		Slant Village		Lower Hidatsa Village		Big Hidatsa Village	
Period	Density	Period	Density	Period	Density	Period	Density
		1. 1725-1785	*35.0*	72. 1740-1785 71. 1700-1740	*10.7*	72. 1745-1790 71. 1700-1745	*3.4*
1. 1660-1700	*149.6*	2. 1625-1725	*70.7*	62. 1650-1700	*4.3*	62. 1650-1700	*3.0*
2. 1600-1660	*90.8*			61. 1600-1650		61. 1600-1650	
3-4. 1550-1600	*61.2*	3. 1575-1625	*15.0*	50. 1525-1600	*2.2*		

The meaning and significance of increased fish and bird bone densities is subject for much speculation at present. Ahler et al. (1993:270) suggest that greater representation of fish in

the archaeological record may be "… a reflection of greater restrictions on bison hunting (perhaps due to intertribal hostilities) which forced a greater reliance on truly local resources." In each occupation series, the data appear to indicate a general increase in the use of (and reliance on?) fish through time. Bird NISP and MNI data for Scattered Village (Table 7.11) show a fairly consistent use of waterfowl through all time periods with an apparent decrease in representation from late Precontact to Postcontact. However, use of grouse and small birds (esp. woodpeckers, passerines) shows a definite increase through the occupational span – at least as presented by bone counts and MNI estimates.

An increase in fishing and hunting of grouse and small passerines may be linked, in part, to a decrease in the local availability of and/or access to larger game (i.e., bison, wapiti, deer, pronghorn). Decline in hunting success may relate both to territorial restrictions due to intertribal hostilities and overexploitation of game resources within the local area by expanding human populations. These factors may also increase dependence on native plants and garden produce, the latter perhaps requiring changes in the seasonal movement of some group members. Whatever the underlying causal links, a decrease in bison availability may have forced a greater dependence on locally available resources: small game (including birds), fish, and native plants.

Summary

1. Comparatively large quantities of fish (21,365), amphibian (n=529), reptile (n=71) and bird (n=2,909) bone were recovered through the use of a fine-screen waterscreen recovery system during the 1998 archeological investigation of Scattered Village. These remains are from all areas of the site and from all excavation blocks. Remains are most plentiful in excavated features but are also common in roof fill, sheet midden and midden dumps.

2. A total of 5,680 fish elements is identified representing nine Families and a minimum of 15 genera. Four groups -- the bullhead catfishes, mooneyes, suckers, and cyprinids – are dominant at the Family level. Burned fish specimens (n=479) account for 8.4% of the identified sample. Tool marks are recorded for eight specimens.

3. Analysis of NISP and MNI values show an increase in fish representation from the Precontact (Periods 3 and 4) through earliest Postcontact (Period 2) occupations with a slight decrease in the latest Postcontact (Period 1) occupation. Analysis of fish bone density using NISP values adjusted to compensate for partially sorted samples reveals a consistent increase in density values through time. Highest densities are recorded in the latest Postcontact period. Both sets of data suggest an increased use of fish during the 150-year span of site occupancy.

4. Total of 529 amphibian and 71 reptile elements are identified. The amphibian sample includes salamander, toads and frogs; 77.3% of the identified remains are from feature contexts – primarily cache pits. One burned toad element is recorded. Seventy-one elements representing painted turtle and snake comprise the reptile sample; one snake vertebra is burned. Amphibian and reptile remains are not considered to be culturally significant in this analysis. Burning may indicate contemporaneity for two specimens and it is likely that many

of the amphibian elements represent animals trapped in open (or partially open) pits -- also suggesting a general temporal association with site occupation.

5. A total of 2,576 bird bones are identified; 10 Orders, 15 Families, and a minimum of 24 genera are represented. The remains of passerines, grouse, raptors and waterfowl are most common. Passerines account for 57% of all materials identified below the Class level. Burned pieces (n=289) make-up 11.2% of the identified total. Tool marks are recorded for 33 elements and 37 pieces of bone are included in the modified bone sample.

6. Analysis of NISP and MNI values for birds reveals a consistent presence for most taxa through the Precontact and Postcontact periods. Woodpeckers and passerines are dominant in all time periods. Grouse increase through time in relation to other taxa. Analysis of bird bone density using adjusted NISP values reveals a marked increase in density through time with the highest value recorded for the latest Postcontact period. As with fish, use of bird resources appears to increase through the four-period occupation of the site.

7. Comparison of Scattered Village fish and bird density data with information from generally contemporaneous samples reported from Slant Village, Big Hidatsa Village and Lower Hidatsa Village also reveals broadly similar patterns. Identified fish and bird specimen densities show a general increase through each temporal series, particularly when comparing Precontact and Postcontact occupations. These data may suggest more intensive use of fish and select bird resources during the Postcontact period.