

Bioarchaeology of Two Mill Creek Sites from Northwest Iowa:
13PM248 and 13WD402

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Research Papers
Volume 41 Number 2



Office of the State Archaeologist
The University of Iowa
Iowa City
2016

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Human Skeletal Remains and Artifacts from the Heendah Hills Site, 13PM248, Plymouth County, Iowa

Robin M. Lillie

Following disturbance caused by mechanical stripping and excavation, human skeletal remains were disturbed, redeposited, and exposed at 13PM248. Subsequent field investigations and an archaeological excavation resulted in the collection of human skeletal remains representing a minimum of 109 individuals, 45 adults and 64 subadults. The adults included 19 males and 13 females. Of the adult males, one was a young adult; two were young to middle-aged; four were middle-aged; three were middle-older adults; and two were older adults. Four females were young adults; one was young to middle-aged; two were middle-aged; and one was an older adult. The subadults ranged in age from late-term fetal to older juvenile (ca. 20 years of age). Six were fetal to newborn; 24 were infants (newborn to 3 years old); 26 were children (3 to 12 years old); and 8 were adolescents (12 to 20 years old). Both dental and osseous pathologies were noted. Dental pathologies included carious lesions, antemortem tooth loss, periodontal and periapical abscesses, hypercementosis, and enamel defects (primarily linear hypoplastic defects). Advanced dental wear was noted in some of the dental remains, but was generally slight to moderate for the adult dentition. Osseous pathologies included degenerative changes associated with use wear or aging; cribra orbitalia; porotic hyperostosis; periostitis; osteoporosis; and evidence of trauma including healed fractures. Based on artifacts found at the site, some in association with human remains, cultural affiliation was probably Mill Creek, although the burial site may have been used over an extended period of time and by other cultures, such as Great Oasis.

Background

At the end of May 2005, human remains were found at a previously unrecorded site, now designated 13PM248, north of Sioux City, T90N, R48W, Section 22, Plymouth County, Iowa, on a high loess knoll overlooking the Big Sioux River (Figure 1). The burials were accidentally encountered during earthmoving (University of Iowa, Office of the State Archaeologist 2005). The landowner had purchased the property with plans to subdivide it into large lots for a housing development. The earthmoving project was to grade an access road into the property off of Highway 12 and included grading on the ridge top where the landowner planned to place his house. It was on this latter area where the remains were encountered.

A large concentration of bone at the northern end of the stripped area was the find that stopped the operation. The landowner and equipment operators stopped all work in the area, covered the remains as best they could, and contacted the Office of the State Archaeologist (OSA) Burials Program (now Bioarchaeology Program).

Shortly after the notification, the initial OSA investigation documented the disturbance and recovered numerous bone fragments from the disturbed surfaces, all re-deposited and out of context. While it was

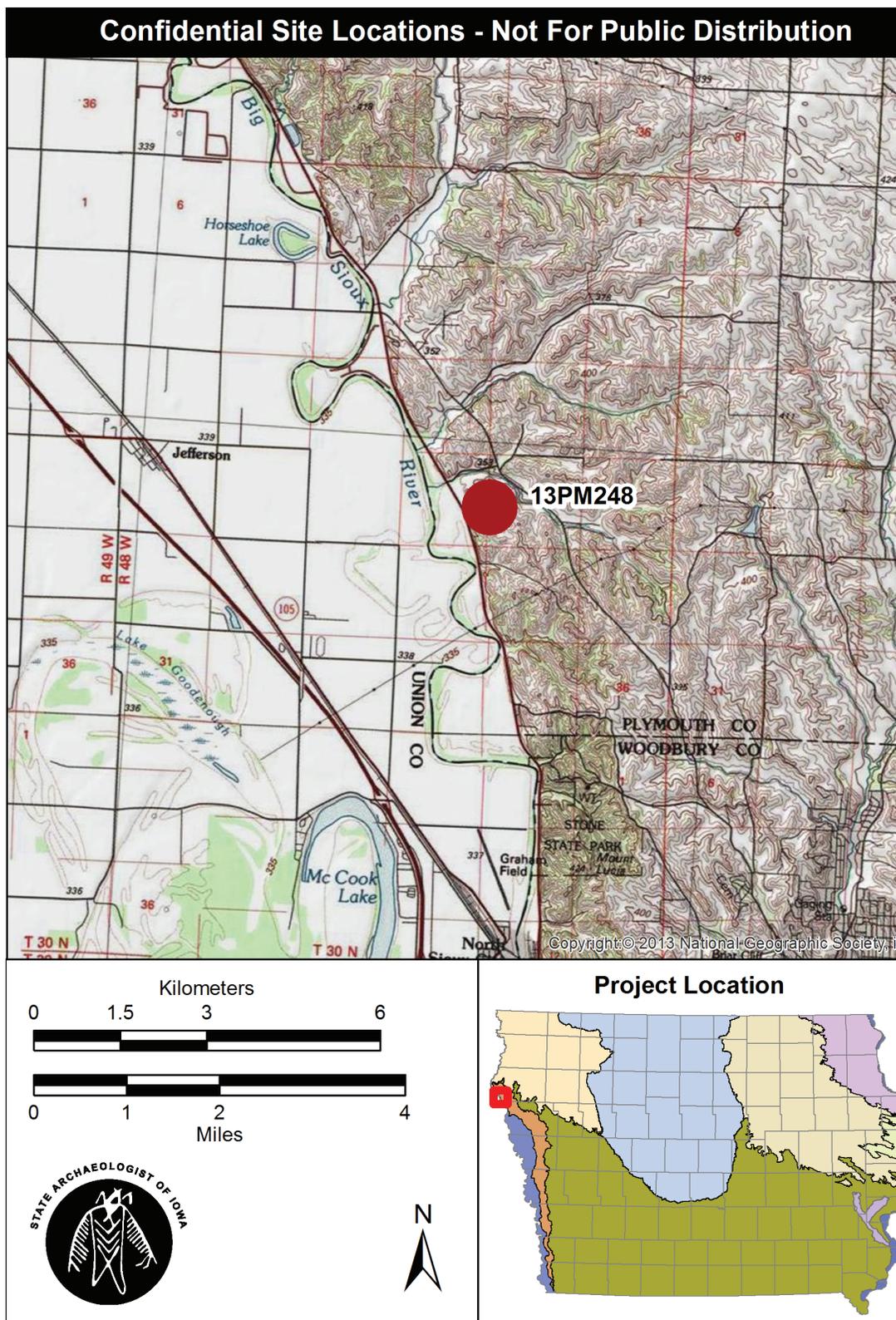


Figure 1. Location of 13PM248 in the SE $\frac{1}{4}$, Section 22, T90N, R48W, Plymouth County, Iowa. Map based on USGS Sioux City N, Iowa, (1976) 7.5' series quadrangle map, scale 1:24,000. Figure map at scale 1:100,000 due to confidentiality of burial site locations.

certain some of the bones within the large concentration were disturbed, the extent of this and other burials was unknown, with the possibility some remains were still in situ. With all top soil having been stripped and devoid of vegetation and with the steep slopes, the entire area was subject to erosion (Figure 2).

During the three subsequent OSA site visits, exposed remains were collected from large areas of the disturbed surface. In June and July site visits, bone fragments were also observed in three or four locations visible in the road cut wall (for a distance of 18 meters or approximately 55–60 feet) in a roughly north-south direction and eroding on the surface of a bulldozed road bed (the approximate east half of the knoll that was removed by earthmoving). The procedure that was used in the earthmoving operation involved loosening of the soil prior to bulldozing. Because considerable soil loosening and bulldozing was done prior to encountering the human remains, it was difficult to determine if the remains observed in the cut face or surface concentrations had been re-deposited and covered over. Limited testing was conducted during the July field work in the areas around the disturbed knoll to determine whether or not intact deposits existed.

After the site visits to evaluate the degree of disturbance and following discussions with the OSA Indian Advisory Council, the decision was made to recover the human remains from the disturbed burials. In the fall of 2005, Shirley Schermer, Burials Program Director, and Robin Lillie, Burials Program Skeletal Biologist, assisted by several volunteers from the Sanford Museum and the Northwest Chapter of the Iowa Archeological Society, began salvage efforts. The plan was to recover skeletal fragments from the surface and the loose/disturbed soil piles scattered around the site and to excavate remains from the disturbed burials. A grid creating 2 m by 2 m units was established and locations of earlier surface concentrations integrated into the grid map (Figure 3). As recovery efforts progressed, it became clear that the burial site was much more extensive and more intact than originally thought. Evidence of intact burials was found below the disturbed/eroding burials. Disturbed but mostly intact burials were found beneath some of the push piles of soil; and several burials were encountered while excavating a unit to reach one of the locations with bone visible in the road cut wall. While recovering the skeletal remains from the loose/disturbed soil piles and from the disturbed and badly eroding burials, the decision was made to cover over the other intact burials, leaving them in place and temporarily stabilized. The results of this work led us to believe there are likely other intact burials at different depths throughout the entire knoll, even below the graded road bed.

Based on the results of the fieldwork, the entire burial knoll was designated a no-build area and to be preserved. Restoration of the landform contours and stabilization of the burial site required multiple truckloads of soil brought in from elsewhere. Re-vegetation efforts have been successful, further stabilizing the knoll.

The landowner continued with his plans for a subdivision, setting aside the burial knoll within a restricted green space. The economic downturn and continued efforts by the Iowa Natural Heritage Foundation eventually led to the acquisition of the property. The property is now owned by the Iowa Department of Natural Resources. In spite of the disturbance to 13PM248, the site retains much of its integrity, significance as a large sacred area, and significance as a cultural landscape. The disturbed remains that were recovered have been reburied on site. Recent designation of the entire property as a state preserve will help provide long-term preservation.

Since the whole knoll probably contained burials, placed there over an extended period of use as a cemetery/ossuary, the designations of “features” used in this report may be artificial constructs (given the degree of disturbance by the heavy equipment), but are useful as points on the site map.

Methods

The osteological analysis followed the guidelines developed by the Paleopathology Association (Bui-kstra and Ubelaker 1994). Osteological inventories were compiled and are presented in Table 1. Cranial metrics (Table 2) were taken following the methods in Howells (1973), Bass (1995), and Moore-Jansen et al. (1994). Cranial nonmetric observations were based on definitions in Finnegan (1972) and El-Najjar and McWilliams (1978) and are presented in Table 3. Postcranial metrics were taken following Bass (1995) and



Figure 2. 13PM248 in June 2005. All top soil stripped and area subject to erosion.

Moore-Jansen et al. (1994) and are presented in Table 4 (adults) and Table 5 (subadults). Postcranial non-metric traits (Table 6) were scored using the definitions in Finnegan (1978). Dental inventories and dental pathologies are presented in Table 7. Dental attrition was scored using the coding method developed by Hinton (1981). Dental metrics (Table 8) were taken using the guidelines and landmarks defined by Goose (1963). Dental nonmetrics were recorded following the descriptions provided in Bass (1995). Enamel hypoplastic defects were measured using the procedures outlined by Goodman et al. (1980) and are given in Table 9. Age estimates were based on one or more of the following methods: dental attrition (Hinton 1981); cranial suture closure (Meindl and Lovejoy 1985); palatal suture closure (Mann et al. 1991); morphology of the pubic symphysis (Suchey and Katz 1986; Suchey et al. 1988); morphology of the auricular surface of the innominate (Lovejoy et al. 1985); skeletal development epiphyseal closure (Krogman 1962); subadult diaphyseal length and ilium breadth (Scheuer and Black 2000, Ubelaker 1989); and the presence or absence of age-related osteological changes. Sex was estimated based on sexually dimorphic metric and nonmetric characteristics (Buikstra and Ubelaker 1994), and talus length (Steele 1976). Pathological conditions were identified using Mann and Murphy (1990) and Ortner (2003).

In some instances, when duplicate elements were found either within the same feature (e.g., Feature 12) or over a large area of the site (e.g., North Slope), the elements were distinguished by assigning labels

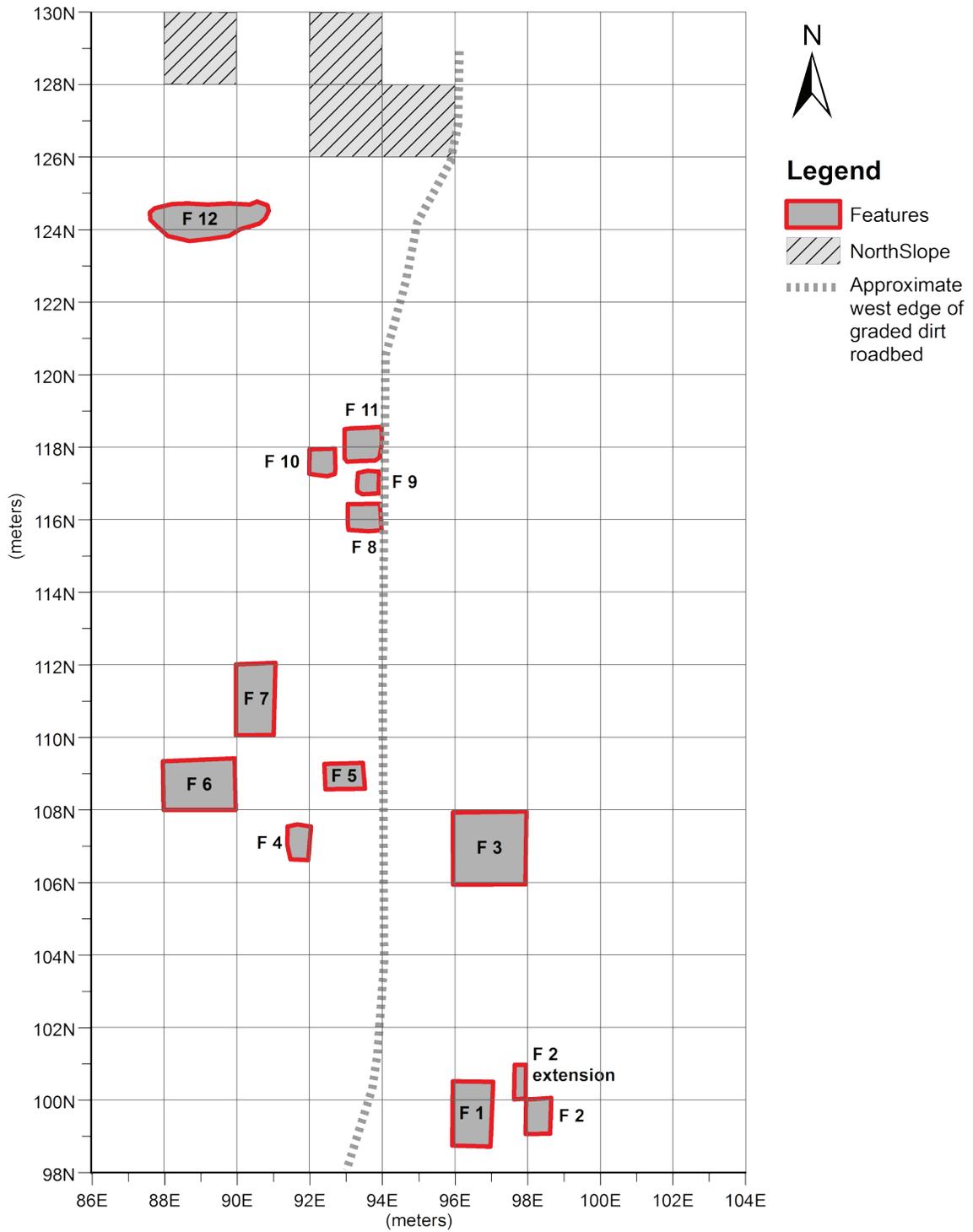


Figure 3. Excavation grid map with location of burials and the North Slope (map by Angela Collins.)

consisting of an abbreviation of the element, the side, and a number. For instance in Feature 12, there were several adult maxillae that were labeled Max L1, R1, L2, etc. This form of labeling duplicate elements was also used for remains collected from the site surface before the excavation grid was established.

In the following description, each feature is described separately, giving the excavation unit or units where all or the majority of the feature was recovered. When remains from adjacent or nearby units were determined to be compatible with a particular feature, they were combined for analysis (see, for example, Feature 5 and possibly Feature 5). Following the individual descriptions of the units/features and general surface collections, a description of the associated artifacts is presented.

Osteological Analysis

FEATURE 1

During the initial field investigations, areas of exposed human remains were marked on the field sketch map using designations “A,” “B,” etc. The partially exposed remains of an adult, designated “B,” were found immediately on and just below the stripped ground surface in the eastern part of the bulldozed access road, on the eastern slope of the knoll, 6.4 m southeast of the northernmost equipment track along the southeast edge of the road. A scatter of fragments about 0.7 m south of “B” was designated “C.” Soil was placed on top of and uphill from this area to help prevent further exposure and erosion. Prior to the return to the site for the July investigation, someone had carefully exposed the articulated upper half of a skeleton, within the area of B/C, but they had left the remains in place. The unknown person had placed dirt clods around the exposed bone and had placed a larger long bone shaft portion next to the skeleton. This feature was further explored during the fall salvage excavations, at which time it was given the designation Feature 1 and was located in Unit 98N96E and the southwest portion of Unit 100N96E (see Figure 3). The feature included remains from three adults and one subadult. The upper portions of Adult 1-1, Adult 1-2, and Subadult 1-1 were directly impacted by the earthmoving, grading, and heavy equipment traffic. Adult 1-3 was discovered directly under Adult 1-2 and Subadult 1-1 and was in good condition. Adult 1-1 was a flexed burial; only the upper torso of Adult 1-2 remained intact; and Adult 1-3 was an extended burial. The subadult burial, Subadult 1-1, was incomplete.

A shell fragment and a piece of chert shatter were found with Adult 1-2 and two small grit-tempered, smoothed-over cord-marked pot sherds may have been associated with this burial. A chert flake and a unifacially worked flake may have been associated with Adult 1-2 or Subadult 1-1. Two small projectile points were found with Adult 1-3; and a small grit-tempered, cord-marked sherd may have been associated with this adult or with Subadult 1-1. Four fragments of bone gorget were also recovered with Adult 1-3. One retouched flake was found in the roadbed just east of Feature 1. The artifacts are described in detail in the artifact section near the end of this report.

Adult 1-1

The upper part of a flexed burial, Adult 1-1, had been disturbed and exposed by earthmoving and grading; the base of the burial was 10 cm (upslope) to 18 cm (downslope) below the road surface. The skull was resting on the left side, facing east. The right arm was flexed, but the left arm was extended. Given the fragile condition of the remains, length measurements of the left tibia and humerus were taken in situ. The cranium had been badly damaged by the earthmoving, grading, and heavy equipment traffic, but the postcranial remains were more complete and in better condition.

The mandible was missing the left condyle and most of the right ascending ramus. The alveolar bone in the area of the incisors, canines, and right third molar had been damaged postmortem. The left canine through first molar, left third molar, and right first premolar through third molar were in situ. The left second molar had been lost antemortem with the socket partially resorbed. The right canine had been lost

postmortem. The left and right central and lateral incisors were present, but loose. Small carious pits were present interproximally on the left second premolar and first molar and the right central and lateral incisors and third molar. Carious lesions had destroyed the crown of the right second premolar and over half of the crown of the first molar. Six loose maxillary teeth were recovered—the left canine, second premolar, and first and second molars, a possible left lateral incisor, and a right first molar. The left first molar had a carious pit on the occlusal surface. The possible maxillary lateral incisor had approximately three-fourths of the crown destroyed by a carious lesion; the crown of the right maxillary first molar had been completely destroyed by a carious lesion. Slight hypercementosis and slight to moderate calculus were present on several maxillary and mandibular teeth. Two areas of enamel hypoplastic pitting were present on the left mandibular canine (Table 9). Attrition throughout was moderate to severe.

Pubic symphysis morphology was consistent with Suchey-Brooks' Phase IV, suggesting an age estimate of 30 to 45 years of age. Auricular surface changes suggested a slightly older age estimate of 40 to 50 years. Sexually dimorphic indicators suggested this individual was male. Although it was not possible to measure the gonial angle, it approximated 90°. The chin was squared and robust overall. The sciatic notch was moderate to narrow in shape. Femur measurements were all in the male range.

There was very slight lipping along the margins of the articular surfaces of the cervical and thoracic vertebrae, with one thoracic vertebra having moderate lipping around the rib articulation. There was slight to moderate lipping along the margins of the articular surfaces of the lumbar vertebrae, hand and foot bones, and long bones. A small area of eburnation, 8 mm by 11 mm, was present on the posterior portion of the glenoid surface of the left scapula. The morphology of the left humerus head was suggestive of a healed, but slightly misaligned, fracture. The surface of the anterior half was roughened, suggesting it was no longer in articulation; a ridge of bone running inferior to superior separated the anterior and posterior surfaces. The posterior surface was somewhat flattened with areas of eburnation, but still in articulation.

Adult 1-2

A partial adult skeleton, Adult 1-2, was found at 18 to 22 cm below the road surface with cranial remains mostly absent and no leg bones found; they were probably destroyed by road grading disturbance. The soil above and surrounding the remains had been extremely hard packed by heavy equipment, making excavation difficult. The vertebral column was relatively intact. The individual was buried either face up or possibly slightly turned. In addition to the recent earthmoving, some of the adult remains appeared to have been disturbed at some point in the past. The hands seemed to be intermingled with the ribs, with one hand under and between the ribs and scapula and the other hand on top of the ribs. Subadult remains were scattered among and just above the remains of Adult 1-2, with the adult ulna and incomplete radius shaft under the subadult cranium. There was some evidence of disturbance from animal burrowing, and the skeleton of a small mammal was found between Adult 1-1 and Adult 1-2.

Only three teeth were recovered—all single-rooted teeth. The crown of one was completely worn away with wear polish at the cemento-enamel junction. Most of the crown of the second tooth, a possible canine, was worn away at an oblique angle onto the root. A carious lesion was present on the oblique portion near the cemento-enamel junction, with hypercementosis on the root. The tip of the root of the third tooth, a possible premolar, had broken postmortem; enamel was missing postmortem except on the labial surface of the crown where moderate calculus was present; attrition was moderate. No measurements were possible.

All epiphyses were fully fused, indicating an adult individual. Although very limited evidence, the severe dental attrition suggested a possible middle-aged to older adult. Measurements of the humerus were close to the ranges for males, suggesting the individual was possibly male.

The thoracic vertebrae exhibited slight to moderate lipping; a compression fracture of one vertebra had created a wedge-shape anteriorly toward the left side. Small Schmorl's nodes were present on both the inferior and superior surfaces of one vertebra. A lytic lesion, with considerable reactive bone as well as bone loss, was present on the superior surface of the right first rib. Two phalanges, one proximal and one middle,

had fused at a right angle, suggestive of a possible fracture at the distal end of the proximal phalanx.

Adult 1-3

Leg bones and a patella were encountered during removal of the Adult 1-2 torso, belonging to an extended burial (Adult 1-3) located just below Adult 1-2 and Subadult 1-1. Further investigation exposed the complete skeleton of an extended burial. Adult 1-3 was oriented in a northwest-southeast direction; the skull was to the northwest with the face toward the east. The innominates, leg bones, and distal ends of the left ulna and radius were in Unit 98N96E, with the rest of the skeleton extending into the unit to the north, Unit 100N96E. The head was considerably higher than the lower legs, possibly buried following the natural slope at the time. Reddened soil, possibly from red ochre, surrounded the cranium. Two phalanges were found above the right innominate, and more were found during screening. No feet and no left hand were recovered, and the right hand was only partially present. In the process of removing the skeleton, a side-notched point was found adjacent to the right scapula and clavicle. A second projectile point was recovered from around the vertebral column. The floor of the unit was leveled and troweled to see if any pit feature edge was visible, but none was found. A possible subadult cranial fragment was resting on the right ulna, and one fragment of a subadult bone was found in the area just southwest of the Adult 1-3 knee; the considerable rodent activity in the unit could have displaced the fragments from the Subadult 1-1 burial located just above.

The Adult 1-3 skeleton was more complete and in better condition than the other individuals from this feature. The cranium was relatively complete, missing only a portion of the base of the occipital. The overall appearance of the cranium was robust; the mastoid process was moderate in size; the supraorbital ridge was somewhat pronounced; and the superior orbital margin was blunt. The zygomas were forward projecting. The mandible was missing only the medial portion of the right condyle.

All maxillary and mandibular teeth were in situ. Attrition was greater on the left side of the maxillary dentition. The left canine and first and second molars and the right first and second molars were somewhat rotated, with the buccal surface rotated mesially except for the left canine, which was rotated somewhat distally. Attrition of the mandibular teeth ranged from moderate for the posterior teeth to severe loss of crown height on the anterior teeth. The mandibular left first molar crown had been destroyed by a carious lesion, leaving only the carious roots. Slight to moderate calculus was present throughout, and heavier on the mandibular anterior teeth. Eight enamel hypoplastic lines were present on six maxillary teeth (Table 9). They were positive for one episode of enamel growth disruption occurring at 5.5 to 6.0 years of age.

Cranial suture closure assessment provided age estimates of 56.2 ± 8.5 years using vault system scoring and 34.7 ± 7.8 years using lateral-anterior system scoring. Assessment of palatal sutures provided an age estimate of 40 to 50 years of age. Most of the sexually dimorphic indicators that could be assessed fell into the male range. The sciatic notch was narrow. Long bone measurements fell mostly in the male range, with a few in the indeterminate range or just inside the female range. Although the gonial angle measurement fell just inside the female range, the overall appearance of the mandible was robust and other cranial indicators suggested male.

Slight lipping along articular margins was common. A tiny cyst was present in the non-articular portion of the right lunate. No other pathologies were noted.

Subadult 1-1

A disturbed subadult burial, Subadult 1-1, was located east of Adult 1-1, north of Adult 1-2, and just above Adult 1-3. The cranium was fragmented and incomplete. Although the maxillae and mandible were fragmented, 14 deciduous and six unerupted permanent teeth were in situ. Additionally, there were four loose teeth present: one deciduous and three unerupted permanent teeth. Postcranial remains were limited to some ribs, vertebrae, right clavicle and humerus, left radius, hand bones, left ischium, right pubis, and miscellaneous fragments.

Vertebral arches had fused, but the arches had not yet fused to the centra, suggesting an age of 1 to 3

years. Development of the deciduous and permanent dentition suggested an age range of 1.5 to 2.5 years of age. Diaphyseal length measurements of the humerus and radius also provided estimates of 1.5 to 2.5 years. No estimate of sex was possible.

FEATURE 2

Bone had been found in loose, disturbed soil in the graded roadbed just northeast of Feature 1. Removal of the disturbed soil exposed two burials, labeled Feature 2 (Figure 3), and designated as Adult 2-1 and Adult 2-2. Although orientation of the burials was similar to that of Adult 1-3 in Feature 1, both Feature 2 burials were 35 to 40 cm higher in elevation. One chert flake, a piece of chert debitage, and small amounts of clam shell were found with Adult 2-1.

Adult 2-1

Adult 2-1 was an extended burial with a northwest-southeast orientation, with the head to the northwest (slightly tilted east) and the feet to the southeast. The arms were extended along the sides. The cranium was crushed by earth moving activity; the superior surface was right at the graded roadbed surface. The rest of the body was 5 to 10 cm below the road surface; a layer of loose soil on top of the remains probably helped protect it somewhat from heavy equipment traffic. Only the calcaneus remained of the left foot; the rest of that foot was probably lost during road grading. The remainder of the skeleton was relatively complete although damaged.

The maxillae were missing most of the facial portions, although the alveolar ridge was intact and all maxillary teeth except the third molars were in situ. The mandible was missing most of the left condyle. All mandibular teeth were in situ except the left third molar. It could not be determined if the third molars were missing antemortem, impacted, or congenitally absent. One small carious pit was located on the occlusal surface of the mandibular right lateral incisor. Slight calculus was present on the mandibular teeth. Attrition was slight to moderate on all teeth. Eleven enamel hypoplastic defects were present on nine teeth (Table 9). They were positive for three episodes of enamel growth disruption occurring at 1.5 to 2.0, 3.5 to 4.0, and 4.0 to 4.5 years of age. The mandibular left second premolar and the right first premolar and third molar were rotated due to crowding.

The iliac crest was fused but the metaphyseal line was still visible, suggesting a young adult. Assessment of the auricular surface provided an age estimate of 25 to 30 years, as did palatal suture closure. All of the cranial sexually dimorphic indicators were female in expression. The sciatic notch was broad, and a preauricular sulcus was present. All the postcranial measurements fell within the female range.

There was possible sacralization of the fifth lumbar vertebra. Very slight periostitis was present on the superior medial surface of the right tibia. The left humerus medial epicondyle was abnormal. It appears to have been fractured antemortem and displaced inferiorly and anteriorly; the anterior surface of the misaligned but healed epicondyle looks as if it became an articular surface. Both the proximal left ulna and radius articular surfaces appear normal.

Adult 2-2

Adult 2-2 was also an extended, supine burial with a northwest-southeast orientation (head to the northwest). The head was slightly tilted to the east; the arms were extended along the sides. The Adult 2-2 remains were in very poor condition and crushed due to their closeness to the scraped surface of the roadbed, most within 5 cm. Due to the poor condition, in situ maximum length measurements were taken for the femur, tibia, and humerus. Of the foot bones, only incomplete tali and an incomplete, partially crushed calcaneus were recovered in situ. Three metatarsals were found in nearby loose soil just west of the approximate midpoint of the right tibia and fibula; the rest of the foot bones were likely destroyed by the road grading.

The cranium was crushed and badly damaged by the road grading and heavy equipment. The mandible, mostly edentulous, was missing the left condyle and most of the right ascending ramus. Dentition was limited to six loose teeth. A possible maxillary right third molar had slight hypercementosis and slight attrition.

Three were single-rooted teeth or roots from multi-rooted teeth. Crowns had been destroyed by carious lesions; all roots had moderate to heavy hypercementosis. Two were single-rooted teeth with severe loss of crown height through attrition. The mandibular left first premolar and first through third molars and right central incisor through canine and second premolar through third molar had all been lost antemortem with sockets resorbed.

Ectocranial sutures were partially fused; endocranial sutures were fused and mostly obliterated. Dense bone, surface irregularity, and articular lipping suggested an older adult. Cranial sexually dimorphic traits and overall size and gracility suggested a female. The few long bone measurements fell into the female range. A very distinct preauricular sulcus was present.

Red staining, possibly from red ochre, was noted on the proximal end of a hand phalanx.

Feature 2 Summary

Feature 2 contained two extended burials. Adult 2-1 was a female adult, 25 to 30 years of age. Adult 2-2 was also female, estimated to be an older adult. Both Adult 2-1 and Adult 2-2 were oriented northwest (head)–southeast (feet); parallel in orientation to Feature 1, Adult 1-3, just west-southwest to the Feature 2 burials. However, both Adult 2-1 and Adult 2-2 were closer to the graded surface (35-40 cm higher) than the Feature 1, Adult 1-3. The closeness to the graded surface resulted in crushing and damage to the Feature 2 individuals. Three shell fragments were found in association with Adult 2-1, and one small shell fragment with Adult 2-2 (see Appendix B).

POSSIBLY FEATURE 1 OR 2

Fragmented remains were collected from the loose soil on the surface within or near Features 1 and 2. It was unclear with which feature they were likely associated. Most of the remains were of adult size except for 13 miscellaneous fragments and a cranial vault fragment that could have been from an adult or subadult. The adult remains included a temporal fragment, a cranial ossicle, 10 cranial fragments (four bleached), a small rib fragment, a scapula fragment, a left greater multangular, a femur shaft fragment, six long bone fragments (three from the same larger fragment of a large long bone), a left first cuneiform, and 15 small miscellaneous fragments. These may have been associated with one or more of the adults from Features 1 and 2 but could not be assigned to a specific individual.

FEATURE 3

In July 2005, during a surface survey of the site, teeth were exposed in the roadbed. A little farther east/southeast what appeared to be a mandible was partially exposed. A couple of bone fragments were visible approximately 0.5 to 1.0 m south/southeast of the teeth. The area where these remains were observed was within Unit 106N96E. The entire unit was excavated to 18 to 22 cm below the roadbed surface, but most of the skeletal material was recovered from a bone concentration in the northwest quadrant of the unit, designated Feature 3. The remains in Feature 3 were on or near the surface, with some in disturbed soil. An incomplete femur in the northwest corner was “upside down with patella in anatomical position underneath;” while just east of it was a second incomplete femur with the patella in correct anatomical position. These femora appeared to form a pair (described below as Adult 3-1). Two crushed proximal tibiae, described below as Adult 3-2, were found on the west side of the unit. The remainder of the unit was sterile except for an incomplete scapula found in the south wall 22 cm east of the southwest corner (discussed below as Adult 3-3). At least three adults and two subadults are indicated by the remains recovered from Feature 3. A chert flake was recovered with the remains of Adult 3-1. One piece of chert debitage and a biface fragment were recovered from Unit 106N96E, but in disturbed context.

Adult 3-1

Adult 3-1 is represented by two patellae and distal femora which appear to be from the same individual.

The femora displayed morphological and metric similarity. The patellae had been recovered in correct anatomical position with the femora and are assumed to be associated. A left tibia that was missing the proximal end may be associated with this individual. It was in close proximity to the femora in situ. A second tibia, the proximal end of a right, was recovered in the more western portion of the unit and does not articulate well with the right distal femur portion. Metrics on both femora and the left tibia indicate a male individual. The line of fusion is still visible on the proximal head of the right femur.

Adult 3-2

Adult 3-2 is represented by two proximal tibia portions, one right and one probably left. The latter tibia was highly fragmented. The right tibia yielded an estimated proximal breadth of 85 mm in the field, but was measured at 80 mm during the osteological analysis in the lab. In either case, the proximal breadth measurement falls in the range for males. Sex was possibly male.

Adult 3-3

A possible third adult, Adult 3-3, was indicated by three elements expressing female characteristics. The scapula fragment recovered in the south wall of the unit yielded a glenoid fossa length of approximately 32 mm. This element was outside of Feature 3 and may be unrelated, but because the area was so highly disturbed, this assumption could not be made in this case. A left distal radius portion, bleached from exposure on the ground surface, yielded a distal width measurement of approximately 31 mm. An incomplete left innominate displayed a preauricular sulcus and raised auricular surface; additionally, the sciatic notch appeared to be wide.

Adult Miscellaneous Remains

Most of the adult remains could not be assigned with confidence to a specific individual, but they did not appear to represent any additional adults. Included with these remains was an incomplete mandible containing the left central incisor through second molars and right central and lateral incisors. The left molars were lost antemortem with the sockets resorbed. The right portion of the mandible posterior to the incisors was absent postmortem. The teeth were well worn, extending to the cemento-enamel junction on the incisors. Wear on the right central incisor angled sharply downward from the labial to lingual surface, possibly resulting from artificial abrasion. These dental remains probably belonged to the same individual observed in July 2005. Age estimated from the dental remains is middle-aged to older adult. Sex was indeterminate. A capitulum portion, probably associated with an incomplete right humerus, displayed slight lipping along the margin. A gracile left fifth metacarpal displayed marked areas of tendon attachment on the shaft, although this is not necessarily pathological.

Subadult 3-1

Subadult 3-1 was represented by two incomplete, unidentified diaphyses and a distal phalanx. These remains were consistent in size with an infant.

Subadult 3-2

Subadult 3-2 was represented by several cranial fragments, two loose teeth, and incomplete remains including the left scapula, unisided distal femur, and proximal left tibia diaphysis. Left and right proximal humerus epiphyses were also present. Compared to more confidently aged subadult remains, size of the long bone portions suggested the individual represented by these remains was probably a young juvenile. Two loose teeth may be associated with Subadult 3-2. They were a probable maxillary left central incisor with the crown eroded and a maxillary right first or second molar. The molar displayed slight blunting of the lingual cusp. The roots were fully developed. The crown size suggested the tooth was more likely a second molar, and no distal contact facet was present. If a second molar, age estimation would be 12 to 14 years. The molar displayed an enamel extension. The central incisor was shovel shaped.

FEATURE 4

The general area of Feature 4 was first noted in June 2005. The proximal portion of a right femur was exposed just north of an east-west trending bulldozer track in what would be designated Unit 106N90E. A humerus and a cranial fragment were exposed in the lower area of this vehicle track in an erosive fissure just above the graded roadbed and about 0.7 m from the right femur. These remains were mapped and then covered in place. In July, it was noted that an unknown person had exposed, but left in place, the previously exposed femur and humerus. Additional remains were exposed near the proximal end of the humerus, including half of a mandible and cranial fragments, long bone shaft fragments, and rib fragments. A cranial fragment was next to the femur. At that time, photographs were taken and the remains were collected. At the same time, a radius and ulna that appeared to be in situ just up slope but within the bulldozer track were noted. An innominate exposed in the dozer track was photographed and left in situ in July.

The September investigations designated Feature 4 as an area that included human skeletal remains from disturbed soil as well as in situ elements that were noted but not excavated in Units 106N90E and 106N92E. Unit 106N90E was covered, in general, with loose, disturbed soil that was screened. Cranial fragments and a possible tibia or femur that extended down into undisturbed soil, were not excavated. The remains removed in September from the loose, disturbed soil in Units 106N90E and 106N92E represented a minimum of two adults and five subadults.

Loose and disturbed soil from adjacent units and units downslope from Feature 4 contained remains that did not duplicate elements representing the Feature 4 individuals. Many of these elements were compatible with age estimates and preservation for Feature 4 Subadults 4-2 through 4-5. There were also remains representing one additional subadult, Subadult 4-6. Adult remains from nearby units did not duplicate any remains from Feature 4 and were compatible with the Feature 4 adults. They were labeled as Miscellaneous Adult. The remains from nearby units are included in the descriptions of the Feature 4 individuals and are identified as “possibly Feature 4” in Table 1. The remains represented two adults, a female estimated to have been 30 to 34 years and a young adult of indeterminate sex. Six subadults, ranging in age from later-term fetal/newborn to 16 years, were also represented by remains from this feature.

Adult 4-1

Adult 4-1 was represented by an incomplete right innominate missing the pubis portion and part of the iliac crest. The sciatic notch was wide, the auricular surface raised, a preauricular sulcus present, and the element was gracile. Sex was estimated to be female based on these characteristics. The auricular surface was finely grained with a few macroporosities, yielding an age estimate of 30 to 34 years.

Adult 4-2

Adult 4-2 was represented by a maxillary left third molar, thoracic vertebra with incompletely fused epiphyseal rings, and the superior-anterior portion of a left parietal fragment with open sutures. The third molar was distinguished by a small carious lesion below the cemento-enamel junction on the buccal root surface and a moderate carious lesion at the cemento-enamel junction on the mesial surface. Moderate to heavy calculus deposits were present circumferentially around the root extending up to 0.5 cm below the cemento-enamel junction. The cusps were slightly blunted. An age estimate of young adult was posited for the individual represented by these remains.

Miscellaneous Adult

The rest of the adult remains were categorized as Miscellaneous Adult and could not be assigned with confidence to a specific individual. Two fragments were possibly associated with Adult 1. A right scapula portion provided a glenoid cavity length in the female range and an incomplete right radius was gracile, suggesting a female adult. The proximal third of a right femur, with the head and trochanters damaged, displayed a third trochanter. A parietal fragment contained part of the lambdoidal suture which was partially fused ectocranially and completely fused endocranially. This fragment may represent a middle-aged to

older individual. Also included with the miscellaneous adult remains was an incomplete left mandible portion containing part of two molar sockets with one root in situ. Pathological conditions were noted on three miscellaneous adult elements. A nearly complete thoracic vertebra displayed slight to moderate lipping along the superior body margin. A left triquetral contained lipping along the facet margins for the hamate and lunate. A left fifth metatarsal had a line of slight bony exostosis along the posterior-lateral shaft.

Subadult 4-1

Subadult 4-1 was a near-term fetus to newborn represented by a cranial vault fragment, two left ribs, and a left ilium. The left ilium breadth of 32 mm falls at the low end of the range for newborns.

Subadult 4-2

Subadult 4-2 was an infant represented by an incomplete left zygoma, incomplete left clavicle, four ribs and six rib fragments, a vertebra fragment, incomplete right ilium, sacral fragment, right femur diaphysis, left tibia diaphysis, and a possible proximal radius epiphysis. A loose maxillary deciduous central incisor was also associated with this subadult. The root was complete, and the occlusal surface was unworn. The femur diaphysis was missing the proximal fourth, and the tibia diaphysis was missing the proximal third. These elements, along with the ilium, were slightly smaller or comparable in size to remains from a confidently aged 2.5 to 3.5 year old. Age was estimated to be 1.5 to 3.5 years.

Subadult 4-3 and Subadult 4-4

Subadult 4-3 was represented by a nearly complete left temporal with an age estimate of 3.5 to 6.0 years based on size. A second subadult in this age range, Subadult 4-4, was represented by an incomplete left petrous portion that appeared to be slightly larger than the temporal representing Subadult 4-3. Subadult 4-4 was probably near the older end of this age range of 3.5 to 6.0 years.

Numerous fragments that could belong to either Subadult 4-3 or Subadult 4-4 included an incomplete left parietal, four occipital fragments, a sphenoid fragment, eight cranial vault fragments, an incomplete left scapula, a first rib, six rib fragments, a cervical vertebra, and the proximal two-thirds of a left radius diaphysis. The arches and body of the vertebra were fused, suggesting an age of 3 to 7 years.

Subadult 4-2, 4-3, or 4-4

A diaphysis fragment appeared to be associated with a young child and may have belonged to Subadult 4-2, 4-3, or 4-4.

Subadult 4-5

Subadult 4-5 was represented by two fully developed permanent incisors, a fragment from a larger rib, a right scapula, two rib fragments, an incomplete radius diaphysis, an incomplete femur diaphysis, and an incomplete calcaneus. One of the teeth was a maxillary right lateral incisor that was shovel-shaped. Dental attrition was slight, with slight blunting of the occlusal edge. Dental development and slight attrition suggest an age estimate of 8 to 13 years. The labial surface of the crown was eroded due to postmortem damage. The other tooth was a right mandibular incisor with no wear. The root tip was broken off and missing, but the tooth was either completely developed or nearly so. Although the enamel was stained postmortem, no enamel defects were observed. Age was estimated to be older child to young juvenile based on dental remains and size of the postcranial remains.

Subadult 4-3, 4-4, or 4-5

An incomplete petrous portion, incomplete right rib, rib fragment, incomplete ulna diaphysis, and a metacarpal were possibly associated with Subadult 4-3, 4-4, or 4-5.

Subadult 4-6

The remains representing Subadult 4-6, all recovered from units adjacent to Feature 6, included duplicate

elements to Subadult 4-2 from Feature 4 and were much smaller than the Subadult 4-2 remains. Subadult 4-6 was represented by incomplete diaphyses of the left humerus, left and right radii, right ulna, right femur, left and right tibiae, and left and right fibulae. Estimated length of the nearly complete tibia diaphyses was 135 mm, providing an age estimate of 1.5 to 2.5 years. Diaphyseal lengths were also estimated for the radii (ca. 95 mm) and the right ulna (ca. 110 mm), yielding the same age estimate. Age was estimated to be 1.5 to 2.5 years.

FEATURE 5

Feature 5 was located within Unit 108N92E. The unit was primarily covered with loose, disturbed soil that was screened. Small pieces of clam shell and one piece of chert debitage was recovered from the loose soil. A possible bundle burial was encountered in the approximate center of the unit just below the disturbed soil and extending 20 to 40 cm below the scraped surface. The bundle burial was excavated and then the remainder of the unit was taken down to the level of the bundle burial. Ribs were encountered along the western line of the unit in the southwest corner. An incomplete cranium and additional fragments were in the northeast corner of the unit extending into the unit to the east. In addition to the bundle burial, numerous scattered elements and fragments were recovered from the unit. Additionally, remains from disturbed soil in adjacent or nearby units (108N94E, 108N88E, and 110N94E) were also found to be compatible with remains recovered from Feature 5. Some of the compatible remains in re-deposited soil were as far away as 4 to 5 m, indicating the heavy disturbance to this area.

The unit was taken down in 10-cm levels. Two fragments from a child and one adult fragment were recovered in the 0–10 cm level. The 10–20 cm level contained additional adult fragments including six femoral condyle fragments with obvious trowel or shovel damage. These refit onto a distal right femur recovered from the bundle burial. An iliac crest fragment from this level was compatible in preservation with an innominate from the bundle burial. The subadult remains were limited to two infant cranial vault fragments and two rib fragments from a child. The 20–30 cm level contained all subadult remains from an infant with the exception of a metatarsal or metacarpal shaft possibly associated with older subadult remains found in the bundle burial. The 30–40 cm level and those recorded as bundle burial were associated with an adult male and a subadult 6.5 to 8.5 years old. The only exception was an adult right pubis that was morphologically dissimilar to a more complete left innominate (see Adult 5-2). Also recovered from the bundle burial was a rib fragment from a newborn. The minimum number of individuals recovered from the bundle burial was four, two adults (Adult 5-1 and Adult 5-2) and two subadults (Subadult 5-1 and Subadult 5-2). Remains that were compatible with these four individuals, but recovered in loose soil in or near Unit 108N92E are described with the relevant individual. Those fragments that could not be associated directly with the bundle burial are listed in the inventory for Feature 5 as miscellaneous adult or miscellaneous subadult remains.

The bundle burial and scattered, redeposited remains in Units 108N88E, 108N92E, 108N94E, and 110N94E represent a minimum of two adults, both middle-aged based on pubic symphyseal morphology, and seven subadults. One of the adults was estimated to be male (Adult 5-1) and the other of indeterminate sex (Adult 5-2). Pathologies were limited to mild cribra orbitalia and slight degenerative changes on two hand phalanges from the miscellaneous adult material. Only one carious lesion was noted on the adult dental remains. Subadult age estimates were a newborn (Subadult 5-1); a 6.7 to 8.6 year old (Subadult 5-2); an infant less than 1 year old (Subadult 5-3); a 1.5 to 2.5 year old (Subadult 5-4); a 2.5 to 3.5 year old (Subadult 5-5); a slightly older child about 3.5-5.5 years (Subadult 5-6), and an older juvenile (Subadult 5-7).

Adult 5-1 – Bundle Burial

Adult 5-1 was represented by a left ulna, left radius, left innominate, incomplete left and right femora, incomplete left and right tibiae, and a right patella recovered from the bundle burial and in the loose top soil. The right tibia portion, radius, and ulna from the loose top soil were compatible with the undisturbed bundle burial remains. During analysis, it was determined that two incomplete elements and a femur fragment

recovered from Feature 6 (Unit 108N88E) were associated with the bundle burial. The right tibia portion from the bundle burial had been heavily animal gnawed, which was unusual for most of the remains from this site. A second heavily animal gnawed tibia was recovered in a nearby unit where Feature 6 was located. This tibia was morphologically and metrically similar to the one in Feature 5. A proximal right femur from this same nearby unit refit with a distal right femur in Feature 5. An adult rib fragment from the lower level of Feature 5 refit with a rib fragment from the disturbed upper level of the unit where Feature 6 was found. The refit remains likely were re-deposited during earth-moving activities at the site. The remains representing Adult 5-1 suggested an adult male, as indicated by the morphology of the innominate (narrow sciatic notch and subpubic angle) and the long bone metrics. Evaluation of the pubic symphysis yielded an age estimate of 36.8 ± 9.6 years (Suchey-Brooks Phase IV). Both femora displayed third trochanters.

Adult 5-2 – Bundle Burial

Adult 5-2 was represented by the pubis portion of a right innominate recovered from the bundle burial. It was morphologically different to the left innominate representing Adult 5-1, both in size and shape. The pubic symphyseal surface yielded an age estimate of approximately 36.8 ± 9.6 years (Suchey-Brooks Phase IV), identical to that estimated for Adult 5-1.

Adult 5-1 or 5-2

Miscellaneous adult remains were recovered from Unit 108N92E and from the disturbed upper levels of 108N88E. These did not duplicate any remains recovered in the bundle burial and may be associated with either Adult 5-1 or Adult 5-2. Remains from Unit 108N92E included an occipital portion, seven cranial vault fragments, fragments of a scapula, possible clavicle, ribs, vertebrae, sacrum or vertebra, and humerus fragments, and long bone shaft fragments. The remains from Unit 108N88E included a cranial ossicle, three ribs, the second cervical vertebra, an incomplete thoracic vertebra, four right metacarpals, six hand phalanges, a right fifth metatarsal, and three foot phalanges. The scattered remains found on the surface of Unit 108N92E included a tooth and long bone shaft fragment from an adult, with the tooth (an unworn third molar) suggesting a young adult. Remains recovered in the loose top soil included an incomplete tibia, and a complete radius and ulna that articulated. The tibia, a proximal half, was heavily animal gnawed. More fragmentary adult remains were also recovered and may be associated with the long bones. No pathological conditions were noted on any of the adult remains.

A partial cranium in the northeast corner of the unit containing Feature 5 extended into 108N94E. Map, notes, and bag designations referred to this area as “108N92E/108N94E.” One smoothed-over, cord-marked pot sherd was recovered near the cranial remains. Although the association of the cranium with Feature 5 is difficult to ascertain, it was included with the Feature’s inventory due to its close proximity to the bundle burial (Adult 5-1). These remains had different cortex coloration (darker with dark speckled stains) than most of the Feature 5 bundle burial remains. It should be noted that part of the cranium was in the wall of 110N94E and this portion did not appear to have been removed, based on field notes.

The cranium was labeled as possibly Adult 5-1 or 5-2 and consisted of the superior two-thirds of the left parietal; the right parietal missing the anterior-inferior and posterior-superior portions; a frontal fragment attached to the right parietal; and the left inferior portion of the occipital attached to the posterior-inferior portion of the left parietal bone. An asterionic bone was intact, and a loose asterionic bone was probably from this same cranium. Ectocranially, a portion of the lambdoidal suture was fused but still visible. The sagittal suture was fused but visible on the posterior two-thirds. Endocranially, both sutures were obliterated. Several Pacchionian depressions were present. No cranial metrics could be taken. The age estimate for the partial cranium, based on partial suture closure, was possibly middle-aged adult, which made it compatible in general age estimate to both Adult 5-1 and 5-2. A piece of pottery was found next to the cranium. A hand phalanx found near the cranium was similar to one in the bundle burial but no positive relationship could be established between the two phalanges; both had slight lipping along the shaft margins. Other adult-sized remains were four long bone shaft fragments of unknown relationship to the bundle burial.

An incomplete occipital that included the right portion of the squamous did not appear to be part of the partial cranium, based on morphology and cranial thickness, as well as partial duplication of the occipital. There was not enough of the incomplete occipital to evaluate the occipital protuberance. Like the partial cranium, it may be associated with either Adult 5-1 or 5-2

Comparison of cranial remains from the 108N92E/108N94E area with cranial remains found in disturbed contexts in Units 108N94E and 110N94E suggested these remains were related. In Unit 108N94E the field notes indicate “loose top soil – more skull in wall” of Unit 110N94E. The remains from Units 108N94E and 110N94E were all recovered from loose soil or were on the surface. The condition of adult cranial and postcranial remains in 110N94E was similar to that of the partial cranium and remains in 108N94E, but these remains were mostly fragmented. A left parietal/occipital fragment from 110N94E refit with the cranium from 108N92E/108N94E. A subadult cranial fragment in 108N94E refit with a fragment in 110N94E. The conclusion was that the remains from these three “designations” (i.e., 108N92E/108N94E, 108N94E, and 110N94E) were probably all from the same group of disturbed remains and may have been associated with Feature 5.

Additional adult remains from these units do not represent any more than one or two adults and could be associated with the adult bundle burial. The remains included a mandible portion from Unit 110N94E that consisted of the left body in the incisor and canine area and the right incisor through first premolar area. The inferior portion of the body and left tooth socket areas were damaged postmortem. The right central incisor and second premolar had been lost antemortem with the sockets resorbed. The right lateral incisor and probably the right canine had been lost antemortem with the sockets only partially resorbed. The right first premolar was in situ with all of the crown and most of the root destroyed by a large carious lesion. The pulp chamber was exposed. Age was estimated to be middle-aged to older adult. A loose, mandibular incisor that could not be sided was recovered from the same unit as the mandible and may be associated with it. The incisor displayed slight to moderate calculus and was worn almost to the cemento-enamel junction. The mandible could have been associated with the partial cranium or Adult 5-1, based on age estimation.

Numerous other adult cranial and postcranial fragments were collected from the loose soil in Units 108N94E and 110N94E. These did not duplicate any remains recovered in Feature 5. They are listed in Table 1 as miscellaneous adult remains. Pathological conditions were limited to mild cribra orbitalia in the right orbit of an adult frontal fragment and two proximal hand phalanges with slight lipping along the shaft margins. Three loose teeth recovered from loose soil in these two units were possibly from an adult. A maxillary left lateral incisor displayed slight to moderate calculus and moderate dental attrition. A mandibular right first or second molar displayed slight calculus and slight to moderate wear. The lingual half of the occlusal surface was not worn. A distal contact facet was present. A single-rooted tooth was missing the crown due to postmortem damage.

Subadults 5-1 and 5-2 – Bundle Burial

Remains representing two subadults were recovered with the bundle burial. Additional remains with similar age estimates were recovered from disturbed contexts within this same unit and assumed to represent the same individuals.

Subadult 5-1 was represented by five cranial fragments, an incomplete right rib, and two rib fragments from the bundle burial and a vertebral arch from the loose top soil. The arch was unfused. Based on the size of the remains, age was estimated to be newborn. Nine cranial vault fragments that were comparable in age estimate but found in fill in Feature 5 may be associated with Subadult 5-1. Two subadult elements, fragments recovered from the loose soil in Units 108N94E and 110N94E, a left scapula and a vertebral arch half, were estimated to represent a newborn and may be associated with Subadult 5-1.

Subadult 5-2 was represented by a nearly complete frontal bone, a facial bone fragment, six cranial fragments, a mandible fragment, six loose teeth, three rib fragments, and a left humerus diaphysis with the ends broken off. All these remains were recovered with the bundle burial. The dental remains consisted of the

erupted deciduous maxillary left canine and second molar and unerupted permanent maxillary left lateral incisor, canine, and both premolars. The deciduous canine was moderately worn, but the deciduous second molar displayed little wear other than slight blunting of the cusps. The left lateral incisor was shovel-shaped. All four of the unerupted teeth were incompletely formed. The left lateral incisor root and left first premolar root were about half formed. The left canine root was about one-fourth formed, and the left second premolar root was just beginning to form. Also, these four permanent teeth displayed six enamel defects positive for one episode of enamel growth disruption occurring at 3.5 to 4.0 years of age. Based on dental development, an age range of 6.7 to 8.6 years is posited for this subadult. Size of the cranial and postcranial remains was consistent with this age estimate.

Subadult 5-1 or 5-2

Other subadult remains of comparable size and age estimate to Subadult 5-2 were found in fill in the unit containing Feature 5. These included two possible cranial fragments, a vertebra fragment, a right ilium fragment, a metacarpal or metatarsal shaft, and an epiphyseal surface fragment. Seven other fragments from the surface of the unit were from subadults: a newborn to infant; an infant to young child; and an older child. The subadult remains from loose top soil were fragments from a newborn to infant and infant to young child. These may be from the same subadults as fragments collected on the surface.

Subadults 5-3 through 5-7

Numerous subadult elements, fragments, and loose teeth were recovered from the loose soil in Units 108N94E and 110N94E. These represent a minimum of five additional subadults. Their relationship to the bundle burial could not be determined, but they are possibly associated with Feature 5.

Subadult 5-3 was represented by a parietal fragment, vault fragment, most of the left half of a mandible, two left ribs, one right rib and a rib fragment, the right half of a thoracic vertebral arch, a vertebral centrum, a metacarpal or metatarsal, and an incomplete, possibly left radius diaphysis. The mandible portion contained the sockets for the deciduous lateral incisors through the permanent first molar. The deciduous lateral incisor and deciduous canine were missing postmortem. The deciduous first molar was partially erupted with the crown complete and root starting to form. The deciduous second molar and permanent first molar were unerupted. Based on development for the deciduous first molar, age was estimated to be 0.55 to 0.75 years.

Subadult 5-4 was represented by an incomplete left humerus diaphysis in two portions. The diaphysis was slightly smaller than the more confidently aged Subadult 5-5 and was estimated to be 1.5 to 2.5 years old.

Subadult 5-5 was represented by a complete left humerus diaphysis and a complete right femur diaphysis. Diaphyseal lengths yielded an age estimate of 2.5 to 3.5 years. A loose unerupted canine may be associated with either Subadult 5-4 or 5-5. The canine crown was between half and three-fourths developed, providing an age estimate of 1.9 to 2.9 years. Two enamel hypoplastic defects were present but not measurable.

A possible mandible body fragment, three rib fragments, and a diaphyseal fragment were too small to associate with a specific subadult, but were compatible with Subadults 5-3 through 5-5.

Subadult 5-6 was represented by an incomplete left humerus diaphysis composed of the posterior of the distal shaft and an incomplete proximal end. Based on size and comparison with the other left subadult humeri, age was estimated to be 3.5 to 5.5 years. Eighteen cranial fragments, a left clavicle, 27 rib fragments, 6 thoracic vertebrae, a lumbar vertebra, four vertebral centra, five vertebral fragments, a right ischium, an ischium or ilium fragment, a sacrum, and nine diaphyseal fragments may be associated with either Subadult 5-5 or Subadult 5-6. These fragments and elements were estimated to be from a child between 2.5 and 5.5 years old.

Subadult 5-7 was represented by a mandible fragment, five loose teeth, a right scapula portion, a rib fragment, a right capitate, and a right foot navicular. The mandible portion was from the right posterior alveolus containing a socket for the second molar and the distal portion of the first molar socket. The second molar

was recovered loose but fit into the mandible socket. The tooth root was completely formed, indicating an age of at least 14.6 to 14.8 years. There was no distal contact facet, and dental attrition was slight (Hinton degree 2, form 1). A small carious lesion was present on the distal surface. The five loose teeth were all maxillary. A left canine displayed slight calculus and slight wear, but the crown surface was eroded postmortem. A left first premolar had slight to moderate calculus and no discernible wear. A left second premolar was unworn, with no calculus. Left and right maxillary third molars were almost completely developed, except for the root tips. Age estimated from dental development of the third molars was 16.3 to 17.2 years. The left molar displayed no dental wear. The right third molar was missing most of the circumferential enamel and part of the occlusal enamel due to postmortem damage. A small enamel pearl was present on this tooth. The remains representing Subadult 5-7 were estimated to represent an older juvenile.

FEATURE 6

Feature 6 was located in Unit 108N88E. During the June and July field visits, it was noted that a concentration of bone was present in this area. The unit was mostly covered with loose/disturbed soil and a push pile that contained a concentration of subadult bone. Once the loose soil was removed and screened during the September excavation, a much larger and more widespread mixed concentration of subadult bone was encountered. To expose this second concentration and determine its depth, the south three-fourths of the unit was excavated to ca. 25cm below the scraped surface. In the north one-fourth of the unit, only the loose soil was removed and screened. As noted in the description for Feature 5, the adult remains encountered in the loose soil in Unit 108N88E either refit or were compatible with the adult remains in the Feature 5 bundle burial. All the other remains encountered in the loose soil and excavated portion of Feature 6 were subadult remains.

Material from the unit between Features 5 and 6 (108N90E) contained quite a few subadult remains that were more consistent with the material from the upper portion of Feature 6. Unit 110N88E also contained a few subadult remains that may be related to Feature 6. No other material around Unit 108N88E appeared to be directly related to this feature.

The subadult remains represented a minimum of seven individuals, based on element size, duplication of elements, and/or age estimates derived from dental remains. It is possible that some or all of these elements are actually related to Feature 5, but were considered a separate feature for analysis purposes.

Subadult 6-1

Subadult 6-1 was represented by the right and superior-central portion of the frontal; the left half of the occipital; the right temporal; six cranial vault fragments; a sphenoid fragment; the right half of a mandible; a right cervical vertebral arch; and three rib fragments. Although these remains appeared to be smaller than those of Subadult 5-1 (newborn), the dental remains provided an age estimate of 0.3 to 0.5 years, and the non-dental remains were more like those of a younger infant. The mandible portion contained the unerupted deciduous central incisor through permanent first molar, except the deciduous first molar which was missing postmortem. The deciduous second molar roots were about one-fourth developed and the permanent first molar crown was almost completely developed.

Subadult 6-2

Subadult 6-2 was represented by an incomplete frontal, incomplete left and right parietals, the occipital basilar and lateral parts, the left zygoma, incomplete left maxilla, two loose maxillary teeth, cranial fragments, rib fragments, four cervical vertebrae, six vertebral centra, left radius and ulna diaphyses, and un-sided femur and tibia diaphyses. On the frontal bone, the metopic suture was still open for 1.5 cm superior to nasion. Age was estimated based on dental development and comparison of the long bone diaphyses with a confidently aged skeleton from a 2.5 to 3.5 year old. Age estimation was an infant less than one year old. The remains were slightly larger than Subadult 6-1. An incomplete radius diaphysis provided an approximate length measurement, yielding an age estimate of newborn to 0.5 years, but this age may be

somewhat underestimated. The estimated length of the left ulna diaphysis was 75 mm, suggesting an age estimate of newborn to one year. All the other diaphyses were too incomplete to measure, but were much smaller than the remains of the 2.5 to 3.5 year old. In the left maxilla, the deciduous incisors were missing postmortem. The deciduous canine was unerupted, and the deciduous first molar was partially erupted. The permanent first molar was loose and unerupted. The deciduous first molar was partially erupted. Two loose right maxillary teeth, the deciduous canine and first molar, were also present. The right deciduous canine root was between initial and one-fourth developed. The right deciduous first molar root was at least one-fourth developed, possibly slightly more. The left deciduous canine also showed initial root development. Age was estimated to be 0.7 to 0.9 years based on dental development. Subadult 6-2 is posited to have been an infant approximately 6 to 12 months old.

Subadults 6-3 and 6-4

Subadult 6-3 and Subadult 6-4 each yielded age estimates of 2.5 to 3.5 years, with one having remains just slightly larger than the other. They are distinguished by size and duplication of elements. Subadult 6-3 was represented by left and right parietals, left and right temporals, an incomplete occipital, and left and right zygomas. Subadult 6-4 was represented by a complete frontal, left and right parietals, left and right zygomas, a nearly complete occipital, and the left temporal. The remains of both individuals were of comparable size to the cranial remains of a confidently aged 2.5 to 3.5 year old. Age for both subadults was estimated to be in this range. A maxillary fragment, right scapula fragment, and fused arches from a thoracic vertebra may be associated with either Subadult 6-3 or 6-4.

Subadult 6-5

Subadult 6-5 was represented by a temporal fragment, an incomplete occipital, right maxilla, mandible, 11 loose teeth, a hyoid fragment, three rib fragments, a sternal body, two incomplete scapulae, a nearly complete left clavicle, the right ischium and pubis, a right humerus diaphysis, left and right radius and ulna diaphyses, six incomplete metacarpals or metatarsals, and six phalanges. The occipital consisted of the right lateral and basilar parts, unfused to each other. The basilar part was larger than those from Subadults 6-3 and 6-4. Estimated length of the nearly complete left clavicle was 87 mm. The left ilium had a breadth of 85 mm. The estimated length of the right humerus was approximately 170 mm. Length of the right radius diaphysis was 134 mm. Age estimation derived from the diaphyseal lengths was 4.5 to 6.5 years.

The loose left maxillary teeth consisted of the left deciduous central incisor and permanent central incisor through first molar. The deciduous central incisor and permanent first molar were erupted. All the other teeth were unerupted. Loose right maxillary teeth included the deciduous central incisor and second molar and the permanent central incisor and first and second molars. The two deciduous teeth and permanent first molar were erupted. The permanent right central incisor and second molar were unerupted. In the right maxillary portion, only the permanent canine was in situ, and it was unerupted. The mandible was nearly complete and contained all the dental remains. The deciduous canines and first and second molars and the permanent central incisors and first molars were erupted. The other teeth were unerupted. Five deciduous teeth displayed carious lesions. The maxillary right central incisor had two lesions, one moderate lesion on the occlusal surface and a larger lesion affecting the buccal and distal surfaces. The mandibular left first molar contained a large lesion affecting all surfaces except the root, exposing the pulp chamber. The mandibular left second molar crown was completely destroyed by a carious lesion, exposing the pulp chamber. The mandibular right canine contained a large lesion affecting all the crown surfaces. The mandibular right second molar contained a slightly larger lesion that had exposed the pulp chamber. A single-rooted tooth, probably deciduous, had the crown completely destroyed by a carious lesion. Six permanent maxillary teeth contained nine enamel hypoplastic defects that were positive for two episodes of enamel growth disruption occurring at 2.5 to 3.0 and 4.5 to 5.0 years of age (Table 9). The maxillary left and right central incisors were shovel-shaped. Age estimation derived from the dental remains was 5.0 to 7.0 years. A general age estimate of 4.5 to 7.0 years is posited for Subadult 6-5.

Subadult 6-6

Subadult 6-6 remains constituted the most complete from this feature. They included a parietal fragment, basilar part of an occipital, a right maxilla, two loose maxillary teeth, a mandible, 13 cranial fragments, manubrium and two sternal bodies, left and right scapulae, left and right clavicles, 17 ribs and numerous rib fragments, six cervical vertebrae, 12 thoracic vertebrae, three lumbar vertebrae, seven vertebral centra and seven arch fragments, incomplete left ilium and ischium, right pubis, most of the first and all of the second sacral bodies, left and right humerus diaphyses, left and right femur diaphyses, four carpal or tarsal bones, three metacarpals or metatarsals, and one phalanx. The six cervical vertebrae, the second through seventh, displayed fusion of the arches to the centra. Only three of the 12 thoracic vertebrae were complete enough to evaluate their level of development. The arches were not fused to the centra, but the arch halves were fused to each other. The three lumbar vertebrae had fused arches with partial fusion to the centra. The left maxillary teeth present were the loose deciduous lateral incisor and permanent canine. The canine was unerupted. In the right maxilla, all the teeth were present except the deciduous canine which was missing postmortem and the deciduous first molar which had been lost antemortem with the socket resorbed. The deciduous incisors and second molar were erupted. The permanent first molar was partially erupted. In the mandible, the left and right deciduous central incisors were missing postmortem. All the other teeth were present, from the deciduous lateral incisors through the permanent second molars. The permanent incisors, canine, premolars, and second molars were unerupted. Six deciduous teeth contained eight carious lesions. The maxillary left lateral incisor contained a small to moderate lesion on the occlusal and buccal surface. The maxillary right central incisor had a large lesion on the lingual surface. The maxillary right lateral incisor had a large lesion affecting all surfaces of the crown. The maxillary right second molar and mandibular left second molar each had a small lesion on the occlusal surface. The mandibular right second molar contained three small lesions on the occlusal surface. One enamel hypoplastic defect was present on the maxillary permanent right first molar (Table 9). The maxillary permanent right second molar had a well-developed Carabelli's cusp. Age derived from dental development was 4.5 to 5.2 years. Diaphyseal lengths of the humeri were 168 mm (left) and 170 mm (right), yielding an age estimate of 4.5 to 5.5 years. Age for Subadult 6-6 was estimated to be 4.5 to 5.5 years.

Subadult 6-7

Subadult 6-7 is represented by a metacarpal proximal epiphysis and one loose tooth. The size of the epiphysis was comparable to a subadult of approximately 7 to 9 years of age. The loose tooth was an unsided mandibular premolar that duplicated the unerupted premolars in the mandible of Subadults 6-5 and 6-6. This unerupted tooth's root was just beginning to develop, providing an age estimate of 5.7 to 7.0 years. Age was estimated to be approximately 6 to 7 years.

Subadult 6-3 to 6-7

Numerous fragments and several vertebrae could not be associated with a specific individual and may go with Subadults 6-3 through 6-6 remains. These fragments include cranial remains, 12 vertebrae and additional centra and fragments, rib fragments, and three possible diaphyseal fragments. Included in these remains was a frontal bone fragment displaying mild cribra orbitalia. Also a second cervical vertebra was fused to the right arch of the third cervical vertebra. The left arch of the third cervical vertebra was not present. These vertebrae were two of several that appeared to be from the same individual and included the first through third cervical vertebrae and the fifth cervical vertebra through the first thoracic vertebra. Where observable, the arches were fused to each other. In the second cervical vertebra, the arches were fused to the body but the dens epistrophei was unfused.

Two loose teeth could not be assigned to a specific individual. A probable molar root had the crown completely destroyed by a carious lesion. This tooth may be associated with Subadult 6-5 or 6-6. A permanent maxillary right molar was unerupted with the crown completely developed and the root just starting to

develop. Since the molar position could not be identified, age estimation was between 2.2 and 12.9 years. The tooth could have been associated with one of the subadults 6-3 through 6-7.

FEATURE 7

Feature 7 was located in Unit 110N90E. This unit was located just north and east of Feature 6 and just north and west of Feature 5. A large jumbled mass of bone was present in the disturbed soil pile on the surface which included cranial fragments, ribs, and vertebrae. These remains were removed, and the loose soil screened. Two pieces of chert debitage and small pieces of clam shell were recovered during the screening process. Additional loose fragments including cranial remains and postcranial elements were also recovered. Long bones were extending downward into what appeared to be undisturbed soil. Much of the undisturbed material, primarily in the west half of the unit, was not excavated. Embedded long bones, a possible cranial base, a femur, clavicle, a portion of an intact vertebral column, ribs, a tibia, and a scapula were uncovered but left in place. If this was a primary burial, position of the body would have been head to the southwest and feet to the northeast. The disturbed upper soil may have been from this burial, but had spread out over the unit.

The osteological analysis of the remains from Feature 7 and adjacent units identified four adults and a minimum of six subadults. The minimum number of adults was determined based on duplicate cranial remains.

The overburden in the unit containing Feature 7 was removed, and a number of bone fragments were recovered on the surface. A number of recovered remains were determined to be possibly associated with individuals in nearby Feature 5 and Feature 6. However, some of the remains from this unit were compatible with both Subadults 7-1 and 7-2, Subadult 7-3 or 7-4, and possibly Subadult 7-5. Because of the highly disturbed nature of the area including and around Feature 7, it is possible that some of the remains assumed to be associated with Feature 7 may have been associated with Feature 5 adults. The inclusion of the adult remains with Feature 7 was based on “best fit” and assumptions about the way the area was disturbed.

Additionally, remains from units adjacent to or near 110N90E (108N90E, 110N88E, 110N92E, 112N88E, 112N90E) were examined to determine if the recovered remains might have been associated with the individuals represented in Feature 7. First and second cervical vertebrae and cranial remains from 108N90E appeared to be from a different cranium than the other three in Feature 7. Additionally, they either duplicated adult remains in Feature 5 or estimation of sex and/or preservation was incompatible. This suggests there was a possible fourth adult burial associated with Feature 7. It was labeled Adult 7-4. Three chert flakes, including one piece of Knife River flint, and one piece of chert debitage were recovered in 110N92E in loose, disturbed soil.

Adult 7-1

Adult 7-1 was represented by a cranium and mandible. The cranium consisted of the left and right maxillae, zygomas, and nasal bones, two possibly right maxilla fragments, an incomplete occipital, a nearly complete frontal, incomplete left parietal and complete right parietal, left and right temporals, and left greater wing of the sphenoid. The mandible was reconstructed and nearly complete. Both maxillae were missing the superior nasal aperture margins. The right maxilla was missing the superior portion and the alveolar ridge was damaged along the premolar and molar sockets. The maxillary left teeth were all present except the first and second molars. These two molars had abscessed out with the sockets resorbing to resorbed. In the right maxilla, the first premolar through first molar were not recovered; their status could not be assessed due to postmortem damage to the alveolar bone. The right incisors, canine, and second molar were present. The right third molar may have abscessed out, with the socket incompletely resorbed, or the tooth may have been lost postmortem. The maxillary left canine, first premolar, and third molar, and the right second molar all displayed moderate to large carious lesions. The pulp chamber of the right second molar was exposed by the lesion. In the mandible, all the teeth were present except the left first and third molars and right sec-

ond molar. The left first molar socket was partially resorbed, so the tooth may have been lost antemortem. The left third molar status could not be determined confidently, but the tooth may have been congenitally absent. The right second molar was lost antemortem with the socket completely resorbed. All the maxillary and mandibular teeth present were extremely worn, with significant loss of crown height affecting 17 of the 23 teeth. Calculus was absent to slight on the maxillary teeth but heavy on the mandibular teeth. Two maxillary and four mandibular teeth displayed slight to moderate hypercementosis. Sex was estimated to be male based on the morphology of the cranium and mandible. The cranial remains displayed large mastoid processes, a pronounced occipital protuberance, and blunt superior orbital margins. The supraorbital tori could not be evaluated due to postmortem damage. The mandible was robust, although the chin was not strongly square. The cranial sutures were fused endocranially and partially fused ectocranially, suggesting a middle-aged individual. However, dental attrition was marked, suggesting an older adult. The maxillae displayed pitting in the sinuses and palatine bones. A large (1 x 1.5 cm) foramen was present in the left maxilla superior to the molar area, leading out from the sinus. This large opening had smooth edges. Irregular, rugose bone deposition was present on the buccal alveolar bone in association with the maxillary left first premolar, which contained a carious lesion extending into the pulp chamber. It is possible that infection from the first premolar spread into the maxillary sinuses.

Adult 7-2

Adult 7-2 was represented by an incomplete cranium consisting of a nearly complete frontal; left parietal and a small portion of the right parietal along the sagittal suture; a nearly complete left temporal; left and right nasal bones; and two left ear ossicles. The supraorbital tori were slight, but the supraorbital margins were blunt and the left mastoid process large. Sex was estimated to be possibly male. A supraorbital foramen was present. The frontal contained numerous Pacchionian depressions, suggesting this may have been an older adult. Not enough of the cranial sutures were present to evaluate suture closure.

Adult 7-3

Adult 7-3 was represented by an incomplete cranium consisting of the posterior three-fourths of the left parietal; the superior sixth of the right parietal; an incomplete left temporal missing part of the body and most of the arch; the superior half of the occipital missing part of the right side; and six vault fragments probably from this cranium. The sagittal suture was nearly obliterated ectocranially. The lambdoidal suture was fused and partially obliterated ectocranially. Both sutures were obliterated endocranially. Based on cranial suture closure, the individual represented by these remains was a middle-aged to older adult. The mastoid process was large and the occipital protuberance somewhat pronounced. Sex was possibly male. Three large lambdoidal ossicles were present.

Adult 7-4

Adult remains from 108N90E represent a fourth adult possibly from Feature 7, labeled Adult 7-4. The remains included frontal, temporal, occipital, alveolar, sphenoid, facial, and unidentifiable cranial fragments. Also included were incomplete left and right maxillae. Some of these remains duplicated the cranial remains representing Adults 7-1 through 7-3 in Feature 7. The left maxilla was a fragment containing the left second and third molars. The right maxilla was missing the superior portion, and the alveolar bone was damaged between the central incisor and first premolar. The second premolar through third molar were in situ. The teeth were slightly to moderately worn and displayed moderate to heavy calculus. The third molars were unworn. No carious lesions were present. The left second and third molars contained enamel extensions. Incomplete first and second cervical vertebrae may be associated with this individual and duplicate miscellaneous adult remains associated with Feature 7. Based on dental wear, age was estimated to be a young adult.

Miscellaneous Adult Remains

Additional adult remains in nearby units may also be associated with the Feature 7 adults and are included in the miscellaneous adult remains from Feature 7. Miscellaneous adult remains from Feature 7 included over 150 cranial fragments, a mandible, four loose teeth, a hyoid, manubrium, left and right clavicles, two right scapulae and scapula fragments, 16 ribs and rib fragments, 10 cervical vertebrae, 14 thoracic vertebrae, vertebral fragments, two innominate fragments, a nearly complete sacrum, two right humeri, an unsided radius, left and right ulnae, a right metacarpal, three right femora, two right tibiae, a left cuneiform, talus fragment, and right metatarsal. The cranial fragments likely belong to one of the three crania representing Adults 7-1 through 7-3.

The mandible was missing the left superior portion of the ascending ramus and the sockets for the incisors. Only the right first premolar was in situ, but consisted of the roots only as the crown had been destroyed by a carious lesion. Status of the incisors was indeterminate due to postmortem damage. The left and right canines, left first premolar, left and right second premolars and first molars were lost antemortem. The left first molar socket appeared to be partially resorbed, and it is possible the tooth was still present antemortem. The left and right second molars and right third molar were lost antemortem with the sockets resorbed. The left third molar may have been lost antemortem as the socket was partially resorbed. Three loose teeth may have been associated with the mandible. One was an unsided mandibular incisor worn almost to the cemento-enamel junction. Two were single-rooted teeth with the crowns completely destroyed by carious lesions that had penetrated into the root. The mandible's mental eminence was pointed and had a gonial angle of 131 degrees, falling in the range for females. However, antemortem tooth loss may have affected the gonial angle. This mandible may have been associated with Adult 7-2 or Adult 7-3.

A fourth loose tooth could not be associated with the mandibular remains. This was a maxillary right second molar that had a pinpoint carious lesion affecting the distal and buccal surfaces at the cemento-enamel junction; a second pinpoint lesion at the cemento-enamel junction on the mesial surface; and a third pinpoint lesion on the occlusal surface.

Some of the postcranial remains were probably from male individuals. These were a superior right scapula portion with the glenoid fossa length in the male range. A right clavicle length measurement was also in the male range. Two robust elements, the proximal third of a right ulna and a right femur (labeled Fem R3), were possibly male.

Several elements appeared to represent females. These may be associated with Adult 7-2 and Adult 7-3 which were "possibly" male. They may also represent one or two additional individuals, both female, although they do not duplicate the other postcranial remains. The possible female remains, in addition to the mandible described above, included a left clavicle, a gracile and incomplete left first rib, the more complete right humerus, two right femora labeled Fem R1 and Fem R2, and the two right tibiae. These remains were either gracile in appearance or had metrics falling into the female range. The only nonmetric traits noted were on two of the right femora (Fem R1 and Fem R2). Both had slight third trochanters.

The cervical vertebrae represent a minimum of three individuals. One group of vertebrae, the second through fifth, displayed degenerative changes and articulated well with each other. A first cervical vertebra did not articulate with these remains and appeared to represent a second individual. The third group of vertebrae was a first and second cervical vertebrae. Fourteen thoracic vertebrae came from a minimum of two individuals, one with degenerative changes.

Pathological changes on the postcranial remains included slight lipping around the proximal articular surface of a right ulna. One of the right tibiae associated with the possible female remains displayed mild periostitis on the medial half of the anterior surface. The largest affected area was 2 by 3 cm in size. The second through fifth cervical vertebrae displayed degenerative erosion on the articular facets. One miscellaneous unidentified cervical body displayed mild degenerative changes. One thoracic vertebra contained mild degenerative changes in the form of lipping around the body margin. One unidentified vertebral body fragment displayed moderate lipping.

Additional miscellaneous adult remains that were possibly associated with Feature 7 were recovered from Units 108N90E, 110N88E, and 110N92E. These include ribs, a vertebra fragment, a left first metacarpal, six hand phalanges, a right patella and patella fragment, a left cuboid, three long bone shaft fragments, an incomplete left fifth metatarsal, and an incomplete, unidentifiable phalanx. A single-rooted tooth, possibly a premolar, contained a moderate-sized carious lesion had destroyed approximately one-third of the crown. It was not possible to tell if the lesion was located on the mesial versus distal surface. Dental attrition was heavy with significant loss of crown height. This tooth was probably associated with a middle-aged or older adult.

Subadults

Subadult remains were fragments or small or incomplete elements from a minimum of six individuals: two newborn to 0.5 years., one ca. 1.5 to 2.5 years, one 4 to 6 years, one 6.5 to 8.5 yrs., and one older juvenile near to adult size. Since these remains came from loose soil in a disturbed area, it is possible they are associated with remains in nearby Features 4, 5, or 6.

Subadults 7-1 and 7-2

Subadults 7-1 and 7-2 were represented by incomplete right ulna diaphyses missing the distal ends. Estimated diaphyseal length for both elements fell in the range of fetal to newborn. An incomplete mandible and a loose tooth may be associated with Subadult 7-1 or 7-2. The mandible consisted of most of the left half, but no teeth were in situ and the alveolar bone was damaged. A loose tooth, possibly a deciduous molar, consisted of a fragment of an unerupted tooth that was just beginning to form. Other subadult remains that appeared compatible with these two subadults were a left scapula, right ilium, incomplete right humerus diaphysis, incomplete right femur diaphysis, incomplete left tibia diaphysis, and an unidentified diaphysis. The breadth of the right ilium was 34 mm, in the age range for fetal to 0.5 years.

Three cranial fragments from Unit 110N88E may be related to one of these two infants. Numerous cranial fragments and two long bone diaphyses recovered from Units 108N90E, 110N99E, 110N90E, and 110N92E also may have been associated with Subadult 7-1 or 7-2. These included an incomplete frontal, incomplete occipital, incomplete left and right temporals, an incomplete sphenoid, and 43 cranial fragments. An unsided femur diaphysis was incomplete. The proximal two-thirds of a left tibia diaphysis was very generally estimated to have been 75 to 85 mm long. The estimated length of the tibia diaphysis yielded a general age estimate of newborn to 0.5 years.

Subadult 7-3

Subadult 7-3 was represented by a sphenoid fragment, an incomplete left clavicle, three rib fragments, a cervical vertebral arch fragment, an incomplete fibula diaphysis, and a metacarpal or metatarsal. They were smaller than remains from a confidently aged skeleton of a child 2.5 to 3.5 years old. Age estimation for Subadult 7-3 was 1.5 to 2.5 years.

Unit 110N88E (west of Feature 7) included two ribs and an epiphyseal fragment that may be related to Subadult 7-3. An incomplete left temporal recovered from Unit 110N92E may also be related. The ribs were smaller than a confidently aged skeleton of a 2.5 to 3.5 year old. Alternately, it is possible the remains are related to Subadult 6-1 in Feature 6.

Subadult 7-4

Subadult 7-4 was represented by frontal and parietal fragments, the left occipital lateral part, the left zygoma, nine cranial vault fragments, a mandible fragment, a clavicle fragment, nine rib fragments, two vertebral fragments, incomplete left ilium and ischium, a femur fragment, six metacarpals or metatarsals, and one phalanx. Based on size of the remains, the individual represented was estimated to be between 4 and 6 years of age. Eight cranial vault fragments, an incomplete right scapula, and a rib fragment from Unit 100N90E may be associated with Subadult 7-4.

Subadult 7-3 or 7-4

The unit northeast of Feature 7 (112N90E) included subadult cranial fragments, two ribs and five rib fragments, an incomplete thoracic vertebra, ilium and long bone fragments, and two metacarpal or metatarsal shafts. Based on general size, they were possibly associated with Subadult 7-3 or 7-4. Other possible Subadult 7-3 or 7-4 remains included seven cranial vault fragments, two ribs and five rib fragments, a possible ilium fragment, four diaphyseal and five epiphyseal surface fragments, and two incomplete metacarpals or metatarsals from Unit 108N90E. Two unfused first cervical vertebral arches were recovered from loose soil in Unit 110N90E. Most of these remains were very fragmented and age was very broadly estimated to fall in the range for a young child.

Subadult 7-5

Subadult 7-5 was represented by a left first rib and an incomplete right radius diaphysis. Based on size, this individual was estimated to be 6.5 to 8.5 years old.

Remains possibly associated with Subadult 7-5 included the anterior-inferior portion of a right parietal (108N90E) and a loose tooth (110N92E). The tooth, a maxillary left lateral incisor, displayed slight to moderate calculus deposits, no dental attrition, and was shovel-shaped. The root was completely formed but the apex had not yet formed, yielding an age estimate of 7.6 to 8.6 years.

Subadult 7-6

Three elements, an incomplete right clavicle, left second metacarpal, and a left proximal tibia epiphysis, represent Subadult 7-6. All were nearly adult sized. The distal end of the metacarpal was not fused to the epiphysis. The tibia epiphysis was unfused and had an estimated proximal breadth of 78 mm, which is within an adult range. A general age estimate of juvenile to older juvenile is posited for Subadult 7-6.

A larger right parietal fragment from Unit 100N92E consisted of the anterior-superior portion including coronal and sagittal sutures that were open. The element was probably near adult size and possibly associated with the juvenile remains of Subadult 7-6.

Subadult 7-5 of 7-6

A maxillary right lateral incisor recovered from Unit 110N88E was possibly related to either Subadult 7-5 or 7-6. It displayed no wear, calculus, or defects. The tooth was shovel-shaped.

Miscellaneous Subadult Remains

A very few fragments could not be assigned to a specific subadult or one or two subadults. These includes a cranial vault fragment recovered from Unit 110N88, two epiphysis fragments from Unit 100N90E, and miscellaneous small bone fragments from Units 100N90E and 100N92E.

Feature 7 Summary

Feature 7 contained three disturbed adult burials with intact (but not removed during excavation) remains related to one or more of these adults. A possible fourth adult is represented by cranial remains collected from adjacent Unit 108N90E. Adult 7-1 was an older adult male. Both Adult 7-2 and 7-3 were possibly male. Adult 7-2 was possibly an older adult, and Adult 7-3 was middle-aged to older. Adult 7-4 was a young adult of indeterminate sex. Miscellaneous adult remains included elements that were male in morphology and metrics and could be associated with Adult 7-1, 7-2, or 7.3. At least two females were represented by adult femora. It is possible they were associated with one of the “possible” males or the adult of indeterminate sex. They may have also represented one to two additional adults from Feature 7.

The six subadults included: two newborn to 0.5 years (Subadult 7-1 and 7-2), one ca. 1.5 to 2.5 years (Subadult 7-3), one 4 to 6 years (Subadult 7-4), one 6.5 to 8.5 years (Subadult 7-5), and one older juvenile near adult size (Subadult 7-6).

POSSIBLY FEATURE 6 OR FEATURE 7

Some of the remains recovered from the disturbed soil within Unit 110N88E could not be confidently associated with a specific feature, but could possibly be related to either Feature 6 (immediately south) or Feature 7 (immediately east). A subadult cranial vault fragment was too small to determine which specific element it came from or the approximate age of the individual, but may be related to subadult remains from Feature 6 or 7. The limited adult remains could be associated with one or more of the three adults identified in Feature 7. These adult remains included a right maxillary fragment, a temporal body fragment, two sphenoid fragments, three cranial vault fragments, two facial bone fragments, an incomplete rib, the distal end of a right tibia, a left cuboid, and left third metatarsal.

FEATURE 8

During the June surface examination of the site, subadult remains were recovered in what would later be designated as Unit 114N92E. These remains, Subadult D, are described in the “Surface Collection” section of this report.

During the July field investigations, subadult remains were noted in the south half of what would later be designated as Unit 116N92E and extending into Unit 114N92E. This area was designated as Feature 8. In September, the loose, disturbed soil in the area of the exposed bone was removed from Units 114N92E and 116N92E. Several artifacts were recovered from the loose soil. These included four plain body sherds, one smoothed-over cord-marked body sherd, eight pieces of chert debitage, two chert flakes, a biface fragment, a marine shell bead, and two pieces of hematite.

An infant cranium was located in the southeast corner of the unit, with other remains extending into the northeast corner of Unit 114N92E. The subadult head was to the east with the legs to the west. The cranium had been crushed by the weight of the overburden and disturbance to the burial. A long bone was present at the same level as the top of the cranium, and was oriented north-south. Phalanges, vertebrae, ribs, and cranial fragments were scattered. The cranium and disturbed remains, including the long bones, all appeared to be part of the same burial. This was a possible bundle burial or an extended burial with the upper portion disturbed by the initial earthmoving. Additional subadult lower leg bones and other long bones were exposed in Unit 116N92E. The subadult remains from the possible bundle burial represented two subadults of the same approximate age. The remains of Subadult 8-1 were slightly larger than those of Subadult 8-2, but both infants were determined to be fetal to newborn. Earthmoving had caused disturbance within the burial area of Feature 8, but additional disturbance may have resulted prehistorically from one individual being interred almost directly on top of the other, so that the remains were somewhat commingled. It is also possible that these two infants were buried together.

The remains of a third and older subadult (Subadult 8-3) were uncovered below the two younger subadults, but these remains were left in place and not excavated. Adult-sized arm bones extended west into the unexcavated portion of Unit 114N92E at a level 20 cm above the remains of Subadult 8-3. The arm bones, apparently adult, were exposed, mapped, and left in place (Adult 8-1).

Remains recovered from the disturbed overburden throughout Units 114N92E, 114N94E, and 116N92E were examined to determine if any of them may have been related to Subadult 8-1 or Subadult 8-2. Several fragments compatible with these two subadults were recovered from disturbed contexts in Unit 114N92E. These are listed in the inventory as Subadult 8-1 or Subadult 8-2 remains. Other fragments and elements recovered from the disturbed soil in this unit are described later in this report under “No Feature.” The other two units did not include any additional remains that may have been related to Subadult 8-1 or 8-2.

Subadult 8-1

Subadult 8-1 was represented by incomplete cranial remains including a frontal left orbit fragment; the basilar and lateral parts of the occipital; left and right temporals missing the squamous portion; left and right zygomas; and a sphenoid fragment. Also representing this subadult were the mandible halves; a nearly

complete right scapula; left and right clavicles; an unsided metacarpal or metatarsal; left and right ischia and ilia; 13 metacarpals or metatarsals; six phalanges; portions of 11 epiphyses; and left and right diaphyses of humeri, radii, ulnae, femora, tibiae, and fibulae.

The mandible halves were unfused and incomplete. The left contained the alveolus for the deciduous central incisor through deciduous second molar; the right half contained the alveolus for the deciduous central incisor through deciduous first molar. The only teeth in situ were the unerupted deciduous left central incisor and right lateral incisor. The crown of the central incisor was about three-fourths formed, while the lateral incisor crown was about half formed. One loose tooth, a possible maxillary deciduous molar, was present. Diaphyseal length measurements were below or at the low end of the range for newborns. Age was estimated to be fetal to newborn.

Subadult 8-2

Subadult 8-2 was represented by the left orbit of the frontal; the left lateral part of the occipital base; an incomplete left temporal; left and right zygomas; a sphenoid fragment; a nearly complete mandible; incomplete right scapula; left and right clavicles; incomplete left ilium; incomplete and unsided ischium; left humerus diaphysis; left and right radius, ulna, and femur diaphyses; left tibia diaphysis; and unsided, incomplete fibula diaphysis. Four ribs, one left and three right, were possibly associated with this subadult. The remains representing Subadult 8-2 were slightly smaller than those associated with Subadult 8-1. Estimated diaphyseal lengths placed the age estimate in the fetal to newborn range. No teeth were present in the mandible, but condition of the alveolus and size of the mandible indicated that all the teeth would have been unerupted.

Subadult 8-1 or 8-2

Numerous fragments from the burial area of the two fetuses to newborns, or recovered from disturbed soil in the vicinity of this burial, could not be associated specifically with either Subadult 8-1 or Subadult 8-2. All were compatible with an age estimate of fetal to newborn. The remains included two frontal fragments; nearly complete left and right parietals; most of the occipital squamous; incomplete left and right maxillae; numerous cranial vault fragments; seven loose teeth; eight left and 18 right ribs, and numerous rib fragments; 14 cervical vertebral arches (seven left and seven right); 40 thoracic or lumbar vertebral arches (21 left and 19 right); numerous unidentified vertebral arches and centra; the first two bodies of the sacrum; two metacarpals or metatarsals; and two to four diaphyseal portions. The loose teeth were all deciduous and consisted of: two maxillary left first molars; an unsided maxillary or mandibular incisor and canine; mandibular left and right first molars; and a possible first molar crown. Development of the tooth crowns suggested an age range of newborn to 0.9 years, with the majority of the age estimates falling in the newborn to 0.15 year range. The left and right maxillae were fragmented. The deciduous canine was present in a right maxilla fragment. Development of this tooth crown was in the newborn to 0.15 year range.

Subadult 8-3

Subadult 8-3 consisted of remains that were exposed, photographed, and left in situ. The remains included both innominates, part of the sacrum, both femora, and both tibiae. None of the long bone epiphyses were fused, and the innominate portions appeared to be unfused as well. The remains were articulated, interred supine, and the tibiae were crossed right over left at the distal ends. Estimated lengths of the right femur and tibia diaphyses provided a general age range of 3.5 to 5.5 years. This burial was not removed during excavation.

Adult 8-1

Arm bones, identified in the field tentatively as a possible radius, possible ulna, and possible humerus, were exposed, mapped, and left in place. The remains appeared to be in correct anatomical position. No age or sex estimate was determined.

FEATURE 9

Feature 9 was located along the center of the eastern portion of Unit 116N92E. Initially, only teeth had been exposed in this unit. Subsequent archaeological investigations identified an adult skull, some associated vertebrae, and other bones of the upper body, labeled Adult 9-1. The remains were 139 cm east and 91 cm south of the northwest corner of 116N92E and 39 cm below the disturbed surface. The head was to the west. The lower body, which would have been to the east, was destroyed by earthmoving. The skull was photographed, mapped, and left in place. The following osteological observations were based on photographs of the remains. The top of the skull was facing slightly south and the frontal bone had become depressed downward onto the zygomas and nasal aperture due to postmortem damage. The maxillae were skewed to the south relative to the mandible. The maxillary left and right incisors, left canine, and left first premolar were visible. The mandibular left and right incisors and left canine through first molar were also visible. The mandibular left second and third molars appeared to have been lost antemortem with the sockets resorbed or partially resorbed. The alveolar bone in the area of these two molars was obscured slightly by soil. The visible teeth appeared to have been moderately worn and with wear flat in form. The chin was square and the supraorbital torus on the left side was pronounced. The individual represented by these remains was possibly male and of approximate middle-age, based on dental attrition. It is possible that some of the adult remains from Unit 116N92N and surrounding units were related to this skull. However, no direct association could be drawn, and most of the remains from Adult 9-1 were likely removed during earthmoving.

FEATURE 10

During the process of taking down the west half of Unit 116N92E, a subadult cranium was partially exposed, mapped, but not excavated, in the northwest corner. These remains appeared to be from a young child. In addition, the upper half of a partially fragmented subadult cranium was exposed, just slightly south and west of the partially exposed cranium, along with a concentration of thin bone. This thin cranial bone was vertically oriented and appeared to be from an infant. A radius-sized bone was just west of the child's cranium, with the proximal end pointed upward, along with what appeared to be a mandible that was not completely exposed. The thin cranial remains were arbitrarily designated Subadult 10-1, and the larger, more fully-exposed cranium designated Subadult 10-2. Portions of the parietals, occipital, frontal, and a temporal bone of Subadult 10-2 are visible in field photographs.

Scattered subadult remains collected from disturbed contexts in the northwest portion of the Unit 116N92E represented a minimum of two subadults and were possibly related to Subadult 10-1 and Subadult 10-2. Subadult remains collected in adjacent Unit 118N92E were consistent in age estimation with Subadults 10-1 and 10-2 and were included in the inventory for these two subadults.

The remains possibly associated with Subadult 10-1 included a frontal fragment; two temporal petrous portions; 30 cranial vault fragments; an incomplete rib; a thoracic vertebral arch and one vertebral centrum; a nearly complete left ilium; incomplete femur, tibia, and fibula diaphyses; an unsided metacarpal or metatarsal; and a phalanx. A right scapula recovered from Unit 114N92E was also included with the possible Subadult 10-1 remains as it duplicated elements possibly associated with the two fetal/newborn infants in Feature 8. Breadth of the ilium was 33 mm, in the range for a newborn to 0.5 year old. All the other fragments and incomplete elements were consistent in size with a newborn to young infant.

The subadult remains possibly associated with Subadult 10-2 included the superior portion of the frontal and a fragment from the right orbit; one cranial vault fragment; three facial bone fragments; a loose deciduous maxillary right central incisor; three vertebral centra; two metacarpals; and two hand phalanges. The frontal portion was consistent in size with a confidently-aged 2.5 to 3.5 year old. The deciduous central incisor was erupted and displayed slight wear, which also is consistent with an age estimate of young child.

FEATURE 11

Feature 11 was located in the northeast corner of Unit 116N92E extending into the southeast portion of Unit 118N92E. A subadult skull was in Unit 116N92E with the rest of the remains extending northeast into Unit 118N92E. The skull was at a depth of about 35 cm below the disturbed surface. An area 40 cm north-south by 65 cm east west was taken down to 40 cm below the scraped surface in Unit 118N92E along the south wall, exposing the postcranial remains associated with the Feature 11 skull. Additional subadult remains scattered in Unit 116N92E, and a radius and ulna in Unit 118N94E, were probably associated with this individual and were included in the osteological inventory. The individual represented by the remains was labeled Subadult 11-1. A rib fragment recovered from disturbed soil in Unit 116N94E may also be related to Feature 11.

Subadult 11-1 was represented by incomplete cranial remains including an incomplete frontal; incomplete left parietal; an occipital fragment; a left temporal; left and right zygomas; the left maxilla; and 41 fragments of the face, sphenoid, palatine bones, and cranial vault. The mandible was in two pieces and incomplete. The postcranial remains included the left scapula; both clavicles; 9 to 10 right ribs; the first cervical vertebra; two thoracic vertebrae; three lumbar vertebrae; a possible lumbar centrum; the left ilium; a pubis fragment; the first body and both alae of the sacrum; diaphyses of the left humerus, radius, ulna, and femur; epiphyses of the distal left humerus, left and right proximal femora, and right distal tibia; and the left calcaneus.

In the maxillae, the in situ teeth were the left deciduous canine and first and second molars and permanent left canine and first premolar. All the other deciduous teeth were present but loose. Loose permanent maxillary teeth included the left and right central incisors, right lateral incisor, canine, first and second premolars, both first molars, and the left second molar. In the mandible, the deciduous right canine, left and right first and second molars, the permanent right central incisors through second premolar, and permanent left second molar were in situ. The mandibular left and right deciduous central incisors and left canine, the permanent left central incisor through canine, and the permanent left first molar were present but loose. All the permanent teeth were unerupted except the maxillary and mandibular left first molars which were partially erupted. No dental pathologies were noted in the deciduous dentition. All the deciduous teeth displayed slight wear except the mandibular central incisors which were slightly to moderately worn. One enamel defect was noted on the permanent mandibular left canine (Table 9). Based on dental development, age was estimated to be 4.5 to 6.2 years. Several postcranial measurements were taken, yielding an age estimate of 5.5 to 6.5 years. The sacral alae were unfused, suggesting an age of less than 5 years. Other indications of age were incomplete fusion of the lumbar arches to the vertebral centra, providing a more general age estimate of less than 5 to 7 years. Age was estimated to be 4.5 to 6.5 years.

FEATURE 12

Feature 12 consisted of the area along the top of the knoll which had been mechanically stripped by the initial earthmoving. It was adjacent to the northeast portion of the knoll that had been mechanically removed down to the level of the roadbed. Loose, disturbed soil had been pushed back over the feature and surrounding area. This portion of the site had been investigated in July, with remains on the surface collected and other observed bone left in situ. Feature 12 extended over all or portions of Units 122N88E, 124N86E, 124N88E, and 124N90E.

During the initial examination of the site, cranial remains and numerous long bones were noted, but all were jumbled together and appeared to have been disturbed from their original burial locations. Several long bones, partially covered, had open spaces under them where no soil was present, suggesting that the bones had been unearthed, and then covered up with loosened soil. During the archaeological excavation, the loose disturbed soil of Feature 12 was screened with all bones and artifacts collected. The artifacts included one small undecorated rim sherd identified as probably Great Oasis or Mill Creek; four smoothed-

over cord-roughened body sherds, eight plain body sherds, one chert flake, and three pieces of chert debitage. During excavation, an incomplete projectile point and a modified columella were recovered.

In addition to collecting loose bones and screening the disturbed soil, the southern portion of Unit 124N88E and the northern eighth of 122N88E were partially excavated. The upper layer of fill of Unit 124N88E consisted mainly of loess with no inclusions except concretions. Beneath the loose soil was a mix of broken bones of adults and subadults for a depth of about 10 cm in the south 40 cm of the unit and covering an area approximately 1 m by 0.65 m. About 20 cm of the north portion of Unit 122N88E was also excavated to the undisturbed surface below the fill. All the remains from disturbed contexts were removed. In Unit 124N88E, below the large area of disturbed remains, a bundle burial was encountered and partially uncovered. It was about 15 cm deep in the southeast corner and about 35 cm deep in the southwest corner of the unit. The remains angled downward from northeast to southwest, with the southwest edge of the burial being the lowest point. The remains and two artifacts were mapped, covered, and left in situ. The identifiable remains comprising the bundle burial were the left and right femora, left and right scapulae, left humerus, distal end of a right humerus, left radius, a tibia, two fibulae, a patella, and an articulated foot. Two clamshells were near or next to the remains. No cranial remains were noted in the exposed portion. The identifiable remains represented a minimum of one adult. Because the exact extent, depth, or original condition of the bundle burial could not be determined due to the severely disturbed nature of the site, the remains recovered from Unit 124N88E and those adjacent to it were considered to be potentially part of the original burial feature.

Since all the recovered remains from Feature 12 came from a disturbed context, either from the surface or in loose, disturbed soil, they were combined and sorted by element, and treated as an ossuary burial. Subadult remains were sorted by general age groups.

The adult remains represented a minimum of five individuals based on duplicate zygomas and tibiae. Based on sex and age estimates, the adult remains from Feature 12 represented a minimum of two females (one young), and three males (one old). Of the female and two males of indeterminate age, at least two were middle-aged. The subadult remains represented a minimum of seven individuals. Based on age estimations, there was a newborn to 6 month old infant, an infant 0.65 to 0.75 years, an infant 1.15 to 1.3 years, a 2 to 4 year old, a 4 to 6 year old, a child between 6 and 11 years of age, and an 11 to 17 year old.

Feature 12: Adult Remains

A minimum of five adults were represented by the remains recovered from disturbed contexts, as evidenced by the presence of five left zygomas and three pairs of tibiae and unrelated left and right tibiae. Three of the left zygomas were attached to left maxillae. The tibiae are discussed below with the postcranial remains. Due to the fragmentation of numerous elements, more individuals may have been represented but could not be identified with confidence.

Cranial remains included three incomplete frontals plus nine fragments; two left and four right parietals plus 17 fragments; a minimum of four incomplete occipitals plus six fragments; three left and two right temporals plus nine fragments; five left and one right zygoma; four left and two right maxillae plus two fragments; and a right palatine bone. In addition to the identifiable cranial remains, over 225 cranial vault and facial bone fragments were present.

Temporal bone Temp R1 displayed a tympanic dehiscence, and Temp R2 contained a small auditory exostosis. Two pairs of maxillae (Max L1 and R1 and Max L2 and R2) and two left maxillae (Max L3 and Max 4) are described under the adult dental remains, as are the mandibular remains (Mand 1 through Mand 4). Seventeen loose teeth were also recovered.

The dental remains included in situ teeth in the maxillae and mandibles as well as 17 loose teeth that may be associated with the maxillae and mandibles or could possibly represent additional individuals. All appeared to be from adults based on dental wear. A pair of maxillae, Max L1 and R1, were comprised of the complete left maxillae and the right side missing the superior lateral portion. A left zygoma was fused

to the left maxilla. All the teeth were in situ except the left incisors, left second and third molars, and the right third molar; the latter tooth may have been congenitally absent. The other absent teeth appeared to be missing postmortem. Calculus deposits were slight to moderate, and dental attrition was moderate to heavy, particularly on the right first molar which displayed complete loss of all the occlusal enamel. Wear was cupped in form on this tooth as well as the left canine and first premolar. No carious lesions were present. Enamel defects could not be evaluated due to calculus buildup or staining.

Maxillae Max L2 and R2 were a possible pair. The left consisted of the second premolar through third molar area, while the right maxilla included the central incisor through second premolar area. Only the left second premolar and second molar and right first premolar were in situ. The other teeth were missing postmortem. The left first molar was lost antemortem with the socket resorbed. The left third molar also was missing with the socket partially resorbed. It is possible this tooth was still present at the time of death. The left second molar was rotated about 30° with the buccal surface angled mesially, possibly as a result of the loss of the adjacent teeth. It contained one small carious lesion at the distal cemento-enamel junction. A dark purplish stain was present on most of the circumferential enamel. A small amount of calculus was present as well. The right first premolar crown had been completely destroyed by a carious lesion, exposing the pulp chamber. Periodontal abscesses were associated with the left second and third molars, while periapical abscesses were associated with the right first and second premolars. Slight dental attrition was noted on the left second premolar, and almost no wear was present on the left second molar. The slight dental attrition may indicate early loss of the opposing teeth or a young adult age estimate.

The third left maxilla, Max L3, was fused to a left zygoma. The nasal area and incisor portion were missing postmortem as was part of the canine socket. The left second molar was the only tooth in situ. The first premolar socket was partially resorbed and the tooth may have been lost antemortem. The second premolar and first and third molars were lost antemortem, with the sockets completely resorbed. The second molar crown was completely destroyed by a carious lesion, exposing the pulp chamber. The fourth left maxilla, Max L4, had some postmortem damage to the alveolar bone and no teeth were in situ.

A minimum of four mandibles were represented. Mand 1 was nearly complete and five teeth were in situ: the left lateral incisor, left and right canines, right first premolar, and right third molar. The left and right central incisors, right lateral incisor, and left first premolar were lost postmortem. The left second premolar through third molar and right second premolar through second molar were lost antemortem, and all sockets completely resorbed except the left third molar socket. Dental attrition was very marked on the two left teeth and moderate to marked on the right canine and third molar. The wear on the right third molar was on the mesial occlusal margin only with enamel worn off almost to the cemento-enamel junction. The right first premolar crown was completely destroyed by a carious lesion, exposing the pulp chamber. The right third molar had a moderate-sized carious lesion at the buccal cemento-enamel junction that had also exposed the pulp chamber. Periodontal abscesses were associated with the right first premolar and third molar. The right first premolar also had an associated periapical abscess.

The second mandible, Mand 2, consisted of the left body with the central incisor through second molar area and the right central incisor socket through partial right canine socket. The left and right central incisors, left first and third molars, and right canine were missing antemortem. All the other teeth were in situ. Two carious lesions were present on the left second molar: a moderate-sized lesion was on the occlusal surface and slightly onto the buccal surface; and a large lesion was on the distal crown surface. No abscesses or calculus were noted, and dental attrition was absent or very slight. Three horizontal enamel hypoplastic defects were present on the left canine (Table 9). The left lateral incisor was rotated slightly with the buccal surface facing distally, and was crowded against the left canine. The left canine was rotated about 30° with the buccal surface facing mesially, and was crowded against the left lateral incisor and first premolar. The left first premolar was slightly rotated with the buccal surface facing distally, and the whole tooth was displaced slightly toward the buccal aspect of the alveolus.

A left body fragment, Mand 3, contained the sockets for the second premolar through second molar, with

the first molar in situ. The other two teeth were missing postmortem. The first molar had no carious lesions, abscesses, or calculus. Dental attrition was moderate and slightly cupped in form. A right mandible portion, Mand 4, consisted of the body from the central incisor through second molar with a partial socket for the third molar. All the teeth were in situ except the third molar which was lost postmortem. No carious lesions, abscesses, or calculus were present. Dental attrition was moderate. Metrics for the Mand 3 first molar were much larger than the Mand 4 first molar, suggesting these two portions were not from the same individual.

The 17 loose teeth were all recovered from Unit 124N88E. They included eight maxillary teeth, five mandibular teeth, and four that could not be identified as either maxillary or mandibular. They represent a minimum of two individuals based on dental attrition. Four teeth are slightly worn: an unsided maxillary central incisor, a maxillary right third molar, and a mandibular left incisor and second molar. The mandibular left second molar roots were fully formed, and there was a distal contact facet present, indicating the left third molar was erupted and in contact with this tooth. No dental pathologies were noted except slight hypercementosis affecting the maxillary right third molar and slight calculus on the maxillary lateral incisor and right third molar. The right third molar displayed a Carabelli's cusp and enamel extension.

The remaining 13 loose teeth included the maxillary left central incisor and canine; two maxillary right premolars; an unsided maxillary premolar; a possible maxillary unsided incisor; one left and two right mandibular first or second molars; two unidentified and unsided incisors; and two unidentified teeth. Dental attrition ranged from moderate to severe, with one of the unidentified and unsided incisors also displaying severe loss of crown height. Cupped wear was noted on four teeth. The mandibular left first or second molar contained two carious lesions, one at the mesial cemento-enamel junction and one at the distal cemento-enamel junction. Two unidentified teeth had the crowns completely destroyed by carious lesions, exposing the pulp chamber. Slight to moderate hypercementosis was noted on the unsided maxillary premolar, unsided possible maxillary incisor, and mandibular left first or second molar. Calculus deposits were slight to moderate on nearly all of the teeth. Two enamel defects were noted on the maxillary left central incisor but were not measurable due to the presence of dental calculus. One of the maxillary right premolars had one enamel defect (Table 9). It is possible that these 13 teeth may represent more than one individual, and some of the 17 loose teeth could be associated with the maxillary or mandibular remains.

Postcranial remains were numerous and most were incomplete or consisted of small fragments. Two left and three right clavicles, two left and two right scapulae, and numerous scapula and rib fragments were present. Also present were 5 cervical, 10 thoracic and 4 lumbar vertebrae. Over 70 vertebral fragments were noted. Three unidentified vertebral body fragments displayed marked degenerative changes in the form of osteophytes.

A minimum of five innominates, three left and two right, were represented by incomplete elements. An additional 45 innominate fragments likely represent additional elements.

Incomplete arm long bones included four left and three right humeri, three left and three right radii, and two left and two right ulnae. Right radius, Rad R1, and right ulna, Ul R1, articulated well with each other and appeared to be from the same individual, a gracile adult. Eight carpal bones, five metacarpals, and seven hand phalanges were recovered. Seven femora, three left and four right, and 36 femur fragments were present. Six of eight tibiae appeared to form three pairs. Tib L4 and Tib R4 did not form a pair, indicating that at least five individuals were represented by the tibiae. This is consistent with the estimate of five adults indicated by the five left zygomas. A distal end fragment was given the label Tib L5 because the distal breadth could be measured. However, this fragment does not necessarily represent an additional individual because several left tibiae were missing the distal end. One left, two right, and one unsided fibulae were present, along with five fibula fragments. A pair of calcanea (Cal L1 and R1) and an unsided calcaneus were also present. Seven tarsals, six metatarsals, and seven phalanges were also identified.

Several elements displayed sexually dimorphic nonmetric traits or metrics. The elements displaying male or possibly male characteristics were as follows. One frontal fragment from the central portion, including nasion and the medial portion of both supraorbital tori, displayed pronounced tori. An incomplete

occipital had a pronounced occipital protuberance. The temporal bones suggested the presence of two males (labeled Temp L1 and Temp L2) and a possible male (Temp R2), based on robusticity of the mastoid process. Mand 1 displayed a very square chin and a gonial angle in the range for males. One of the innominate fragments contained a narrow sciatic notch, suggesting a possible male. A possible pair of femora, Fem L1 and Fem R1, were robust, suggesting a possible male. The midshaft circumference for both of these femora fell in the range for males. The midshaft circumference for Fem R2 was also in the range for males. Fem R3 was robust, but no midshaft measurements were possible. The morphology and metrics of these elements suggested the presence of three possible males.

Elements displaying female characteristics included two frontal fragments with a left orbit margin that was sharp and moderately pronounced supraorbital tori. An incomplete occipital was gracile, and right temporal bone Temp R1 displayed a small mastoid process, suggesting a possible female. Mand 2 was gracile and the chin was pointed, suggesting a female. Duplication of the frontal portions indicates a minimum of two possible females.

Estimation of age was limited to general ages derived from dental attrition, while more specific ages were provided by evaluation of the auricular surface of three innominates and palatal suture closure. At least one young adult was represented by Mand 2 and four loose teeth displaying slight dental wear. The mandible was probably from a female adult.

Based on dental attrition displayed on teeth in Max L1 and R1, a pair, and Mand 3 and Mand 4, at least two middle-aged adults are represented. Maxillary pair Max L1 and R1 provided an age estimate of 35 to 45 years based on palatine suture closure. One pair of innominates, Inn L1 and R1, contained enough of the auricular surface to provide a general age estimate of 30 to 39 years. The intact auricular surface of Inn R2 provided an age estimate of 30 to 34 years. The palatine suture closure and auricular surface age estimates fall in the middle-age range and could be associated with the two middle-aged adults represented by the dental remains. No sex estimate was possible for these remains.

At least one older adult was represented by Max L3, which displayed widespread tooth loss, and Mand 1 which displayed advanced dental wear and antemortem tooth loss. Mand 1 represented a male. A fragment of possible ossified cartilage may suggest an older adult, but identification of the fragment was tentative. Thirteen loose teeth with moderate to severe dental attrition, appear to represent a middle-aged to older adult. They could be associated with one of the two middle-aged adults or the older adult.

Feature 12: Subadult Remains

Subadult 12-1

Subadult 12-1 was represented by an incomplete frontal and unisided parietal; a right temporal; four cranial fragments; one loose tooth; two rib portions; an unfused vertebral half and unfused centrum; a left ilium and right ischium; a right femur diaphysis and four unidentified incomplete diaphyses. The loose tooth was an unerupted, deciduous maxillary left second molar. The crown was approximately one-fourth developed, providing an age estimate of 0.25 years. The ilium breadth of 36 to 38 mm yielded an age estimate of newborn to 0.5 years, as did the femur diaphyseal length of 81 mm. Subadult 12-1 was estimated to have been between newborn and 0.5 years of age.

Subadult 12-2

Subadult 12-2 was represented by a single loose tooth: an unerupted, deciduous mandibular right first molar. The root was about one-fourth developed, yielding an age estimate of 0.65 to 0.75 years.

Subadult 12-3

A third infant, Subadult 12-3, was represented by two loose teeth. Both were deciduous and mandibular, a left canine and right first molar. The deciduous canine root was half developed, yielding an age estimate of 1.25 to 1.3 years. The deciduous first molar roots were three-fourths developed, providing an age estimate

of 1.15 years. Age was estimated to be 1.15 to 1.3 years.

Subadult 12-2 or Subadult 12-3

Several fragments, incomplete elements, and another loose tooth may have been associated with either Subadult 12-2 or 12-3. These included eight cranial fragments; a possible maxilla fragment; a left scapula; incomplete left clavicle; four ribs and a rib fragment; a first cervical vertebral arch half; two additional vertebral arch halves and three centra (all unfused); incomplete humerus and femur diaphyses; a proximal row hand phalanx; and two metatarsals or metacarpals. The loose tooth was a deciduous maxillary left lateral incisor. The root was three-fourths developed, providing an age estimate of 0.75 to 2.0 years and was more likely associated with Subadult 12-3.

Subadult 12-4

Subadult 12-4 remains consisted of an incomplete right temporal; 14 cranial vault fragments; a mandible fragment; two incomplete ribs; two thoracic vertebrae; a vertebral centrum; the right tibia's distal epiphysis; and an incomplete diaphysis. The thoracic vertebrae displayed fused arches which were not yet fused to the centra. The tibia's distal epiphysis and other elements were compared to a confidently aged skeleton from a 2.5 to 3.5 year old. All the Subadult 12-4 remains were about the same size or slightly larger. A general age estimate of 2 to 4 years was posited for Subadult 12-4.

Subadults 12-5 and 12-6

Subadults 12-5 and 12-6 were close in age but distinguished because the fragments and elements associated with Subadult 12-5 were smaller than those representing Subadult 12-6. Subadult 12-5 was represented by a frontal fragment; seven parietal fragments; two occipital fragments; a right temporal fragment; 52 cranial vault fragments; an incomplete left maxilla; an incomplete mandible; one loose tooth; the right clavicle; three unisided ribs and 22 rib fragments; a lumbar vertebra and six vertebral fragments; a right ilium fragment and right ischium; an incomplete sacral body; two femur diaphyses; an unisided proximal femur epiphysis; four diaphysis fragments; and an unisided, incomplete metacarpal or metatarsal. One unisided parietal fragment displayed moderate porotic hyperostosis near and above what appeared to be the squamosal suture. The left maxilla portion consisted of the sockets for the deciduous incisors, but no teeth were in situ. The mandible consisted of the anterior portion for deciduous incisors and canines but no teeth were in situ. Due to postmortem damage, the sockets for the permanent canines were visible in the mandible portion. The form of these sockets suggested the permanent canine crown was completely developed, providing an estimated age of 3.9 to 4.0 years. The loose tooth was a deciduous maxillary left second molar. The root tips were broken off postmortem and the crown surface was eroded. The buccal cusps were slightly worn. The left femur diaphysis was missing the neck, but a broad diaphyseal length estimate of 225 to 235 mm yielded an age estimate of 4.5 to 5.5 years. The unisided femur diaphysis was incomplete and crushed postmortem, but was of approximately the same size as the left femur diaphysis. A broad age estimate of approximately 4 to 6 years was posited for Subadult 12-5.

Subadult 12-6 was slightly larger and therefore estimated to be slightly older than Subadult 12-5. This child was represented by two loose teeth; the left first rib and two rib fragments; one thoracic and one lumbar vertebra; a right proximal humerus epiphysis; an unisided proximal radius epiphysis; the distal fourth of a left femur diaphysis; and a left distal tibia epiphysis. The two loose teeth were a deciduous maxillary left second molar and a permanent maxillary right premolar. The deciduous second molar contained a large carious lesion that had destroyed all of the mesial surface. The roots had started to resorb. A broad age estimate of 6 to 11 years was estimated based on this tooth. The permanent premolar crown was complete and the roots may have started to form. Since it could not be determined if this was a first or second premolar, age was estimated to be 4.7 to 7.0 years. The two vertebrae displayed fusion of the arches to the body, but the epiphyseal rings were unfused. The left femur diaphysis, although incomplete, was larger than the left femur representing Subadult 12-5. Age estimate, based on general size, was 5.5 to 7.5 years. A general age

estimate for Subadult 12-6 was posited to be 6 to 11 years.

Subadult 12-7

Subadult 12-7 was represented by an incomplete occipital; two loose teeth; an incomplete left rib; a right clavicle; a lumbar vertebra; an incomplete ilium; complete left and incomplete right humeri; an incomplete left radius; an incomplete right ulna; an incomplete left femur diaphysis; an incomplete tibia or femur diaphysis; an incomplete right fibula; two metatarsals; and an incomplete phalanx. The two loose teeth were a maxillary right third molar and a mandibular right first or second molar. The maxillary right third molar root was between half and three-fourths developed, and it was possible that this tooth was partially erupted. It displayed no wear and there was no mesial contact facet. Based on development of the root, age was estimated to be 15.1 to 16.9 years. The mandibular right first or second molar displayed slight wear on the occlusal surface. There was no distal contact facet, and the tooth had an enamel extension. A broad age estimate of 8 to 15 years was posited based on this tooth. The lumbar vertebra was nearly adult-sized but the epiphyseal rings were unfused. It was possible this element was associated with a young adult rather than a juvenile. The incomplete ilium was unfused. The ilium generally fuses between 11 and 17 years. The left humerus was complete; although the head was not completely fused, the distal end was fused, providing an age estimate of 13 to 17 years. Metrics for this element were clearly in the female range but this may be a reflection of an immature skeletal element rather than sex. The right humerus consisted of the distal half with the medial epicondyle not yet fused. This element was very gracile and contained a septal aperture. An age estimate of 12 to 14 years was suggested by the lack of fusion of the medial epicondyle. The left radius was missing the distal end. The element was gracile and the line of fusion for the proximal epiphysis was still visible. Age estimate was 11.5 to 17 years. The right ulna was also gracile and consisted of the proximal third with the proximal epiphysis not completely fused. This provided an age estimate of 12 to 16 years. The left femur diaphysis was incomplete, with the ends broken off so that epiphyseal union could not be evaluated. The right fibula was missing the proximal end; the distal epiphysis was not yet completely fused, providing an age estimate of 15 to 20 years. This element was very gracile. The proximal third of the shaft was markedly bowed medially. The two metatarsals both had unfused distal epiphyses, suggesting an age less than 11 to 16 years. A broad age estimate of 12 to 17 years is posited for Subadult 12-7.

NORTH SLOPE

The area around Feature 12, located near the high point on the knoll, was designated “North Slope.” This area contained loose, disturbed, and/or redeposited soil. A surface collection was made of the general area, with any collected remains labeled as coming from the North Slope with no unit designations. Additionally, the loose soil was screened from Units 126N92E, 126N94E, 128N88E, and 128N92E and found to contain human remains and artifactual material. While some human remains from the top of the knoll very likely ended up eroding out or being moved mechanically downhill and mixed with the other north slope remains, the north slope area probably contained more remains from the area where a large portion of the knoll had been removed. It likely contains some intact burials left in place. It is also possible the North Slope contained remains redistributed from Feature 12. The recovered artifacts included 18 plain body sherds; nine smoothed-over cord-roughened body sherds; one Mill Creek rim sherd; one Mill Creek ceramic bowl sherd; one “seed jar” shoulder sherd; eight chert flakes (one of Knife River flint); four pieces of chert debitage; two chert scrapers; an incomplete projectile point; and a modified bone similar to a squash knife. Numerous pieces of clam shell were also found.

Over 730 elements and partial elements and nearly 2,800 fragments identifiable by element were recovered, along with 74 loose teeth (see Table 1). Only four of the loose teeth could be associated positively with the maxillary or mandibular remains.

The following summary describes the minimum number of individuals, elements suggestive of adult males or females, and pathologies noted. The reader is referred to tables for specific metrics, nonmetrics,

and dental observations.

Adult Remains

The minimum number of adults was determined to be 17 based on duplication of the proximal end of the left femoral shaft. None of these femora was complete, but some were nearly so. Six provided estimated metrics suggestive of males, and five were gracile or had estimated metrics suggesting females. The remaining six were indeterminate for sex.

Some of the elements and partial elements displayed sexually dimorphic nonmetric characteristics or metrics suggesting male adults. They did not appear to represent any additional males to the six males or possible males represented by left femora. The possibly male or male elements included: one complete frontal (Fr 1) and two frontal fragments possibly from the same element; one right and two left temporals (Temp L3, L4, R3) and an incomplete right temporal; a nearly complete mandible (Mand 3) and a partial mandible (Mand 5); two left and one right incomplete scapulae (Scap L1, L7, R2); a pair of innominates (Inn L1 and R1) and a left innominate (Inn L3); two sacra (Sac 1, Sac 3); a right humerus (Hum R4); a radius pair (Rad L3 and R3); four right femur shaft portions (Fem R2, R4, R6, R9) and a distal femur (Fem R10); two left and one right incomplete tibiae (Tib L1, L2, R2); and three left fibula portions from a minimum of two fibulae (Fib L2, L7, L8). Based on dental attrition, the nearly complete mandible (Mand 3) was estimated to be young to middle-aged. The probable innominate pair (Inn L1 and R1) displayed morphology of the auricular surface that yielded an age estimate of 40 to 49 years. The left innominate (Inn L3) had an age estimate of 30 to 34 years based on the auricular surface morphology.

Those elements displaying female characteristics or that were particularly gracile included: two frontal fragments from two distinct frontals; paired left and right temporals (Temp L1 and R1); a nearly complete left scapula (Scap L6); two right scapulae (Scap R1, R6); two left clavicles (Clav L1, L2); a possible innominate pair (Inn L2 and R3); left innominate (Inn L4); right innominate (Inn R3); two incomplete sacra (Sac 2, Sac 4); two left, three right, and one unpaired incomplete humeri (Hum L7, and 15; R8, 11, 12, U1); a radius pair (Rad L1 and R1), two left radii (Rad L5, 7) and two incomplete right radii (Rad R8, R10); three left ulnae (Ul L1, L2, L5); a right femur (Fem R3); two left (Tib L3, L5) and two right (Tib R1, R6) tibiae; and a left fibula (Fib L4). The left and right innominates Inn L2, and Inn R3 may have come from the same individual based on morphology and estimation of age. The auricular surface morphology yielded an estimate of 40 to 49 years for both elements. The morphology of the pubic symphyses yielded an age estimate of 38.2 ± 10.9 years (Suchey-Brookes Phase IV). A general age estimate of 40 to 50 years is posited for the individual represented by this possible innominate pair. The unpaired right innominate (Inn R6) was incomplete, but the auricular surface morphology yielded an age estimate of 30 to 40 years.

The dental remains in the maxillae, mandible, and loose teeth do not appear to represent any additional individuals. There were 102 teeth in situ and 168 tooth sockets. Fifteen teeth had been lost antemortem. The remaining sockets were for teeth that were either lost postmortem and not recovered or were among the loose teeth. The total number of observable teeth was 178, including both the in situ and loose teeth. Thirty-one carious lesions were observed in 27 teeth. Of these, 19 were pinpoint to small lesions and four were moderate-sized; eight tooth crowns had been completely destroyed by carious lesions. Twelve teeth had the pulp chamber exposed due to carious lesions.

Most of the in situ teeth could be assessed for the presence or absence of alveolar abscesses. Excluding the teeth that were lost antemortem with the sockets partially or completely resorbed, four periodontal and six periapical abscesses were observed. In general, dental calculus deposits were slight to moderate, with some exceptions (i.e., Max 7, Mand 3). Fourteen teeth displayed generally slight hypercementosis, but the majority of teeth could not be evaluated for this pathology. Dental attrition ranged from slight (i.e., Max L3 and R3) to severe (i.e., Max L2 and R2, Max L5, R4) with anterior teeth showing extreme loss of crown height. In general, most of the dentition displayed moderate to advanced attrition. Only 68 teeth were well enough preserved to observe enamel defects. Of these, 13 teeth displayed 22 enamel defects; all but one

were linear enamel hypoplasias. Of these, only 13 defects were measurable on 9 teeth (Table 9).

Pathological conditions included degenerative changes, evidence of disease processes, and trauma. Three elements displayed evidence of osteoporosis in the form of cortical thinning: a proximal right humerus shaft (Hum R16); the distal fourth of a left femur (Fem MiscL19); and a right tibia missing the distal end (Tib R5). Periostitis was noted on seven elements. It is possible all were from the same individual as there is no duplication of elements. A left ulna (U L1) consisted of the proximal two-thirds of the bone. New bone deposition was present starting at 7.2 cm inferior to the proximal end and extending superiorly along and around the shaft for 5.5 cm. The new bone was coarse and microporous with at least two larger porosities on the posterior surface. Bone deposition was greatest on the medial and posterior surfaces. Slight periostitic bone deposition was present along the superior surface of the right ala of a sacrum composed of the two superior bodies (Sac 5). The proximal fourth of a left femur (Fem MiscL19), which appeared to display osteoporosis, also contained slight periostitic bone deposition on the anterior surface. The distal end of a right femur (Fem R10) contained periosteal new bone deposition on the posterior and medial surfaces immediately proximal to the condyles, especially medially. Left tibia (Tib L7) was missing most of the anterior surface of the shaft in the proximal half. Mild, active periostitis was present on the medial surface covering an area measuring 1.5 cm anteroposteriorly by 8 cm superoinferiorly. Two possible tibia fragments also contained mild, unhealed periostitis over the cortical surface. One fragment measured 1.3 by 3.8 cm, and the other was 1.4 by 5.3 cm. It is possible they are from the pathological left tibia. The right tibia (Tib R5) that displayed osteoporosis also contained areas of new bone deposition on the anterolateral surface near the broken distal end. The affected area measured 1.6 cm mediolaterally by 2.1 cm superoinferiorly. An incomplete, unisided fibula (Fib U1) consisting of the about half of the shaft contained mild, healed periostitis. The affected area's size was not noted.

Degenerative changes in the form of slight lipping along articular facets and/or body margins were noted in six cervical vertebrae (one 2nd, three 3rd-7th, two unidentified). Degenerative erosion and pitting were noted on the body of one unidentified cervical vertebra and one 3rd through 7th cervical vertebra on the superior and left inferior articular facets. Eleven thoracic and 18 lumbar vertebrae displayed slight to moderate osteophytic lipping along the body margins. A fifth lumbar vertebra had both moderate marginal lipping and degenerative erosion on the inferior body margins. The proximal fifth of a sacrum (Sac 2) possibly from a female, contained moderate to severe osteophytic lipping along the left margin of the body.

Degenerative changes were noted on three additional elements. Slight erosion was present in the glenoid fossa of a left scapula (Scap L7); slight lipping was present along the distal end margins of an incomplete right ulna (UI R2); and slight lipping was present along the distal margins of a right first metacarpal.

A nearly complete mandible (Mand 1) contained degenerative changes on the right condyle. The right condylar surface was much larger in the anteroposterior direction than the left; was curved inferiorly; and had slight osteophytic lipping. No other evidence of degenerative erosion, porosity, or eburnation were present. The first molars in this mandible were lost antemortem and the right first and second molars displayed small carious lesions. The cause may have been associated with a change in chewing pattern due to dental pain. Trauma to the jaw, resulting in slight dislocation, may also have created the differential shape of the two condyles.

A first lumbar vertebra was missing the right transverse process. It could not be determined if this was the result of trauma or congenital absence. A right vertebral rib end displayed osteophytic lipping, porosity, and bone deposition suggestive of either disease or trauma.

Evidence of trauma in the form of compression or depression fractures was noted in two cervical vertebral bodies on the right side of the bodies; on the body of one lumbar vertebra; and the superior surface of a sacral body. The possibly male frontal (Fr 1) contained a small healed depression fracture located 6.4 cm superior to the medial corner of the left orbital margin. It measured 12 mm mediolaterally by 7 mm superoinferiorly. The right radius in the pair (Rad L3 and R3) contained a healed fracture on the posterior surface just superior to the distal end. A healed fracture was present at the distal fourth of a right ulna (UI R1) shaft.

The affected area measured about 4 cm superoinferiorly, extended circumferentially, and the distal margin of the affected area was about 4.5 cm superior to the distal end. The circumference of the shaft was greatly enlarged by bone deposition to about twice normal size. It is possible that radius Rad R3 and Ulna UI R1 were from the same individual since the fractures were in the same location on both elements.

Subadult Remains

Subadult remains recovered from the North Slope represent a minimum of 22 or 23 individuals ranging in age from late fetal/newborn to older adolescent.

Subadult NS-1

A left temporal, two cranial vault fragments and an unside ilium represent Subadult NS-1. The breadth of the ilium, 30 mm, suggests an age estimate of late-term fetus to newborn.

Subadults NS-2 to NS-5

Subadults NS-2 to NS-5 were distinguished by duplication of the left ilium (Table 1). All four were estimated to have been newborns or newborn to six-months old. In addition to the ilia, numerous elements were consistent with this age estimate, but could not be assigned with confidence to a specific individual. These included frontal and temporal portions, a right zygoma, 76 cranial vault fragments, three to four mandibles, and five loose teeth. Postcranial remains included two left scapulae, a left clavicle, five ribs, six vertebrae and 23 vertebral arch halves, two ischia, a left humerus diaphysis, left and right radius and ulna diaphyses, four femur and three tibia diaphyses, and nine incomplete unidentifiable diaphyses. Dental development in the mandibles provided age estimates of 0.25 to 0.55 years (Mand 1), 0.25 to 0.7 years (Mand 2), and 0.25 to 0.45 years (Mand 3). The five loose deciduous teeth displayed development ranging in age estimation from newborn to 0.75 years.

Subadults NS-6 to NS-8

Three subadults were represented by duplication of the right temporal, deciduous maxillary left canine and second molar, and femur diaphysis. Dental development for Subadult NS-6 yielded an age estimate of 0.95 to 1.3 years. Subadults NS-7 and NS-8 were estimated to be 0.7 to 0.9 years. None of the femoral diaphyses were complete but all were consistent in size with the dental age estimates. Additional remains consistent with subadults approximately one year of age could not be assigned to a specific individual. These included two incomplete frontals, an incomplete left parietal, two occipital basilar parts, a left temporal, a nearly complete right maxilla (Max R1), three incomplete mandibles, and 12 loose teeth. Postcranial remains included a left scapula and clavicle, 10+ ribs, at least 16 vertebrae, ilium portions, and 10 long bone diaphyses. The right maxilla (Max R1) and one of the mandibles (Mand 1) contained dentition consistent with a subadult 0.95 to 1.30 years old. The second mandible (Mand 2) provided a dental age of 0.40 to 0.70 years. The third mandible contained only part of the right alveolus containing an unerupted tooth. Age estimates for 12 loose deciduous teeth ranged from 0.5 to 1.55 years. Several of the teeth were duplicates, but all could have come from maxillary or mandibular remains of three individuals and do not duplicate the teeth in the right maxilla or three mandibles.

Subadults NS-9 to NS-10

A loose, deciduous maxillary left lateral incisor displayed wear that was nearly flat in form, but with no dentin exposed. A very general age estimate of two years is posited for this individual, Subadult NS-9. A left maxilla (Max L1) represents Subadult NS-10. The posterior portion of the maxilla was damaged post-mortem but the element contained the sockets for all the deciduous teeth. An unerupted deciduous second molar and unerupted permanent canine were associated with the maxilla. Based on development of these two teeth, age was estimated to be 1.5 to 2.9 years. Two additional loose deciduous teeth, a maxillary left lateral incisor and right canine, may also be associated with Subadult NS-10.

Additional remains that may be associated with either Subadult NS-9 or NS-10 included three incom-

plete temporals, two incomplete left maxillae, a mandible fragment, numerous cranial fragments, and possibly four loose teeth. The postcranial elements and fragments came from ribs, vertebrae, innominates, a sacrum, a femur, a tibia, and hand and foot bones. One of the left maxillae (Max L2) contained four partial root sockets and two sockets for unerupted teeth. The other left maxilla (Max L3) was a fragment with partial sockets and may be associated with Max L1. The four loose teeth were two permanent maxillary lateral incisors (one left, one unsided), and deciduous mandibular left and right lateral incisors. Age estimates ranged from two to four years. It is possible some or all of these teeth are associated with one of these two young children.

Subadult NS-11

Five loose teeth and a right talus represented Subadult NS-11, estimated to be approximately 3 to 4 years old. The teeth were the deciduous maxillary left second molar and deciduous mandibular left first and second molars, and an unsided permanent maxillary central incisor and permanent mandibular left incisor. The permanent incisors were unerupted, with development indicating an age of around three to four years. The deciduous maxillary left second molar was completely developed but had no distal contact facet or occlusal wear, suggesting it was recently erupted (age ca. 2.85 to 3.0 years). Development of the deciduous mandibular molars was also complete. The deciduous mandibular first molar crown was about half destroyed by a carious lesion. The deciduous mandibular left second molar was slightly worn, with pinpoint of dentin exposed. Both of these molars were consistent with an age estimate of around 4 years.

Subadult NS-12

Subadult NS-12 was represented by left and right maxillae, two mandible portions, four loose teeth, and a right talus. The maxillae were fused to each other. The left maxilla consisted of the left anterior portion for the incisors and part of the left palatine bone. No teeth were in situ. The right maxilla consisted of the inferior portion with complete sockets for the incisors and partial sockets for the deciduous and permanent canines, deciduous molars, and unerupted permanent first molar. No teeth were in situ in the right maxilla. The mandible consisted of two portions: the left portion included the ascending ramus, a partial molar socket, and an unerupted molar, probably the permanent second molar; the right half was missing the condyle with the erupted permanent lateral incisor and deciduous molars and unerupted permanent second molar in situ. The permanent left first molar was lost postmortem but the socket morphology suggested that the roots were about half formed, indicating an age estimate of 5.0 to 5.2 years. The permanent, unerupted right second molar was visible and the crown was between three-fourths and completely developed, providing an age estimate of 5.4 to 6.4 years. The right deciduous molars displayed pinpoint dentin exposure and slight calculus deposits. Four loose teeth are possibly associated with Subadult NS-12. These were the permanent maxillary left central incisor and canine, an unsided deciduous mandibular second molar, and a permanent mandibular premolar. Root development of the permanent maxillary incisor and canine provided an age range of 4.6 to 5.7 years. The permanent mandibular premolar crown was between three-fourths and completely developed, yielding an age estimate of 4.2 to 6.2 years, depending on tooth position. Most of the circumferential enamel and roots were missing from the unsided deciduous mandibular second molar. The tooth had dentin exposed on the buccal half of the occlusal surface, but little wear on the lingual half. The age estimate for Subadult NS-12 is 4.6 to 6.4 years. The permanent maxillary left incisor contained two enamel hypoplastic defects, and the left canine contained one (Table 9).

Subadult NS-13

Subadult NS-13 was represented by a right maxilla and right talus. The maxilla contained the unerupted permanent lateral incisor and second molar. The deciduous molars were erupted and in situ. The other teeth were lost postmortem. The permanent first molar had erupted. Development of the permanent second molar indicated an age range of 4.6 to 5.2 years.

Subadults NS-11 to NS-13

Numerous cranial and postcranial fragments and incomplete elements were consistent with an age estimate between 3 and 6 years. The cranial remains included two frontal fragments, two left and one right parietal, portions of three occipitals, two left and two right temporals, a right zygoma, and an incomplete mandible possibly associated with Subadult NS-11. The mandible portion consisted of the right ascending ramus and part of the right body with no teeth or tooth sockets. Postcranial remains included portions or fragments from the sternum, scapulae, clavicle, ribs, vertebrae, innominate, sacrum, left humerus and ulna, 15 hand bones, three femora, two patellae, two tibiae, two or three fibulae, and four foot bones. One of the frontal fragments, consisting of the lateral half of the right orbit, displayed slight cribra orbitalia.

Subadult NS-14

Subadult NS-14 is represented by left and right maxillae, the right zygoma attached to the right maxilla, and three loose mandibular teeth. The left maxilla was damaged postmortem and only the permanent first molar is in situ. The left unerupted permanent central incisor, canine, and second premolar were also present but loose. The right maxilla contained sockets for the permanent canine through second molar, with the canine and first premolar present but loose. The right deciduous second molar and permanent first molar were erupted and in situ. The deciduous second molar was well worn, with most of the dentin exposed on the occlusal surface. Development of the permanent teeth indicated an age range of 5.9 to 8.6 years. The permanent maxillary left central incisor was shovel-shaped. This tooth and the two permanent canines each contained two linear enamel hypoplastic defects (Table 9). They were positive for two episodes of enamel growth disruption occurring at 2.5 to 3.0 years and 3.0 to 3.5 years of age.

Subadult NS-15

An incomplete mandible, two loose mandibular teeth, and three loose maxillary teeth represent Subadult NS-15. The mandible consisted of eight fragments from the posterior portion of the left body. Two loose mandibular teeth were probably associated with this mandible. They were an unerupted left first or second premolar and unerupted left second molar. Roots of the molar were about one-fourth developed, yielding an age estimate of 7.8 to 9.3 years. The premolar root was one-fourth developed, suggesting an age range of 6.4 to 7.8 years depending on tooth position. The maxillary teeth were an unerupted left canine, and two unerupted right premolars. The canine root was one-fourth to one-half developed, with an age estimate of 5.3 to 8.0 years. The maxillary premolars had the same development as the mandibular premolar. One of the maxillary premolars had one linear enamel hypoplastic defects, and the maxillary premolar had two defects (Table 9). A broad age range of 6.4 to 9.3 years is suggested for Subadult NS-15.

Subadult NS-16

Subadult NS-16 was represented by a loose permanent maxillary left canine that was unerupted. This tooth duplicated maxillary left canines associated with Subadults NS-14 and NS-15. The tooth contained two linear enamel hypoplastic defects (Table 9). The canine root was half developed, suggesting an age estimate of 7.1 to 8.0 years for Subadult NS-16.

Subadult NS-17

Subadult NS-17 was represented by a left maxilla with the portion posterior to the permanent first molar missing postmortem. A small inferior fragment of the left zygoma was attached to the maxilla. The bone for both elements was in poor condition. The permanent first premolar and first molar were in situ and erupted. The permanent second premolar was partially erupted. The permanent central incisor through canine were lost postmortem. Development of the permanent teeth yielded an age range of 9.2 to 10.8 years. A loose maxillary right third molar may be associated with this individual. The crown was about one-half devel-

oped, indicating an age estimate of 10.8 to 11.2 years.

Subadult NS-18

A permanent maxillary right third molar representing Subadult NS-18 duplicated the maxillary right third molar representing Subadult NS-17. The tooth was slightly more developed, with the crown between one-half and three-fourths complete. Age was estimated to be 10.8 to 11.6 years.

Subadult NS-17 or NS-18

A loose permanent maxillary right second premolar may be associated with either Subadult NS-17 or NS-18. The root was three-fourths developed, yielding an age estimate of 10.0 to 10.8 years.

Subadults NS-14 to NS-18

Numerous cranial and postcranial elements and fragments and seven loose teeth could be associated with one of the five subadults between approximately 6.0 and 11.5 years of age (Subadults NS-14 to NS-18). Some of these were more likely associated with those in the younger age range and others with the older age range of this group. The cranial remains included an incomplete frontal, right parietal, a left temporal, and several other cranial fragments. The postcranial remains included an incomplete hyoid, sternal body, possible clavicle, left and right scapulae, ribs, three to four vertebrae, at least two innominates, diaphyses from a left radius and left ulna, 12 hand bones, two distal femur epiphyses, a tibia diaphysis, a fibula diaphysis, and six foot bones. A left and a right ilium came from two different individuals. Breadth of the right ilium was 97 mm, with an age estimate of 6.5 to 7.5 years. The left ilium breadth of 114 mm suggested an older age estimate of 8.5 to 9.5 years. The loose deciduous teeth included a maxillary left second molar, two right second molars, and a mandibular left first molar. All were erupted and displayed varying degrees of wear from slight (maxillary left second molar) to advanced (one of the maxillary right second molars with the roots mostly resorbed). The other maxillary right second molar crown was more than half destroyed by a carious lesion that had exposed the pulp chamber. The other deciduous molars displayed some root resorption. The other loose teeth were the erupted, or partially erupted, permanent maxillary left and right first or second molars and mandibular left first or second molars. The maxillary left first or second molar contained one enamel hypoplastic defect (Table 9). Age estimates based on root development were 5.0 to 11.1 years, 5.9 to 11.6 years, and 5.5 to 11.6 years.

Subadults NS-19 and NS-20

Subadult NS-19 was an older child to older juvenile represented by the superior left and central portion of a frontal, incomplete left and right parietals, incomplete left and right clavicles, a left patella, and a left second metatarsal. Duplicate elements indicated a second older child to older juvenile, Subadult NS-20, represented by the superior central and right portion of a frontal; the posterior two-thirds of a right parietal attached to the lateral-inferior portion of the occipital (missing the base); left and right clavicles; a left patella; and a left second metatarsal. The right clavicle was complete and measured 117 mm long, providing an age estimate of 13 to 14 years. The remaining elements or partial elements were similar in size to those representing Subadult NS-19.

Cranial fragments, an incomplete left temporal, an incomplete mandible, and numerous postcranial remains may be associated with either Subadult NS-19 or NS-20. The postcranial elements, generally fragmented or incomplete, include a right scapula, 11 ribs plus fragments, a left radius diaphysis portion, two hand bones, a right femur diaphysis portion, two tibia and two fibula diaphysis portions, and five foot bones. The right tibia diaphysis was complete, with a length of 280 mm and age estimate of 9.5 to 12.5 years. The mandible fragment contained the alveolar bone with sockets for the first and second molars. The area for the third molar was present, but this tooth appeared to be congenitally absent as no socket was visible through the broken alveolus. The right second molar was in situ, and the right first molar was lost postmortem. The second molar displayed moderate calculus buildup, but no dental attrition. A broad age range of 12 to 17

years was posited for the individual represented by the mandible fragment.

Subadults NS-18, 19, or NS-20

Four loose permanent teeth could be associated with either Subadult NS-18, 19, or 20. These were a maxillary right lateral incisor and right premolar, and a mandibular left incisor and right first molar. The maxillary lateral incisor displayed slight wear, moderate calculus buildup, and was somewhat shovel-shaped. The maxillary right premolar root was completely formed, but the apex was still open, suggesting an age estimate of 9.8 to 11.7 years. It contained one enamel hypoplastic defect (Table 9). The mandibular left incisor was slightly worn and shovel-shaped. The mandibular right first molar root tips were broken off, but the tooth appeared to have been fully formed. The occlusal surface was slightly worn. An age range of 8 to 12 years is suggested by the two mandibular teeth.

Subadults NS-21 and NS-22

Two younger adolescents, approximately 12 to 16 years old, were represented by duplication of the fibulae diaphyses and loose maxillary right canines. For Subadult NS-21, the fibulae diaphyses were incomplete but of nearly adult size. The maxillary right canine displayed slight exposure of the dentin. The fibula diaphyses representing Subadult NS-22 were also incomplete, but one was composed of the distal half with the distal epiphysis unfused suggesting an age of less than 12 to 15 years. The maxillary right canine was slightly more worn than that representing Subadult NS-21.

Several elements and four loose teeth were possibly associated with either Subadult NS-21 or NS-22. These included a left maxillary fragment, right mandible fragment, left and right first ribs, an incomplete right radius diaphysis, three hand bones, and three foot bones. The left maxillary fragment contained the erupted first and second molars. Both teeth were unworn. A carious pit was on the occlusal surface of the second molar. The second molar had no distal contact facet. The right mandible fragment also contained the erupted first and second molars and partial socket for the third molar. The first molar was moderately worn, while the second molar displayed slight wear. Both teeth had moderate calculus buildup. The second molar had antemortem enamel chipping on the distolingual corner. No distal contact facet was present on this tooth. The four loose teeth were the maxillary left canine and second molar, mandibular left second molar, and the unerupted mandibular right third molar. The maxillary teeth displayed slight exposure of the dentin due to attrition and slight to moderate calculus. The second molar also had slight hypercementosis. The maxillary left canine contained one enamel hypoplastic defect (Table 9). The mandibular left second molar had no distal contact facet; displayed slight to moderate dentin exposure; and had a small carious pit on the occlusal surface. The unerupted mandibular right third molar roots were about one-fourth developed, suggesting an age estimate of 14.5 to 14.8 years.

Subadult NS-23

The remains assigned to Subadult NS-23 were a mandible fragment, loose maxillary right premolar, right clavicle, innominate fragment, coccyx body, and right talus. All of these remains suggested an older adolescent, 16 to 20 years old. The mandible fragment contained sockets for the left incisors and the right side to the first molar socket. The right lateral incisor through second premolar were in situ. The lateral incisor and canine displayed slight hypercementosis and calculus. The canine and first premolar were slightly to moderately worn, and the second premolar and first molar displayed slight dentin exposure. The first premolar also contained two linear enamel hypoplastic defects (Table 9). The loose maxillary right premolar also displayed slight exposure of the dentin. Wear on the premolars suggests that these teeth were not newly erupted, and the individual represented was at least in middle to later adolescence.

The four postcranial elements also suggested an older adolescent, but they could also have belonged to a young adult. The right clavicle was complete, quite gracile, but nearly adult-sized. The sternal epiphysis had not yet fused. Size and lack of sternal epiphyseal fusion suggested an older adolescent, or possibly a gracile young adult. The innominate fragment consisted of an unsided and incomplete pubis portion,

including about one-third of the symphysis. Billowing in the pubic symphysis was most similar to Suchey-Brooks Phase I, with an age estimate of 15 to 23 years. The coccyx body was unfused and slightly smaller than adult-sized. The right talus was gracile, measuring 47 mm long, suggesting an older adolescent or gracile adult.

North Slope Miscellaneous Subadult and Possibly Adult Remains

Thirteen loose teeth and numerous postcranial fragments could not be assigned to one of the identified subadults. In some cases, such as for unidentified molars, only broad age estimates were possible. None of these remains suggest the presence of any additional subadults. A left maxilla portion with no teeth in situ except for an unerupted supernumerary tooth, and a single-rooted tooth with the crown and part of the root destroyed by a carious lesion, could not be assigned to either adult or subadult remains. An unidentified maxillary left molar contained two enamel hypoplastic defects (Table 9).

No Feature

Some of the scattered, redeposited human skeletal remains collected throughout the gridded area of the site could not be assigned to a specific feature. Although some of these remains may represent additional individuals, it is just as likely that they had been disturbed from areas where features were identified. The remains were inventoried by the unit from which they were collected. The detailed inventory is presented in Table 1.

Units 96N98E, 98N86E, 100N90E, and 100N92E were near Features 1 and 2. None of the remains matched the individuals identified in those two features, although all appeared to be adult remains. Most of the elements consisted of fragments and others were incomplete. Included in the remains collected from these units were an incomplete right radius, a right innominate portion, and two temporals that yielded some diagnostic information. The radius was gracile with a maximum transverse distal width of 30 mm, in the range for females. The right innominate portion consisted of most of the ilium, which displayed a wide sciatic notch and a preauricular sulcus, suggesting a female. Evaluation of the auricular surface yielded an age estimate of 45 to 50 years. A right temporal was gracile and had a small mastoid process, suggesting a possible female. This element also contained a tympanic dehiscence. A left temporal had a large mastoid process and the arch extended beyond the external auditory meatus, suggesting a possible male.

Units 102N96E, 102N88E, and 102N90E contained primarily small fragments of adult cranial and postcranial remains, with most of the postcranial elements fragments of ribs, vertebrae, or scapula. Two left temporal fragments from separate units were refit. Two mandible portions each contained one tooth. Only one subadult element was present, the incomplete spine of a left scapula from a child approximately 4 to 6 years old.

One element was collected from each of Units 104N86E and 104N88E. An incomplete right ilium portion included an incomplete auricular surface and damaged acetabulum. The sciatic notch appears to be narrow, suggesting a possible male. A nearly complete thoracic vertebra was of approximate adult size, but the epiphyseal rings were unfused, indicating an older adolescent. It is possible both elements were from the same individual.

Two adult long bone fragments and a left lunate were collected from Unit 114N92E, the same unit that contained Feature 8. Since only subadult remains were recovered from Feature 8, the adult remains were not associated with this feature. Additional adult remains from adjacent Unit 114N94E may be associated, although at least two individuals were represented by mandibular dentition. The mandible was missing the portion posterior to the mesial root socket for the left third molar. The third molars were erupted. The incisors, canines and right first premolar were missing postmortem, with the remaining teeth in situ. Dental attrition was slight, as were calculus deposits. Seven small carious lesions were present on the occlusal surfaces of the second and third molars: one on the left second molar, two on the right second molar, three

on the left third molar, and one on the right third molar. A loose left mandibular canine displayed postmortem staining not noted on the teeth in the mandible. Also, dental attrition on the loose canine was quite advanced, including loss of the crown height. Additional adult remains were a cervical vertebra, a gracile incomplete tibia, and an incomplete right talus. Most of these remains were eroded postmortem. The tibia appeared to be lightweight, possibly as a result of osteoporosis. Subadult remains collected from adjacent Units 114N92E and 114N94E appeared to go together and were not related to the subadults in Feature 8. The subadult remains included cranial and rib fragments from an infant about 1 year of age; incomplete left and right parietals, an incomplete occipital lateral, 12 cranial fragments, and a right mandible fragment containing an unerupted permanent first molar from a child 1.5 to 3.5 years old; and a frontal fragment, a loose maxillary right lateral incisor, three rib fragments, a metatarsal, and a phalanx from an older child ca. 5 to 8 years old. The maxillary lateral incisor contained two enamel hypoplastic defects (Table 9).

Units 116N92E and 116N94E contained both adult and subadult remains. The subadult elements were compatible with subadults in Feature 8 and Feature 11 and were included with those features. The adult remains may be related to the adult elements in Units 114N92E and 114N94E described above and represent two adults based on duplication of the right orbital area. One of the adults, labeled Adult 1, was represented by cranial remains recovered from Unit 116N94E. The incomplete frontal had a slightly rounded orbital margin. The area of the supraorbital tori was absent. The occipital was missing the base and had a moderately pronounced protuberance. Sex was indeterminate. An anterior-central portion of a right parietal conjoined with the frontal. Adult 2 was represented by primarily fragmented cranial remains, two single-rooted teeth, four hand phalanges, and a long bone shaft fragment. The frontal fragments included the right orbit and torus area, which had a somewhat blunt superior orbital margin and rounded torus. There was insufficient evidence to estimate sex. The two loose teeth were well worn. One was completely missing the crown due to dental attrition; the other still retained most of the circumferential enamel but crown height was significantly reduced.

Human remains in loose soil extending from Unit 118N86E north through Unit 122N86E were collected without separating the remains by unit. Because of this, it could not be determined if any of the remains might have been associated with Feature 6, which was just east of Unit 118N86E. Only a few fragments and incomplete elements were found, but at least three individuals were represented, one adult and two subadults. The adult remains included a temporal fragment, mandible fragment, two loose teeth, a thoracic vertebra, an incomplete left tibia, a fibula shaft portion, seven long bone shaft fragments, and a left third metatarsal. One of the loose teeth was a single-rooted tooth with the crown broken off and the root very eroded taphonomically. The other was a mandibular left third molar with fairly advanced wear and a slightly cupped occlusal surface. Slight calculus deposits were noted. A small carious lesion was present at the cemento-enamel junction. A cranial fragment, two rib fragments, and an incomplete left humerus diaphysis were compatible with a very general age estimate of 2 to 6 years. An incomplete, unisided radius diaphysis came from an older child, probably 8 to 10 years of age.

Adult-sized fragments, incomplete elements, and miscellaneous small fragments from the following units could not be associated with any feature: 114N88E, 116N88E, 118N90E, 118N92E. Subadults fragments from 120N92E were too small to suggest an age estimate, and no features were nearby. Bone fragments, primarily from adults, were collected along the graded road bed in units 102N96E, 104N98E, 106N98E, 110N98E, 112N96E, 116N96E, 118N96E, 120N94E, 122N94E, 122N98E, 124N98E, 126N96E, and 126N98E.

Surface Collection

General surface collections were conducted in June, July, and September 2005 prior to establishment of the excavation grid. The area collected included the entire stripped surface of the knoll and the roadbed going downhill to the southwest of burial area. Two pieces of chert debitage and a chert scraper were recov-

ered along with human skeletal material.

A minimum of eight adults were represented by left femora, labeled Adult 1 through Adult 8. The proximal third of the shaft was duplicated in Adult 1 through 7. Adult 8 was represented by the distal half to two-thirds of the left femur shaft. It did not match with the Adult 6 or 7 femora, and duplicated portions of the Adult 1 through 5 femora. Overall robusticity and femoral metrics suggested Adult 1 was possibly male and Adult 2 possibly female. The other femora were indeterminate for sex.

Adult cranial remains included a minimum of five frontals, four left and four right parietals, four occipitals, three left and eight right temporals, four left and two right zygomas, a pair of maxillae, two additional left and two additional right maxillae, five mandibles, and nine loose teeth (see Table 7 for detailed dental inventories). The hundreds of postcranial elements and fragments represented nearly all skeletal elements and are detailed in Table 1.

Adult remains that were possibly from males included three frontals, one mandible, two left scapulae, a right innominate, a right humerus, three right femora, two left and one right tibiae, and three right tali. Remains that were possibly female were two frontals, two mandibles, left and right scapulae, left and right humeri, left and right radii, a right femur, and a right tibia. The minimum number of males was three and females was two.

Age estimates were derived from dental remains and two right innominates. Maxilla L1 displayed slight wear on the premolars and slight to moderate wear on the first molar, suggesting a young adult. A mandible missing the anterior alveolar portion, Mand 1, also had dental wear suggesting a young adult. It is possible these two elements came from the same individual. The mandible morphology suggested a possible female. The maxilla labeled Max R2 contained the sockets for the incisors and canine. The lateral incisor and canine were in situ and displayed significant exposure of the dentin that was cupped in form. Age was estimated to be middle-aged or older adult. A right mandible portion, Mand 3, contained the three molars. The first and second molars were well worn, and the third molar moderately worn, also suggesting a middle-aged to older adult. Max R2 and Mand 3 may be from the same individual. The morphology of Mand 3 suggested a possible male. A second right mandible portion, Mand 4, included the socket for the second premolar through third molar with the molars in situ. All the molars were moderately worn, suggesting a middle-aged adult. An older adult is represented by the right half of mandible, Mand 2. The incisors and canine were missing postmortem, with only the second premolar and third molar in situ. The first premolar and first and second molars had been lost antemortem, with the molar sockets completely resorbed. The second premolar crown was completely destroyed by a carious lesion with the pulp chamber exposed. The third molar was severely worn with significant loss of crown height. Evaluation of the auricular surface of the two incomplete right innominates yielded age estimates of approximately 35 to 39 years (Inn R1) and approximately 45-49 years (Inn R2). Based on the dental remains, one young adult, one middle-aged adult, one middle-aged to older adult, and one older adult were represented. The young adult was possibly female, and the middle-aged to older adult was possibly male. The right innominates may be associated with any of these individuals except the young adult.

A minimum of 11 subadults were represented by remains collected from the site surface. These subadults were generally differentiated by age estimates derived from dental development and the size of cranial and postcranial remains. Each subadult was given a letter designation. If more than two subadults fell in the same age category, they were distinguished by an added number, such as Subadult B-1 and B-2, both 0.5 to 1.5 years old.

Subadult A was a newborn to 6 month old represented by eight cranial fragments, two loose teeth, a left rib, two rib fragments, an incomplete left humerus diaphysis, and a nearly complete left femur diaphysis. Dental age was 0.25 to 0.75 years. The estimated length of the femur diaphysis (80 mm), suggested a newborn to 6 month old.

Subadults B-1 and B-2 were 0.5 to 1.5 years old. Subadult B-1 was represented by nine cranial fragments, a mandible fragment, two loose teeth, a left rib, seven rib fragments, two thoracic vertebrae, a right

ilium, and four long bone diaphyses. Measurement of the left ulna diaphysis and right ilium breadth fell in the range of 0.5 to 1.5 years. Measurement of the left humerus diaphysis was in the range of 0.5 to 2.5 years. Dental age derived from the deciduous maxillary right first molar and mandibular left first molar was 1.15 to 1.95 years. Subadult B-1 was represented by a deciduous mandibular left first molar, right ilium, and thoracic vertebra. The tooth and ilium duplicated remains from Subadult B-1. Development of the thoracic vertebra, which had fused arches, suggested a separate individual, but it is possible this element was associated with Subadult B-1. The tooth associated with Subadult B-2 and the ilium breadth provided identical age estimates to Subadult B-1.

Twenty-six cranial fragments, an incomplete mandible, a loose tooth, left rib, three rib fragments, and an incomplete left radius diaphysis represented Subadult C. The mandible contained all the left tooth sockets for the deciduous central incisor through second molar. The right side was damaged and had sockets for the deciduous molars only. Both left and right permanent first and second molars were unerupted. The deciduous left first and left and right second molars were in situ and displayed no dental attrition. The deciduous second molars each contained a small carious lesion on the occlusal surface. The permanent maxillary left central incisor contained three enamel hypoplastic defects (Table 9). Based on dental development, age was estimated to be 2.85 to 3.9 years. The radius diaphysis length was estimated, providing an age range of 2.5 to 4.5 years for this individual.

Subadult D was represented by remains found together. These were a cranium missing the left maxilla and temporal, a left mandibular body fragment, six loose teeth, and an unfused portion of the first cervical vertebra. The deciduous right central incisor through second molar were in situ and erupted. The permanent first molar was absent, but had been unerupted. The six loose teeth were the deciduous maxillary left lateral incisor and first and second molars, and mandibular left canine through second molars. No dental pathologies or dental wear were noted. Dental age estimated from the remains was 1.15 to 1.55 years.

Seven cranial fragments, two mandible fragments, and 17 postcranial elements or fragments represent Subadult E. No dental remains were recovered. Age was estimated based on the estimated length of a left humerus diaphysis (170 mm) and comparison with the remains of a confidently aged 2.5 to 3.5-year-old. Age was estimated to be 3.0 to 5.5 years.

Subadult F, estimated to be 5.5 to 7.5 years of age, was represented by an incomplete right parietal, right maxilla and palatine bone, one loose tooth, incomplete left scapula, one rib, five vertebrae, and four long bone diaphyses. The right maxilla contained sockets for all the deciduous teeth and permanent first and second molars. The deciduous central incisor was a loose tooth, and the deciduous lateral incisor was missing postmortem. The deciduous canine through second molar and permanent first molar were erupted. The permanent second molar was unerupted. A small carious lesion was present on the lingual surface of the permanent first molar. Wear on the deciduous central incisor and deciduous molars was slight to moderate, with the canine slightly more worn than the molars. Evaluation of the unerupted permanent second molar development provided a dental age of 6.2 to 6.4 years. The left humerus diaphysis was 192 mm long, providing an age estimate of 5.5 to 7.5 years.

Subadults G-1 was represented by an incomplete frontal, a right zygoma, five cranial fragments, three loose teeth, an incomplete left clavicle, four ribs, a right femur diaphysis, a left patella, right tibia and fibula diaphyses, and six hand and foot bones. The three loose teeth were the permanent maxillary left incisors and probable second molar. All were slightly worn. Dental age was estimated to be 8 to 12 years. The right femur diaphyseal length was estimated to be between 300 and 320 mm long, providing an age estimate of 8.5 to 10.5 years. The size of the right fibula diaphysis was consistent with this age estimate. Subadult G-2 was represented by a right third metatarsal. One of the foot bones associated with Subadult G-1 was a smaller left third metatarsal. Subadult G-2 was estimated to be in the same age range, 8 to 12 years, as Subadult G-1. Left and right parietal fragments and an occipital fragment may be associated with either Subadult G-1 or G-2, based on the size of these elements.

Forty-nine cranial fragments, a loose maxillary left first or second molar, a metacarpal or metatarsal, and

21 rib or long bone fragments could not be assigned to a specific individual, but may be associated with Subadult C, E, F, G-1, or G-2. The loose molar was unerupted and provided an age range of 2.7 to 7.0 years, depending on whether it was a first or second molar.

Subadult H was a juvenile approximately 13 to 16 years old. This individual was represented by 11 cranial fragments, an incomplete right maxilla, three loose teeth, two ribs, a thoracic vertebra, three sacral and three innominate fragments, five hand bones, incomplete right humerus, incomplete left ulna, incomplete right femur, two tibia epiphyses, and five foot bones. The two tibia epiphyses, one proximal and one distal, were both unfused. Fusion of the tibial epiphyses usually occurs between ages 13 and 19 years. The right maxilla contained the sockets for the central incisor through second premolar with all except the central incisor in situ and erupted. A loose maxillary left central incisor was possibly associated with these dental remains. It had four enamel hypoplastic defects (Table 9). The incisors displayed slight wear that was flat in form. The canine and premolars were unworn. The second premolar root was fully formed, providing an age estimate of at least 13.8 to 14.3 years. The right lateral incisor was shovel-shaped.

Three loose teeth and a rib fragment may be associated with Subadult G-1, G-2, or H. They were the maxillary left and mandibular right canines, which were unworn, and a mandibular left first or second molar. The maxillary canine had one linear enamel hypoplastic defect (Table 9). The molar had two small carious pits, one on the occlusal surface and one on the buccal surface. This tooth was slightly worn. Because the molar's position could not be identified, it may represent an individual anywhere between 8 and 18 years old. The rib fragment was too small to associate with a more specific age range.

Subadult I was an older juvenile represented by a nearly complete right maxilla with the right palatine bone zygoma attached, a manubrium, a right clavicle, two vertebrae, an incomplete left innominate, incomplete right radius, and two metatarsals. Indications of age included the unfused sternal epiphysis of the right clavicle (less than 24 to 29 years); incompletely fused epiphyseal rings on the two vertebrae (less than 20 to 24 years); unfused iliac crest and partially fused ischial tuberosity (ca. 16 to 18 years); and incomplete fusion of the distal epiphyses of the metatarsals (ca. 11 to 16 years). Additionally, the maxillary right third molar was unerupted. This tooth was missing postmortem, but it had not completely formed, suggesting an age of less than 18 to 21 years. In the right maxilla, the incisors, canine, and second premolar also were missing postmortem. The first premolar and first and second molars displayed almost no wear. Slight calculus was present. A general age range of 16 to 20 years is posited for Subadult I.

Very few of the miscellaneous adult remains displayed any pathology. Degenerative changes were the most commonly observed. Lipping was observed on a cervical vertebra; three thoracic vertebrae; one lumbar vertebra; three vertebral fragments; the distal articular surfaces of right humeri Hum R3 and R6; the distal articular surface of an incomplete right radius Rad MiscR; and the inferior articular margins of a right talus; Moderate enthesis development was present along the shafts of four proximal row hand phalanges. and on the heel of a left calcaneus. Incomplete right tibia, Tib R3, consisting of the shaft, displayed moderate active periostitis on the medial surface above the nutrient foramen covering an oval-shaped area measuring 3.7 cm superoinferiorly by 3.0 cm mediolaterally. Partially healed periostitis was present on the lateral surface in the distal portion of the shaft over an area measuring 4.3 cm superoinferiorly by 2.2 cm mediolaterally. The circumference at nutrient foramen for this tibia shaft was in the range for males. The distal half of a left femur, Fem MiscL, had a distal femoral cortical excavation which may suggest trauma to the left knee joint. A left fifth metacarpal had a pronounced muscle attachment forming a ridge along the shaft as well as two smooth exostoses on the medial shaft surface. These suggested a possible healed fracture or trauma to the metacarpal.

Only two subadult elements displayed pathologies. The right orbit in the frontal from Subadult C exhibited slight cribra orbitalia. The left fifth metatarsal from Subadult H contained a pronounced ridge along the shaft and a small exostosis on the anterior shaft near the distal end, suggesting a possible healed fracture or trauma.

The right femur diaphysis from Subadult G-1 had round indentations on the shaft identified as gnaw

marks from a raccoon or fox. Ten were on the medial and opposing lateral surface on the distal third of the shaft, scattered over an area measuring 3.2 cm superoinferiorly by 2.0 cm anteroposteriorly. They were 3 to 5 mm in diameter and about 1 mm or less in depth.

The surface-collected remains represent a minimum of eight adults, including at least three males and two females. The 11 subadults ranged in age from newborn to older juvenile.

Ceramic Artifacts

The 56 pot sherds recovered from 13PM248 were examined by Michael Perry, Project Archaeologist, Office of the State Archaeologist. The majority were plain body sherds or “crumbs,” but 22 were decorated and/or culturally identifiable. Eighteen body sherds displayed smoothed-over cord-roughened exteriors. The culturally identifiable sherds included two from Mill Creek bowls, one with an interior slip; a shoulder sherd from a Mill Creek seed jar; and a rim sherd identified as probably Great Oasis or Mill Creek. The fifth sherd was a collared rim sherd, specifically identified by type as a Forman rim by Steve Lensink, Associated Director, Office of the State Archaeologist. Most of the sherds were recovered from the North Slope area, including three culturally identifiable ones. Two were associated with Feature 1, Individual 1-3. One sherd was in the vicinity of Feature 5, and five were from the unit containing Features 9, 10, and 11. Fourteen sherds, including two culturally identifiable ones, were from the unit containing Feature 12, located just south of the North Slope area.

Lithics, Bone and Shell Artifacts – by Mark L. Anderson

LITHICS

The lithic assemblage recovered from 13PM248 includes chipped stone tools and debitage. The tool types are based on morphological characteristics and do not necessarily indicate actual tool function, although function is considered. Tool typologies used in this analysis are based on those of Ahler (1986), Andrefsky (1998), Callahan (1979), Crabtree (1972), Justice (1987), Morrow (1984, 1994), Perino (1971), and White (1963, 1968). Ten chipped stone tools and twenty-eight pieces of debitage were recovered during the excavations.

Projectile Points and Fragments

The chipped stone tools included two complete projectile points and two projectile point fragments, two biface fragments, two scrapers, and one retouched flake. Projectile points are typically spear, dart, or arrow points. They may also be effectively used for a variety of cutting, sawing, and scraping tasks in the form of hafted knives. Two complete projectile points and two projectile point fragments were recovered from 13PM248 with all four representing arrow points.

The two complete projectile points resulted from refitting. Both were broken in two pieces and were noticed as matching pieces during this analysis. The first refit point, a finely made pressure flaked point, measured 45.2 x 11.8 x 3.3 mm with the width taken at the base, weighed 2.8 g, and was made of either an unidentified chert type or possibly from a heavily weathered piece of Knife River Flint. It had relatively deep, u-shaped side notches low on the blades, squared basal ears, with the base and notches heavily ground. The distal fragment was recovered from Unit 98N96E (Feature 1), while the bulk of the point was recovered in association with Feature 1, Adult 1-3. The second refit point was also a finely made pressure flaked point, measuring 18.7 x 13.4 x 3.6 mm and weighing 0.8 g. It was likely made of glacial till chert and had relatively deep, u-shaped notches, squared basal ears, with the base and notches heavily ground. It was much smaller in size than the first refit point but otherwise was almost identical in most respects and likely represented an exhausted and discarded point. Both the blade and basal portions were recovered from Fea-

ture 1, Adult 1-3. The two projectile points fit well into the Cahokia Cluster typically dating from roughly A.D. 900–1,100 (Justice 1987:232–235).

Two additional projectile point fragments were recovered from 13PM248 and both were blade fragments. The first was relatively well made, measured 8 x 5 x 2 mm, weighed 0.7 g, and was made of Winterset chert. The distal tip was absent along with both basal ears. It appeared that the ears broke removing most of the base and both notches. This fragment was recovered from loose soil in the North Slope. The second point fragment was also relatively well made, measured 7 x 4 x 1 mm, weighed 0.5 g, and was made of Sheldon chert. The distal tip was also absent as was the entire base, broken off across the neck. This fragment was recovered from Feature 12 in Unit 124N88E. The barbs were intact as were the upper portion of the u-shaped notches on both point fragments. They were similar to the second refit point, and both point fragments fit within the Cahokia Cluster.

Biface Fragments

Two biface fragments were recovered from 13PM248. The first was the distal half of a well-made pressure flaked biface measuring 23.1 x 24.9 x 8.8 mm and weighing 5.2 g. It was made of heat treated Tongue River Silica. The biface was broken at the approximate midpoint exposing a bi-convex cross-section. The basal corners were smoothly rounded, and the base was very convex with the midline of the biface forming a slight pointed projection along the convex base. This artifact likely represents a stage 4 biface with only notching left to make it a stage 5 or finished tool. This biface was recovered from Feature 8 in Unit 116N92E at the 0-20 cm level. The second biface fragment was only a small crescent from one of the lateral edges, measuring 20.8 x 8.0 x 6.4 mm, weighing 5.2 g, and made of some type of Mississippian System chert, possible Maynes Creek. This artifact was at least a stage 3 biface but may also have been stage 4 if more were present. This second biface was recovered from disturbed soil in Feature 3, Unit 1206N96E. Both biface fragments showed characteristic breakage patterns consistent with modern mechanical fracturing. These types of breaks are typical of being driven over by medium to heavy equipment, such as a tractor or backhoe, or struck by an implement blade or edge.

Scrapers

Scrapers are chipped stone artifacts with one or more steep working edges; three were recovered at 13PM248. The first scraper was made on a bifacial thinning flake of Winterset chert, measured 15.6 x 17.6 x 4.4 mm, and weighed 1.5 g. The primary working edge was along the distal end with steep retouch on the right lateral edge. A portion of the left lateral edge had been broken but a spur-like projection remained at the left-distal edge junction. These spurs are often formed as a result of breakage and repair indicating that this scraper has been used and refit at least once and suggests it may have once been larger and had a long use-life. The scraper was recovered from the general site surface.

The second scraper was made on a large, broken, bifacial thinning flake, measured 45.9 x 35.8 x 7.1 mm, weighed 15.2 g, and was made of Bijou Hills Orthoquartzite. The original striking platform had been worked to form the primary scraping edge with steep retouch forming scraping edges along both lateral edges extending back to the break. The break on this artifact is also typical of mechanical breakage through either being driven over or struck with an implement blade or edge. This scraper was recovered from the North Slope.

The third scraper was complete and a rather unique tool form. The scraper was made on a rectangular piece of shatter, measured 23.1 x 14.0 x 8.1 mm, weighed 3.0 g, and was made of Hertha chert. Both distal and proximal ends had steep retouch forming 13.2 and 13.4 mm working edges respectively. The left lateral edge, when viewed from the dorsal surface, had been retouched the entire length forming another working edge. Although this was not a steeply flaked edge, the piece of shatter was convex along this edge, and it is likely that this edge was also used for scraping tasks. The third scraper was recovered from the loose soil in the North Slope, Unit 126N94E.

Modified flakes

A single retouched flake was recovered from 13PM248. This tool was made on a secondary decortication flake, measured 38.4 x 30.9 x 8.6 mm, weighed 7.2 g, and was made of a likely heat treated glacial till chert. The tool was broken, similar again to mechanical breakage, with the remaining 31.6 mm left lateral edge and the distal 24.8 mm of the right lateral edge retouched. The remaining 20.2 mm of the right lateral edge was not altered and may represent the location of the original striking platform. Although the retouch along both lateral edges was somewhat steep, it does not fit the classic typological definition of a scraper. Functionally, it could have served as such, as well as meeting other generalized cutting needs. The retouched flake was recovered from Feature 1, in association with Adult 1-2 or Subadult 1-1.

Debitage assemblage

The debitage assemblage was composed of 28 pieces and included the full range of lithic reduction stages. The assemblage was heavily biased to the early stages of lithic reduction with 50% representing shatter, primary and secondary decortication flakes. These debitage types represent removal of cortical or exterior weathered material and occur during the first several stages of biface manufacture. There were four reduction flakes in the assemblage which represented both early and mid-stage reduction but at least later than the decortication proves. Four bifacial thinning flakes and six flake fragments composed the remainder of the assemblage. One of the four bifacial thinning flakes had a small amount of cortex on its dorsal surface indicating that the flake was likely removed during either stage 2 or 3.

At least eight different types of lithic raw material were identified in the assemblage. Tongue River Silica composed the greatest amount at 36 % (n=10) and included eight flakes and two pieces of shatter. This is a naturally occurring material derived from the locally available glacial till gravels. The next most common was undifferentiated glacial till chert and was identified as similar to other glacial till chert types held in the University of Iowa, Office of the State Archaeologist (UI-OSA) lithic raw material assemblage. Four flakes were not identifiable to any known samples in the UI-OSA assemblage but most likely also represent chert recovered from locally available glacial till gravels. Four flakes of Sioux quartzite, another locally available material from both glacial tills and bedrock, were contained within the assemblage. A single flake of Knife River Flint was recovered. Although the origin of this material is in western North Dakota, it does appear in cobble form in the locally available glacial till gravels. When combined with the previous four types, 86 percent (n=24) of the lithic raw material recovered at 13PM248 was obtained locally. The remaining 14 percent (n=5) included three flakes of Republican jasper and one flake of an unidentified Pennsylvanian System chert type. Republican jasper is a lithic type found in Nebraska and Kansas, while Pennsylvanian System cherts are found a bit closer in west central and southwest Iowa. Both of these types are considered non-local chert types and could have only arrived on site through human agencies.

Based on this information it appears that the lithic debitage recovered from 13PM248 represents primarily early stage lithic reduction with the majority of materials originating from locally available sources. With half of the debitage representing early stage reduction, a general lack of later stage debitage, and particularly the absence of smaller size grade debitage, this assemblage suggests that it may likely represent redeposited trash rather than material produced on site.

Chipped Stone Summary

Ten chipped stone tools and twenty-eight pieces of debitage were recovered during the recovery excavations at 13PM248. The chipped stone tools included two complete projectile points and two projectile point fragments, two biface fragments, three scrapers, and one retouched flake. The debitage assemblage represents primarily early stage lithic reduction with the majority of materials originating from locally available sources. Based on the above analysis, the entire lithic assemblage showed signs of breakage due to mechanical impacts, either from being driven over or from being hit by an implement blade or edge. The debitage assemblage was weighted heavily towards early stage lithic reduction materials. This may indicate

that they represent redeposited trash rather than material produced on site. The chipped stone tools were likely complete artifacts of rather high quality manufacture. The two refit projectile points and the two point fragments indicate an association with the Late Prehistoric period. Raw material types present in both tools and debitage suggest a primary reliance on locally available materials but also indicate a trade potential including material derived from one hundred miles away or more.

BONE ARTIFACTS

Three modified bone artifacts, 28 unmodified bones, and numerous bone fragments were recovered at 13PM248. The three modified bone artifacts are described in detail below. The 28 unmodified bones were either complete, contained an articulating surface, or had some other unique identifier affording Order identification. They are described below, per provenience. Further identification to Family, Genus or Species was not pursued. UI-OSA personnel and the OSA faunal comparative collection assisted this identification. The numerous unmodified bone fragments represent unidentifiable portions of bones and are not discussed.

A rectangular bone fragment was recovered from loose soil in the North Slope, Unit 126N94E. It measured 70.6 x 34.0 x 3.3 mm, weighed 8.6 g, and was made of the distal end of a rib bone likely from a bison or elk. Both surfaces and three of the four edges had been ground smooth, while the fourth edge had been broken. There appeared to be rodent gnaw marks on the external surface of the artifact. There was no specific indication of potential tool use, and it may represent a blank or as yet unfinished item such as a pendant or other piece of jewelry.

A mammalian baculum was recovered from Unit 118N92E, having fallen out of a collapsed bank about 30 cm below the scraped ground surface. It had been slightly modified by grinding the distal end to a sharp point. The proximal end has been broken off removing the articulated surface. The bone was most likely from a raccoon, but could also be from a badger. Absence of the articulated surfaces limits positive species identification.

Another rectangular bone fragment was recovered in association with Feature 1, Adult 1-3. It measured 24.5 x 16.4 x 1.5 mm, weighed 0.6 g, and was made of a rib bone from a larger animal, likely deer, elk, or possibly bison. One lateral edge and the proximal edge had been broken. There was a single hole drilled through the bone near the corner of the two intact edges that measured 2.66 mm in diameter. Another drill hole was present 9.2 mm from the previous one but that lateral edge broke through the hole. The original artifact size is undetermined but its form is consistent with bone pendants recovered from sites of similar antiquity.

Two complete bird tibiae were recovered from Feature 1 in association with Adult 1-3. One fish bone, possibly a scapula, was recovered from a disturbed area of Feature 3 in Unit 106N96E. Seven bones were recovered from Feature 8 in Unit 116N02E. These were two bird tarso-metatarsi and one tibio-tarsus that may represent one individual; one unidentified bird long bone shaft and one pharyngeal arch from a fish; and two rodent incisors.

The North Slope yielded bones from several animals. Two were reptile long bones, possibly from a turtle. Two rodent incisors and six rodent vertebrae were recovered from a disturbed area in Unit 126N92E of the North Slope. Three additional bones from the North Slope were the right half of a small mammal pelvis, likely from a rodent; two amphibian long bones; and one reptile vertebra, possibly from a snake.

One rodent vertebra and one likely rodent vertebral fragment were recovered from Unit 108N90E (no associated feature). A bison tibia fragment was recovered from shovel test 2 at 65 cm below the scraped ground surface.

SHELL ARTIFACTS

Four modified shell artifacts and numerous unmodified shell and shell fragments were recovered at 13PM248. The four modified shell artifacts are described in detail below. Several fresh water mussel shells

in the assemblage had complete or partial hinges but were not identifiable. Identification was assisted by Turbitt (2005), UI-OSA personnel, and the OSA faunal comparative collection. The numerous unmodified shell fragments representing unidentifiable portions of likely fresh water mussel shells are not discussed.

A pair of marine shell beads, one each, were recovered from Feature 8 (Unit 114N92E) and the North Slope. These two shells likely belong to the marine gastropod *Marginella*, and were nearly complete with the following exception. The apex had been ground off exposing the umbilicus. This afforded an opening to pass a fine string through the aperture and out the removed apex so the shell could be worn as a pendant, necklace, or other piece of jewelry.

A third shell disk bead measured 6.86 mm in diameter and 3.44 mm thick. The hole was tapered from both sides with the larger opening measuring 3.4 mm and the opposite side measuring 2.48 mm. It is possible that this disk bead could be made from a *Busycon* shell but without further analysis this is only speculation. The bead was collected from the southwest corner of Unit 116N92E, but no further excavation was conducted in this area. The bead was recovered about 22 cm below the scraped surface and was not directly associated with any designated feature.

One complete marine shell columella was recovered from the south end of Unit 124N88E in Feature 12 (Figure 4). This appeared to be a complete columella likely from the marine gastropod *Busycon* or welk. It measured 202 mm in maximum length by 19.52 mm at its widest near the approximate midpoint. This artifact had a drill hole near the apex that measured 4.4 mm in diameter and indicates that this was likely worn as a pendant.



Figure 4. Modified columella probably from a marine gastropod *Busycon* or welk found in Feature 12. Drilled hole to left in photo.

Summary

Site 13PM248, known as the Heendah Hills Site, was discovered in 2005 following mechanical stripping of the knoll where the site is located. Stripping revealed human skeletal remains that had been disturbed from their original burial contexts and were scattered across most of the eastern portion of the knoll and along the eastern side of a road that was graded around the knoll's circumference. Investigations carried out in May and July determined that some intact or partially intact burial features were still in situ. A limited archaeological excavation conducted in the fall of 2005 identified 12 features, most of which were excavated or partially excavated due to significant disturbance or their location within the graded roadbed. Human

skeletal remains and a limited number of artifacts were collected from the site surface where the elements were scattered and redeposited, often in loose soil. Additional remains came from features and the heavily disturbed area along the north portion of the knoll (North Slope).

Bundle burials were present in Feature 5 and likely in other features, although recent disturbance made evaluation of burial context difficult to determine with certainty. A likely bundle burial was partially exposed in Feature 12 but not excavated. Extended burials were present in Features 1, 2, and probably Feature 8 (two neonates to newborns). Portions of probable extended burials were observed in other features (8, 9, and 10) but not excavated. In addition to a few artifacts that could be positively identified as grave goods, two burials contained small amounts of red ochre, Adult 1-3 and Adult 2-2.

The investigations and archaeological excavation resulted in the collection of human skeletal remains representing a minimum of 109 individuals, including 45 adults and 64 subadults. The minimum of 45 adults was determined by 21 adults represented within features and 24 duplicate proximal shaft portions of the left femur recovered from the North Slope and general surface collection. Of the 45 adults, 19 were male: one young; two young to middle-aged; four middle-aged; three middle-aged to older; and two older adults. Seven males were of indeterminate age. Thirteen adults were female: four young; one young to middle-aged; two middle-aged; one older adult; and five of indeterminate age. Sex of the remaining 13 adults was indeterminate but included two young adults, one young to middle-aged adult, two middle-aged adults, one middle-aged to older adult, and one older adult.

The minimum of 64 subadults was determined by age estimates and/or duplicate elements within the features (40 subadults) and 24 subadults represented by disturbed remains from the North Slope and one surface burial (Subadult D). The subadult ages ranged from late-term fetal to older juvenile (ca. 20 years of age). Six were fetal to newborn; 24 were infants (newborn to 3 years old); 26 were children (3 to 12 years old); and 8 were adolescents (12 to 20 years old).

Nearly 700 teeth were present and observable (i.e., excluding unerupted teeth in their crypts). Dental pathologies included carious lesions, dental abscesses, antemortem tooth loss, hypercementosis, dental calculus, and enamel defects. Carious lesions were present in 102 of 599 erupted teeth, an observed frequency of 17.02%. There were 463 tooth sockets intact enough to evaluate the presence or absence of alveolar abscesses and antemortem tooth loss. Of these, 19 displayed evidence of periodontal abscessing and 11 contained periapical abscesses. Antemortem tooth loss with the socket resorbing or completely resorbed was observed for 45 teeth (9.7% of all intact sockets). The roots of 341 teeth were observed for the presence or absence of hypercementosis. Slight to moderate hypercementosis was observed in 36 teeth (10.6% of all teeth with intact roots). Some degree of dental calculus was relatively ubiquitous, even on some of the deciduous teeth. Older individuals generally had heavier deposits, as would be expected. Advanced dental wear was noted in some of the dental remains particularly for older individuals. However, attrition was generally slight to moderate for the majority of adult dentition. Of the 300 teeth that could be evaluated for the presence or absence of enamel defects, 64 teeth (21.3%) were affected. Only five individuals had enamel hypoplastic defects that were positive for nine episodes of enamel growth disruption (Adult 1-3, Adult 2-1, Subadult 5-2, Subadult 6-5, and Subadult NS-14). This relatively low incidence of evidence for nutritional or disease-related stressors could be the result of a healthy population. However, many of the individuals with dental remains had only a few teeth, some only one or two. Of the nine positive episodes, six occurred between 1.5 and 4.0 years of age and may be related to weaning stress. The other three episodes occurred between 4.0 and 6.0 years.

Overall, the dental remains are indicative of a diet including cariogenic foods as well as meat proteins responsible for the accumulation of dental calculus. Some grit content in the diet, or occurring during food processing, led to continuous dental attrition throughout life. Both dental wear and carious lesions leading to dental abscesses and exposed pulp chambers likely caused the relatively high observed incidence of antemortem tooth loss. Dental health suggests a sedentary lifestyle including some agricultural activity as well as hunting of game. The location of the site east of the Big Sioux River, the presence of freshwater

clamshell in the burial fill, and fish bone recovered from the site strongly suggest a riparian component to the diet as well. The presence of marine gastropods indicates trade networks extended to salt-water areas, probably the Gulf Coast. Some of the raw lithic material came from as far away as 100 miles or more. These artifacts suggest not only reliance on local materials, but an extensive trade network as well.

Osseous pathologies included degenerative changes associated with use wear or aging; cribra orbitalia; porotic hyperostosis; periostitis; osteoporosis; and evidence of trauma including healed fractures. Degenerative joint disease was noted in a minimum of nine individuals: Adult 1-1; Adult 1-2; Adult 1-3; Adult 2-2; Feature 4 miscellaneous adult remains; Feature 5 miscellaneous adult remains; Adult 7-3 or 7-4; and remains recovered from the North Slope. Two incidences of cribra orbitalia were noted in a frontal portion associated with Subadults 6-3 to 6-6 and North Slope Subadults NS11 to NS13. Moderate porotic hyperostosis was present on an unsided parietal portion associated with Subadult 12-5. At least three adults had elements displaying periostitis, Adult 2-1; Adult 7-3 or 7-4; and seven adult elements from the North Slope that may all have been from one individual. Osteoporosis was noted in three elements (a right humerus, left femur, and right tibia) among the miscellaneous adult remains from the North Slope and in one gracile, unsided tibia portion among the No Feature remains. It is possible all these elements were from the same individual.

Evidence of trauma included the displacement and possible fracture of a left humerus (Adult 1-1); fused phalanges (Adult 1-2); possible fracture of the distal left humerus (Adult 2-1); compression fracture of three vertebrae and the first sacral body from one individual (North Slope miscellaneous adult remains); a healed lesion one, or fracture of, a frontal (North Slope miscellaneous adult remains); and healed fractures of a right radius and right ulna probably from the same individual (North Slope miscellaneous adult remains). Cysts or lesions were noted on a rib from Adult 1-2 and a lunate from Adult 1-3. Evidence of infection in the maxillae and palatine bones of Adult 7-1 was possibly the result of infection spread from a lesion and dental abscess associated with the maxillary left first premolar. Also noted was fusion of the second and third cervical vertebrae associated with Subadults 6-3 to 6-6, although this may not necessarily have been pathological in origin.

Based on artifacts found at the site, some in association with human remains, cultural affiliation of 13PM248 is probably Mill Creek, although the burial site may have been used over an extended period of time and by other cultures. The site's location in the Loess Hills, approximately one-half mile east of and overlooking the known Mill Creek village 13PM4, Kimball Site, is also suggestive of a Mill Creek affiliation.

All the human remains and related artifacts were reburied on site in May 2012.

Acknowledgements

The work involved in documenting, surface-collecting, and excavating at 13PM248 would not have gone as quickly or smoothly without the following volunteers who worked in the heat and dust with professionalism: Linda Burkhart, Michelle Deiber Kumm, Kerisa Pingel (staff of the Sanford Museum, Cherokee, Iowa), Mary Helgevold, Nancy Hodgson, Mark Mertes, Laurie Oxley, and Jim Younie (members of the Northwest Chapter of the Iowa Archeological Society). The author is grateful for the introduction and descriptions of Features 1 through 3 provided by Shirley J. Schermer, former director of the Burials Program (now Bioarchaeology Program), as well as her editorial suggestions. Thanks to Mark L. Anderson and Michael Perry of the OSA for their able assistance with artifact identification. Special thanks to Lara K. Noldner for reading and editing this report.

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Table 1. Inventory of Human Skeletal Remains from 13PM248, Plymouth County, Iowa.

Feature 1

Adult 1-1

9 cranial fragments
hyoid
mandible, reconstructed
10 loose teeth, plus 2 small fragments
14 ribs, incomplete – 11 left, 3 right
26 rib fragments
3 clavicle fragments
scapula, left, fragmented – portion of glenoid cavity and body with acromion process plus inferior border
4 scapula fragments
sternum, nearly complete
5 cervical vertebrae – 1st, 2nd, and 3 incomplete
11 thoracic vertebrae – 7 bodies relatively complete; 3 bodies incomplete; 1 body and arches
3 lumbar vertebrae – 1 body; 1 body and partial arch; 1 nearly complete
62 vertebral fragments – 3 body, 48 arch, 11 small miscellaneous
humerus, left, incomplete – distal half plus head
radius, left, nearly complete
2 ulnae, left and right, incomplete – left missing distal end; right distal half
2 hand naviculars, left and right
2 lunates, left and right
2 triquetrals, left and right
2 pisiforms, left and right
2 greater multangulars, left and right
2 lesser multangulars, left and right
2 capitates, left and right – left complete; right incomplete
2 hamates, left and right
2 first metacarpals, left and right
7 metacarpals – 6 incomplete
26 hand phalanges – 8 proximal row, 8 middle row, 10 distal row
2 innominates, left and right, incomplete – left incomplete ilium and ischium; right pubis and portion of acetabulum
2 innominate fragments – iliac crest
2 femora, left and right – left nearly complete; right ca. 2/3 shaft
7 femur fragments – 1 distal end fragment; 3 head or distal articular surface fragments; 3 shaft fragments
2 tibiae, left and right, incomplete – left distal 3/4; right, ca. central 1/3 of shaft
2 tibia fragments, proximal end
2 fibulae, left and right – left nearly complete in two pieces; right fragment of proximal end
3 fibula shaft fragments
2 patellae, left and right, nearly complete
calcaneus, left
2 tali, left and right – left complete; right incomplete
foot navicular, left
cuboid, left
2 1st cuneiforms, left and right
2nd cuneiform, left
3rd cuneiform, left
5 metatarsals, incomplete
2 first metatarsal portions - proximal ends
4 foot phalanges
78 miscellaneous long bone fragments
345.6 g tiny miscellaneous fragments

Adult 1-2

3 loose teeth
20 ribs – 8 left; 12 right, including first rib
53 rib fragments
clavicle, right – scapular end damaged
scapula, right
sternum, fragmented
11 vertebrae – thoracic, relatively complete

Table 1. continued.

Feature 1 continued

Adult 1-2 continued

vertebra – probable lumbar, incomplete arch
34 vertebral fragments – 17 body, 17 arch plus 10.6 g small fragments
humerus, right
radius, left – distal 2/3 of shaft
proximal end of radius, unsided
2 ulnae, left – missing distal end; right – 1/4 proximal
fragment of distal end of ulna
navicular, right
lunate, right
triquetral, right
pisiform, right
hamate, left, incomplete
2 capitates, left and right
2 greater multangulans, left and right
2 lesser multangulans, left and right
8 metacarpals – two missing heads
1 metacarpal head fragment
25 phalanges – 8 first row, 8 middle row, 8 distal row, plus one first row and one middle row fused
7 miscellaneous fragments
65.9 g tiny miscellaneous fragments

Adult 1-3

cranium
mandible
19 ribs, mostly incomplete – 12 left, 7 right
22 rib fragments
sternum, complete
2 scapulae, left and right – both missing most of body
2 clavicles, left and right
7 cervical vertebrae
12 thoracic vertebrae
5 lumbar vertebrae
sacrum – missing most of posterior surface
2 humeri, left and right
2 radii, left and right
2 ulnae, left and right
navicular, right
lunate, right
capitate, right
hamate, right
triquetral, right
lesser multangular, right
pisiforms, left and right
2 metacarpals – 4th and 5th, right
14 phalanges (hand) – 4 proximal row, 4 middle row, 6 distal row
2 innominates, left and right
2 femora, left and right
2 tibiae, left and right
2 fibulae, left and right
2 patellae, left and right
75.4 g tiny, miscellaneous fragments

Subadult 1-1 – 1.5 to 2.5 years

cranium, fragmented – 4 frontal, right petrous with incus and malleus, petrous portion, left parietal, 6 endocranial, 41 vault
1.9 g tiny cranial fragments
maxilla, fragmented
mandible, fragmented
3 loose teeth
4 ribs – 3 left, 1 right

Table 1. continued.

Feature 1 continued

Subadult 1-1 – 1.5 to 2.5 years continued

2 rib fragments
7 vertebrae – centra
9 vertebral arch fragments
clavicle, right – two nearly contiguous pieces
humerus, right
radius, left
2 pisiforms, left and right
2 metacarpals – 1 missing ends/epiphysis
10 phalanges
ischium, left
pubis, right
18 miscellaneous fragments
23.6 g tiny miscellaneous fragments

Feature 2

Adult 2-1

frontal, incomplete - left half lateral portion and inferior ½ including nasion
parietal, left and right, incomplete – left posterior and inferior portions; right posterior-inferior corner
occipital, nearly complete
2 temporals, left and right
zygoma, left – with small portion of maxilla fused
2 maxillae, left and right, incomplete – missing most of facial area
13 cranial fragments
mandible, nearly complete – missing most of left condyle
7 loose teeth
hyoid
3 sternum fragments
2 scapulae, left and right, incomplete – both missing ca. ½ of body
2 clavicles, left and right
22 ribs – 10 left, 12 right
7 cervical vertebrae
12 thoracic vertebrae
5 lumbar vertebrae
12 vertebral fragments
2 humeri, left and right
2 radii, left and right
2 ulnae, left and right
2 hand naviculars, left and right
2 lunates, left and right
2 triquetrals, left and right
2 greater multangulars, left and right
2 lesser multangulars, left and right
2 hamates, left and right
2 capitates, left and right
pisiform, right
8 metacarpals – left and right 1st, 4th, and 5th; left 2nd and 3rd
19 hand phalanges – 8 proximal row, 5 middle row, 6 distal row
2 innominates, left and right, incomplete – both missing pubes and ca. ½ of ischium
sacrum, incomplete – promontory and right superior portion and large portion of posterior
5 sacral fragments
2 femora, left and right
2 tibiae, left and right
2 patellae, left and right
2 fibulae, left and right – left missing proximal end
2 calcanea, left and right
talus, right
cuboid, right
foot navicular, right

Table 1. continued

Feature 2 Adult 2-1 continued

1st cuneiform, right
2nd cuneiform, right
3rd cuneiform, right
5 metatarsals – 3 incomplete; right 4th; right 5th missing distal end
2 foot phalanges
6 small miscellaneous fragments
45.8 g tiny miscellaneous fragments

Adult 2-2

occipital
parietal, left – posterior and inferior portions
temporal, left
8 cranial fragments
mandible – largely edentulous; missing left condyle and most of right ascending ramus
5 loose teeth
2 scapulae, left and right, incomplete
2 clavicles, left and right, incomplete – both missing medial ends
6 cervical vertebrae – 1st and 2nd complete; others incomplete
7 thoracic vertebrae, arches
5 lumbar vertebrae, arches
2 vertebral body fragments
62.3 g small to tiny vertebral fragments
3 ribs – 1 left, 2 right
50 rib fragments
2 humeri, left and right, incomplete – left distal end only; right distal 2/3s
2 humerus fragments – incomplete heads
2 radii, left and right, incomplete – left head; right incomplete shaft plus head
2 ulnae, left and right, incomplete – left olecranon process; right missing distal end
hand navicular, right
2 lunates, left and right
2 pisiforms, left and right
greater multangular, right, incomplete
lesser multangular, right
capitate, right
hamate, right
small sesamoid bone
6 metacarpals
14 hand phalanges – 5 proximal row, 3 middle row, 1 distal row, 5 either proximal or middle row
sacrum, fragment of posterior surface
2 innominates, left and right – portions of ilium with portions of auricular surfaces and ca. ¾ of acetabulum
5 innominate fragments
2 femora, left and right, incomplete – left head; right proximal 2/3s and fragmented distal end
patella, right
2 tibiae, left and right, incomplete – incomplete proximal ends, somewhat crushed
fibula, right, incomplete – distal end
calcaneus, incomplete – partially crushed
2 tali, left and right, incomplete
3 metatarsals
80 long bone fragments
6 small miscellaneous fragments
69.2 g small miscellaneous fragments
172.9 g tiny miscellaneous fragments

Possibly Feature 1 or 2

Adult – 100N96E

7 cranial vault fragments – 2 bleached, 2 possibly cranial
temporal fragment
long bone shaft fragment – from smaller long bone
7 miscellaneous fragments – 2 bleached, adult or subadult

Table 1. continued

Possibly Feature 1 or 2 continued

Adult – 100N100E

2 cranial fragments – bleached
scapula fragment – body margin
greater multangular, left
femur shaft fragment – possibly distal posterior shaft
2 long bone shaft fragments
1st cuneiform, left
5 miscellaneous fragments

Adult – 102N98E

cranial ossicle
3 long bone shaft fragments – all from same larger fragment of larger long bone
Adult or Subadult
cranial vault fragment
6 miscellaneous fragments

Feature 3

Adult 3-1 – indeterminate age and sex

2 femora, left and right, incomplete – left: distal 2/3s; right: proximal end with head/neck, distal 1/3 plus shaft fragment
2 patellae, left and right
tibia, left, incomplete – missing proximal end
Adult 3-2 – indeterminate age and sex
2 tibiae, left and right – left: anterior superior fragment with tubercle, 4 proximal end fragments probably from this left tibia;
right: proximal end

Adult 3-3 – possible female of indeterminate age

scapula fragment, right – glenoid fossa area
radius, left – distal end, bleached
innominate, left – inferior and anterior of ilium with about 1/3 of auricular surface (eroded) and acetabulum

Adult Miscellaneous Remains

2 cranial vault fragments
mandible – right missing lateral and posterior to right I2; inferior 1/2 of body missing below incisors; left condyle missing
clavicle fragment, right – from lateral end
7 scapula fragments, right and unsided – right: coracoid process, acromion process end; unsided: 3 body, 2 spine
convex articular surface fragment – possible humerus head or femur condyle
3 vertebra fragments – transverse process; lumbar arch fragment; thoracic or lumbar arch fragment
5 innominate fragments – 3 iliac crest; portion of ischium, ilium body
humerus, right – distal 1/2 with most of lateral epicondyle and capitulum broken off; capitulum fragment
ulna, unsided, incomplete – incomplete distal end
capitate, left
triquetral, left
2 metacarpals, left and unsided – left 5th; unsided shaft portion
6 hand phalanges – 2 proximal row, 1 middle row, 3 distal row
2 tibia fragments – anterior shaft and posterior shaft with nutrient foramen
2 fibula shaft portions, unsided
metatarsal, unsided – distal 1/3
metacarpal/metatarsal fragment – shaft
69 long bone shaft fragments – mostly femur and tibia

Subadult 3-1 – infant

2 diaphyses, incomplete – unidentified
phalanx – distal row

Subadult 3-2 – child to older child

parietal, left – superior-posterior third with sagittal and partial lambdoidal sutures
temporal, right – includes petrous portion, mastoid process, external auditory meatus & right malleus
occipital fragment – right lateral portion of squamous with lambdoidal suture
4 sphenoid fragments
cranial vault fragment – with unfused suture
2 loose teeth
scapula, left, incomplete – acromion process
2 scapula fragments – possible body fragments
sacrum fragment – ala fragment with unfused surface

Table 1. continued

Feature 3 continued

Subadult 3-2 continued

2 humerus proximal epiphyses, left and right – left complete, right incomplete and in 2 pieces

lunate, left

femur distal epiphysis fragment, unsided – fragment from anterior

tibia diaphysis, left – proximal third

diaphysis fragment

Subadult Miscellaneous Remains

3 epiphyseal surface fragments – possibly from proximal left tibia diaphysis

Miscellaneous

65.4 g miscellaneous fragments

Feature 4

Adult 4-1

innominate, right – missing pubis; part of crest missing

Adult 4-2

parietal, left – superior-anterior portion

loose tooth

thoracic vertebra

Feature 4 Adult Miscellaneous Remains

cranial ossicle – large, 2.5 x 3 cm x ca. 1 cm thick

mandible fragment – inferior margin portion

2 cranial fragments

scapula, right – glenoid fossa (possibly Adult 4-1) and coracoid process

scapula fragment, right – spine portion

3 scapula fragments, right and unsided – right: spine; unsided: body margin; base of acromion process

18 rib fragments – 14 body, 4 vertebral end

thoracic vertebra – body only

2 vertebra fragments – body

humerus, unsided – head

humerus fragment, possible – capitulum?

2 radii, left and right, incomplete – left: proximal half missing head; right: proximal 1/4 with head damaged

ulna, right – distal half missing distal end

2 metacarpals, left – 2nd and 5th

3 hand phalanges – distal row, includes first digit; 1 incomplete & bleached

femur, right – proximal 1/3 with head and trochanters damaged

tibia shaft fragment – anterior crest

metatarsal, left – 4th

2 foot phalanges – proximal row, includes first digit

6 long bone shaft fragments

Possibly Feature 4 Adult Miscellaneous Remains

parietal fragment, right – posterior central portion with small part of lambdoidal suture

zygoma fragment – possible

4 cranial vault fragments

facial bone fragment

mandible – left ascending ramus and portions of 2 molar sockets

scapula, left, incomplete – acromion process

2 scapula fragments – possible

rib, left, nearly complete

5 rib fragments, right and unsided – right vertebral end; unsided 4 body

2 cervical vertebrae – 1st in 2 pieces, left and right facets; 1 3rd to 6th complete

thoracic vertebra, nearly complete

4 vertebra fragments – 3 facet, 1 spine

humerus, right – central superior shaft portion

humerus fragment – 2 fragments refit

triquetral, left

metatarsal, 5th, left

8 long bone diaphysis fragments

Table 1. continued

Feature 4 continued

Subadult 4-1 – newborn

cranial vault fragment
2 ribs, left, nearly complete
ilium, left

Subadult 4-2 – 1.5- to 3.5 years

femur diaphysis, right – missing proximal 1/4
tibia diaphysis, left, incomplete – missing proximal 1/3
epiphysis – possibly proximal radius

Possibly Feature 4 Subadult 4-2 – 2.5 to 3.5 years

zygoma, left – inferior portion
loose tooth
clavicle, left – lateral 1/2 to 3/4
4 ribs, left and right – left: vertebral half; right: 2 nearly complete, vertebral end
6 rib fragments – body
vertebra fragment – unfused arch portion
ilium, right, incomplete
sacrum fragment – possible right ala with unfused surface plus small fragment

Subadult 4-3 – 3.5 to 6.0 years

temporal, left – with small portion of greater wing of sphenoid; missing superior 1/2 of squamous portion

Subadult 4-4 – 3.5 to 6.0 years

temporal, left – petrous portion

Subadult 4-3 or 4-4 – 3.5 to 6 years

parietal, left – posterior-inferior 1/4
parietal fragment, unsided
4 occipital fragment – 3 fragments from squamous portion; base fragment along foramen magnum
sphenoid fragment
8 cranial vault fragments – 2 with sutures; 2 possibly left parietal
scapula, left, incomplete – spine portion
scapula fragment
rib, 1st, unsided
6 rib fragments – 1 left vertebral third; 5 unsided (1 sternal end)
cervical vertebra – portions fused; possibly associated with temporal
radius diaphysis, left – missing distal 1/3

Subadult 4-2, 4-3 or 4-4

diaphysis fragment

Subadult 4-5 – older child to young juvenile

2 loose teeth
rib fragment – body
calcaneus, right, incomplete – medial 2/3 without posterior heel

Possibly Feature 4 Subadult 4-5

scapula, right – superior-medial portion with incomplete spine; glenoid fossa area
2 rib fragments – body
radius diaphysis, unsided, incomplete – very eroded
femur diaphysis – incomplete distal end

Possibly Feature 4 Subadult 4-3, 4-4, or 4-5

temporal, right – part of petrous portion
rib, right, incomplete
rib fragment
ulna diaphysis, unsided, incomplete – middle portion
metacarpal

Possibly Feature 4 Subadult 4-6 – 1.5 to 2.5 years

humerus diaphysis, left, incomplete
radius diaphyses, left and right, incomplete – distal ends broken off
ulna diaphysis, right, incomplete – proximal and distal ends broken off
femur diaphysis, right, incomplete – proximal and distal ends broken off
2 tibia diaphyses, left and right, nearly complete
2 fibula diaphyses, left and right, incomplete – 3 portions
2 possible epiphysis fragments

Table 1. continued

Feature 4 continued

Miscellaneous Remains

7.7 g fragments

Possibly Feature 4 Miscellaneous

2.8 g fragments

Feature 5

Adult 5-1

2 innominates, left, right, and unsided – left, incomplete: 4 pieces reconstructed ; right fragment, unsided iliac crest
radius, left – goes with left ulna

ulna, left, nearly complete – missing part of olecranon process & posterior of head; goes with l. radius

2 femora, left and right, incomplete – left: most of shaft; separate proximal and distal ends; right: most of shaft; proximal end
missing head, 6 condyle fragments refit

patella, right – compatible with right femur

2 tibiae, left and right, incomplete – left proximal half; right shaft and proximal end

Adult 5-2

innominate, right, incomplete – pubis

Adult Miscellaneous Remains

occipital, incomplete – sella tursica and right condyle area

7 cranial vault fragments

scapula fragment, unsided – acromion process/spine portion

2 possible clavicle fragments

10 rib fragments

3 vertebra fragments – facet, body, spine; 2 possibly cervical
sacrum or vertebra fragment

humerus fragment, unsided – olecranon fossa

6 long bone shaft fragments

Adult Miscellaneous Remains (redeposited remains from Unit 108N88E)

cranial ossicle

3 ribs, right, 1 nearly complete, 2 incomplete – 2 incomplete = vertebral ends only

rib fragment

cervical vertebra, 2nd – dens epistrophei and left superior articular facet

thoracic vertebra fragment – arch

4 metacarpals, 2nd-5th, right

6 hand phalanges – 4 proximal row, 2 middle row

metatarsal, 5th, right – missing distal end

3 foot phalanges – proximal row

Possibly Adult 5-1 or 5-2

cranium, incomplete – right parietal missing anterior-inferior and posterior-superior portion; left parietal consisting of
superior 2/3s; frontal fragment fused to r. parietal; left inferior occipital with posterior-inferior left parietal and
left asterionic bone; separate occipital portion from right squamous

cranial vault fragment – small, possibly parietal

Possibly Feature 5 Adult Miscellaneous Remains

frontal – right inferior 1/6 with right orbit

temporal fragment

2 occipital fragments – condyle, lateral base

mandible – anterior central portion with left body in incisor/canine area and right incisor to P2 area

4 mandible fragments – at gonion; 2 body fragments with partial root sockets; very robust right coronoid process

4 facial bone fragments

hyoid, incomplete – greater horn

7 cranial vault fragments – 1 possibly frontal or zygoma orbit margin

loose tooth

sternum – 2 body pieces

2 clavicles, left and right, incomplete – left lateral 1/4; right acromial end

scapula, left – lateral ½ missing glenoid fossa, coracoid, and acromion process; 3 body fragments; acromion process end; 2
body/margin

rib, 1st, left, incomplete – unsided sternal end may go with this rib

18 rib fragments, left and unsided – 1 left vertebral end

thoracic vertebra – arches only

4 vertebra fragments – spine, 2 facet, transverse process

Table 1. continued

Possibly Feature 5 Adult Miscellaneous Remains continued

innominate, right, incomplete – superior portion of ischium with part of acetabulum
coccyx segment
humerus fragment, unsided – incomplete head
radius, left, incomplete – distal half
5 hand phalanges – 2 proximal row, 2 middle row, 1 distal row
fibula shaft portion
16 long bone shaft fragments – 4 possible
calcaneus, left – missing most of inferior ½; gracile
2 1st cuneiforms, left and right, incomplete
4 metatarsals, left and right – left and right 5th (pair); left 3rd, unsided distal end
4 foot phalanges – 2 middle row, 2 distal row including 1st digit
hand/foot sesamoid bone

Possibly Feature 5, Possibly Adult

3 loose teeth

Subadult 5-1 – newborn

5 cranial fragments
rib, right, incomplete
2 rib fragments
vertebral arch – unfused, left ½

Possibly Subadult 5-1

9 cranial vault fragments

Possibly Feature 5 Subadult 5-1

scapula, left
vertebra arch half

Subadult 5-2 – 6.7 to 8.6 years

frontal, nearly complete – superior 4/5
6 cranial fragments
facial bone fragment
mandible fragment – body
6 loose teeth
3 rib fragments
humerus diaphysis, left – ends broken off

Possibly Subadult 5-2

cranial vault fragment – probably
cranial fragment – possible, bleached
vertebra fragment – body
ilium fragment, right
metacarpal/metatarsal – shaft
epiphyseal surface fragment

Subadult 5-1 or 5-2

loose tooth
diaphysis fragment
parietal fragment
cranial vault fragment
mandible

Possibly Feature 5 Subadult 5-3 – infant (less than 1 year)

3 ribs, 2 left, 1 right – 1 left complete
rib fragment – body
thoracic vertebra arch half, right
vertebra centrum
metacarpal/metatarsal

radius diaphysis, possibly left, incomplete – mid-diaphysis

Possibly Feature 5 Subadult 5-4 – 1.5 to 2.5 years

humerus diaphysis, left, incomplete – proximal 1/6 and distal 1/4

Possibly Feature 5 Subadult 5-5 – 2.5 to 3.5 years

femur diaphysis, right, complete
humerus diaphysis, left, complete

Table 1. continued

Feature 5 continued

Possibly Feature 5 Subadult 5-4 or 5-5

loose tooth

Possibly Feature 5 Subadult 5-6 – 3.5 to 5.5 years

humerus diaphysis, left – posterior of distal shaft; incomplete proximal end

6 diaphysis fragments – possibly from left humerus

Possibly Feature 5 Subadult 5-5 or 5-6

6 parietal fragments, 1 right – right superior 1/3

2 occipital fragments – squamous portion at lambdoidal suture; base fragment

sphenoid, incomplete – 3 portions plus 2 fragments

cranial ossicle

8 cranial vault fragments

clavicle, left – lateral 1/4 with end damaged

27 rib fragments, right and unsided – 2 right vertebral ends

6 thoracic vertebrae – with body partially fused; arch/spine area, unfused to body; unfused centrum, arch fragment

lumbar vertebra – body broken off, but had been fused to arches; left arch portion

5 vertebra arch fragments

4 vertebra centra – 2 incomplete; 7 fragments from at least 2 centra

ischium, right, incomplete – child

ilium or ischium fragment – possible, with unfused surface, child

sacrum – 2 unfused bodies, inferior body, unfused ala

9 diaphysis fragments – 1 with epiphyseal surface

Possibly Feature 5 Subadult 5-7 – juvenile

mandible fragment – right posterior alveolar with 3 partial sockets for M2 and distal M1; M2 refit in this portion, – M2 has no distal contact facet

5 loose teeth

scapula, right – acromion process and coracoid process

rib fragment – body, older child-juvenile

capitate, right – small, probably juvenile (or older child)

foot navicular, right – small, possibly juvenile or older child

Possibly Feature 5 Subadult Miscellaneous Remains

3 epiphysis fragments

Miscellaneous and Possibly Feature 5 Miscellaneous

35.1 g fragments

Feature 6

Subadult 6-1 – 0.3 to 0.5 years (infant)

frontal – right and superior/central portion; right orbit portion

occipital, incomplete – left half

temporal, right – petrous portion and squamous (2 pieces)

6 cranial vault fragments

sphenoid fragment

mandible, incomplete – right half

cervical vertebra arch, right

3 rib fragments

Subadult 6-2 – infant ca. 1 year

frontal, incomplete – left 1/2; right 1/2 and left central portion plus right lateral fragment

2 parietals, left and right, incomplete – left posterior-superior 1/4, anterior-inferior 1/4, and posterior-inferior 1/5; right 2 fragments form anterior 1/2

occipital – basilar, both laterals, all somewhat damaged

zygoma, left – articulates with frontal

maxilla, left – missing most of dm2 socket and posterior area

3 loose teeth

2 possible sphenoid fragments

21 cranial fragments – 18 vault; 1 possibly palatine

4 rib fragments

4 cervical vertebrae – 1st left & right arches plus dens epistrophei; 2nd left arch; 4 unidentified arches (2 left, 2 right)

6 vertebra centra – 1 probably lumbar

ulna diaphysis, left – missing distal end

radius diaphysis, left – proximal end

Table 1. continued

Feature 6 continued

Subadult 6-2 continued

femur diaphysis, unisided, incomplete

tibia diaphysis, unisided – incomplete

4 diaphysis portions

Subadult 6-3 – 2.5 to 3.5 years

2 parietals, left and right – left: nearly complete in 2 pieces, missing most of inferior margin and small area in inferior center;
right: 2 pieces, missing a portion of the middle and superior margin

2 temporals, left and right

occipital – missing central inferior and left inferior portion of squamous; inferior left base portion with lateral fused, basilar

2 zygomas, left and right, complete

Subadult 6-4 – 2.5 to 3.5 years

frontal, complete

2 parietals, left and right

2 zygomas, left and right

occipital, nearly complete – missing right base area; basilar present but unfused to laterals

temporal, left

Subadult 6-3 or 6-4

maxillary fragment

scapula, right, incomplete – medial spine area

thoracic vertebra

Subadult 6-5 – 4.5 – 7.0 years

temporal fragment – possible zygomatic arch

occipital – right lateral unfused to basilar

maxilla, right – anterior portion containing sockets for dc and mesial root of dm1 with unerupted C in situ

mandible

11 loose teeth

hyoid fragment – possible

3 rib fragments, 1 right, 2 unisided

sternal body – unfused

2 scapulae, left and right, incomplete – left: most of lateral third plus spine fragment; right: missing most of body and inferior
and medial margins, medial spine area

clavicle, left, nearly complete – sternal end damaged

innominate, right, incomplete – right ilium and pubis

humerus, right – diaphysis with proximal end missing and distal end incomplete; proximal epiphysis

2 radius diaphyses, left and right – left proximal 1/4 with proximal end missing; right complete

2 ulna diaphyses, left and right – left proximal end fragment; right missing distal end with proximal end damaged

6 metacarpals/metatarsals, incomplete – including 1st

6 phalanges, 5 complete

Subadult 6-6 – 4.5 to 5.5 years

maxilla, right, complete

parietal fragment

occipital, incomplete – basilar

2 loose teeth

4 sphenoid fragments

9 cranial vault fragments

mandible, complete

sternum, incomplete – manubrium; 2 sternal bodies

2 scapulae, left and right – left superior and lateral portions; right missing medial and inferior margins; left and right unfused
coracoid processes

2 scapula fragments – body

2 clavicles, left and right

17 ribs, left and right – 9 left including 1st; 8 right including 1st

48 rib fragments

6 cervical vertebrae - 2nd-7th, 4 complete; 1 nearly complete but fragmented; 1 incomplete

12 thoracic vertebrae – 9 consist of arches or arch portions

3 lumbar vertebrae – arches; large centrum; nearly complete

Table 1. continued

Feature 6 continued

Subadult 6-6 continued

7 vertebral centra
7 vertebra fragments – arch
2 innominates, left and right, incomplete – left incomplete ilium; ischium; right pubis
sacrum – most of 1st and all of 2nd body
2 humerus diaphyses and proximal epiphyses, left and right
2 femora, left and right, incomplete – left diaphysis missing both ends; right diaphysis proximal end; both proximal epiphyses
diaphysis fragment – epiphyseal surface
4 carpal or tarsal bone
3 metacarpals/metatarsals
phalanx

Subadult 6-3 through 6-6

3 frontal fragments – right orbit area; lateral 2/3s of left orbit area; left orbit area
occipital fragment
13 sphenoid fragments
38 facial bone fragments
59 cranial fragments – 40 vault
mandible fragment – possible body fragment
7 cervical vertebrae – C1, both halves (left incomplete) and posterior arch; C1, dens epistrophei and arches; C3, arches fused to body; C4, right arch fused to C3, left arch and body are absent; C5; C6; C7
2 thoracic vertebrae – T1 articulates with C7 above; unidentified thoracic with body and arches
9 vertebra centra – unfused but larger sizes; 2 probably lumbar, 1 probably thoracic
16 vertebra fragments – 4 arch/spine portions, probably thoracic; 12 arch fragments
15 ribs, left and right – 8 left, including 1st; 7 right
82 rib fragments
3 possible ilium fragments
3 possible diaphysis fragments

Subadult 6-7 – ca. 9 years

parietal fragment
loose tooth
metacarpal proximal epiphysis

Subadult 6-5 through 6-7

loose tooth

Subadult 6-3 through 6-7

loose tooth

Subadult Miscellaneous Remains

9.5 g fragments

Miscellaneous Remains

12.8 g fragments

Feature 7

Adult 7-1

cranium – nearly complete frontal; incomplete left parietal with superior ½ along coronal suture, most of the sagittal suture plus posterior ¼ and inferior along squamosal suture; right parietal; incomplete occipital, left and right temporals; left and right zygomas and maxillae; left and right nasal bones; left greater wing of sphenoid
mandible, nearly complete
loose tooth

Adult 7-2

cranium – nearly complete frontal and left parietal; incomplete right parietal; nearly complete left temporal; left and right nasal bones; 2 left ear ossicles

Adult 7-3

cranium – incomplete left and right parietals; incomplete left temporal; incomplete occipital; 6 vault fragments

Possibly Feature 7 Adult 7-4

4 frontal bone fragments – including right superior orbit area with sharp margin and flat torus
4 temporal fragments, right and unsided – right: posterior portion of squamous; unsided: 2 with squamosal suture; petrous portion fragment
occipital fragment
2 maxillae, left and right, incomplete – left: fragment containing M2 and M3; right: superior portion broken off and alveolar bone damaged between I1 and P1; right superior portion fragment

Table 1. continued

Feature 7 continued

Possibly Feature 7 Adult 7-4 continued

alveolar bone fragment – with 2 partial sockets
5 sphenoid fragments
6 facial bone fragments
21 cranial fragments – 12 vault
2 cervical vertebrae, incomplete – 1st right third & posterior arch fragment; 2nd missing part of left arch
cuboid, left

Feature 7 Adult Miscellaneous Remains

8 parietal fragments – 2 with squamosal suture
5 occipital fragments – 2 left base with incomplete condyle; 2 right base with incomplete condyle; superior squamous portion
temporal fragment – styloid process
cranial ossicle
3 maxilla fragments, right and unsided – right superior portion forming nasal aperture; 2 unsided alveolar bone fragments
with partial sockets
68 cranial vault fragments – 8 with suture portions
71 facial/sphenoid fragment
mandible – missing left superior portion of ascending ramus and sockets for incisors; left coronoid separate piece
4 loose teeth
hyoid – in 3 parts
manubrium, nearly complete
clavicle, left – very gracile
clavicle, right – robust
2 scapulae, right, incomplete – acromion process; superior 1/3 with glenoid fossa
9 scapula fragments – 5 margin, 4 body
16 ribs, left and right – left and right 1st (pair); 7 left including gracile and incomplete 1st and 1 vertebral end, 7 right vertebral
ends
40 rib fragments
10 cervical vertebrae – MNI of 3. 1 from C2-C5; 2 from C1; 3 from C1 & C2; unidentified body; 2 from C3-C7 vertebrae
14 thoracic vertebrae – MNI of 2
17 vertebra fragments – 3 body; 14 spine/process/facet
2 innominate fragments – very robust acetabulum; pubis ramus margin
sacrum, nearly complete – right inferior broken off below third body
humerus, right – proximal 1/4 and distal 2/3 with small portion of shaft missing; proximal end crushed with head intact
humerus, right – distal articular portion only
radius, unsided – midshaft portion
2 ulnae, left and right – probably not a pair; left most of shaft (not as robust as right); right proximal 1/3, robust;
unsided shaft portion probably right
metacarpal, 2nd, right
femur, right (FR1)
femur, right (FR2) – proximal 1/2 with greater trochanter damaged
femur, right (FR3) – proximal 1/2 missing neck, head, & greater trochanter; robust
3 femur fragments – distal end of shaft, 2 incomplete heads with fovea capitis
humerus or femur fragment – probable head fragment
tibia fragment – proximal end portion
2 tibiae, right, incomplete – eroded portion of shaft with nutrient foramen; portion of shaft with nutrient foramen
7 long bone shaft fragments – 4 from smaller long bones; 3 possible long bone shaft fragments
2nd cuneiform, left
talus fragment
metatarsal, 2nd, right, incomplete – missing distal end
Possibly Feature 7 Adult Miscellaneous Remains
loose tooth
2 ribs, left and unsided – 1 left nearly complete, 1 vertebral end; unsided body portion
8 rib fragments – 3 possible
3 vertebra fragments – facet
metacarpal, 1st, left
6 hand phalanges – 5 proximal row, 1 middle row
patella, right
patella fragment – possible inferior margin fragment

Table 1. continued

Feature 7 continued

Possibly Feature 7 Adult Miscellaneous Remains continued

tibia, unsided, incomplete – proximal end, bleached, eroded; missing most of circumferential cortex

2 metatarsals, left – 3rd complete; 5th missing distal end and bleached

3 long bone shaft fragments – 1 possible

phalanx – distal end fragment

Subadult 7-1 – older fetus to newborn

ulna diaphysis, right – missing distal end

Subadult 7-2 – older fetus to newborn

ulna diaphysis, right – missing distal end

Subadult 7-1 or 7-2

mandible, incomplete – most of left ½, no teeth in situ, alveolar bone damaged

loose tooth

scapula, left

ilium, right

humerus diaphysis, right, incomplete – distal 1/3-1/2

femur diaphysis, right, incomplete – missing both ends

tibia diaphysis, left, incomplete – proximal 1/3-1/2

diaphysis, incomplete

Possibly Feature 7 Subadult 7-1 or 7-2

frontal – left and central inferior with left orbit; right half of right orbital area

occipital, incomplete – basilar and right lateral, unfused

temporal, left – petrous portion & fragment of body

temporal, right, incomplete – temporomandibular fossa and arch portion

sphenoid, incomplete – sella tursica plus 2 fragments

43 cranial fragments – mostly vault

femur diaphysis, unsided, incomplete – diaphysis portion plus fragment

tibia diaphysis, left, incomplete – proximal 2/3s

Subadult 7-3 – 1.5 to 2.5 years

sphenoid fragment

clavicle, left, incomplete – missing sternal end

3 rib fragments

cervical vertebra fragment – arch fragment

fibula diaphysis, unsided, incomplete – ca 1/2-2/3s

metacarpal/metatarsal

Possibly Feature 7 Subadult 7-3

temporal, left – external auditory meatus, petrous and mastoid processes

2 ribs, left and right –nearly complete right; left missing sternal end

epiphyseal surface fragment

Subadult 7-4 – ca. 4 to 6 years

possible frontal fragment

possible parietal fragment – superior along sagittal suture

occipital lateral, left

zygoma, left – superior 3/4s

9 cranial vault fragments

mandible fragment – inferior margin

clavicle fragment – shaft

9 rib fragments

2 vertebra fragments – arch

ilium, left, incomplete – 2 pieces

ischium, left, incomplete

femur distal epiphysis fragment – condyle

6 metacarpals/metatarsals

metacarpal/metatarsal/phalanx proximal epiphysis

phalanx

6 diaphysis fragments

Table 1. continued

Feature 7 continued

Possibly Feature 7 Subadult 7-4

8 cranial vault fragments
scapula, right – spine portion missing lateral 1/3 and acromion process
rib fragment

Subadult 7-3 or 7-4

2 cervical vertebrae, 1st, incomplete – unfused left arch

Possibly Feature 7 Subadult 7-3 or 7-4

7 cranial vault fragments
2 ribs, left and right – missing sternal ends, probably from 2 different subadults
5 rib fragments – body
thoracic vertebra, incomplete – arches fused but not fused to body
possible ilium fragment
4 diaphysis fragments
5 epiphyseal surface fragments – 1 from diaphysis
2 metacarpal/metatarsal – shaft only

Subadult 7-5 – 6.5 to 8.5 years

rib, 1st, left
radius diaphysis, right, incomplete – ends missing

Possibly Feature 7 Subadult 7-5

parietal, right – anterior-inferior portion
loose tooth

Subadult 7-6 – juvenile to older juvenile

clavicle, right, incomplete – both ends missing
metacarpal, 2nd, left – distal end unfused
tibia proximal epiphysis, left)

Possibly Feature 7 Subadult 7-6

parietal fragment, right – anterior-superior with coronal and sagittal sutures; possibly juvenile

Possibly Feature 7 Subadult 7-5 or 7-6

loose tooth

Subadult Miscellaneous Remains

2 epiphysis fragments
miscellaneous fragment

Possibly Feature 7 Subadult Miscellaneous Remains

cranial vault fragment
0.1 g fragments

Miscellaneous Remains

31.9 g fragments

Possibly Feature 7 Miscellaneous Remains

13 miscellaneous fragments – 1 bleached
7.7 g fragments

Possibly Feature 6 or 7

Possibly Adult Feature 7

maxilla fragment, right – superior portion fragment
temporal fragment – with portion of squamosal suture
2 sphenoid fragments
3 cranial vault fragments
2 facial bone fragments
cuboid, left
metatarsal, 3rd, left
rib, unsided, incomplete – ends missing
tibia fragment, right – most of distal end, very robust
cranial vault fragment

Feature 8

Subadult 8-1 – fetal to newborn

frontal, incomplete – left orbit
occipital, incomplete – basilar and left and right laterals
2 temporals, left and right – both missing squamous portion plus 2 ear ossicles
2 zygomas, left and right – left complete; right missing lateral portion

Table 1. continued

Feature 8 continued

Subadult 8-1 continued

sphenoid fragment
mandible – unfused halves, incomplete; left alveolar area for di1-dm2; right area for di1-dm1; body fragment; left coronoid process; superior portion of right ascending ramus; possible mandible fragment; left ascending ramus, posterior of body (probably right)
scapula, right – nearly complete
2 clavicles, left and right
2 ischia, – left complete, right incomplete
2 ilia, left and right – left complete; right nearly complete
humerus diaphysis, left
humerus diaphysis, right
2 radius diaphyses, left and right – left ends damaged
2 ulna diaphyses, left – left distal end broken off
2 femur diaphyses, left and right
2 tibia diaphyses, left and right – nearly complete
2 fibula diaphyses, left and right – 1 nearly complete; 1 missing ends
13 metacarpals/metatarsals, unsided
6 phalanges, unsided
11 epiphyses – 2 complete possibly proximal fibula

Subadult 8-2 – fetal to newborn

frontal, incomplete – left orbit
occipital, incomplete – left lateral of base
temporal, left, incomplete – squamous portion and petrous portion
2 zygomas, left and right
sphenoid fragment
mandible, nearly complete – right condyle missing or damaged; no teeth in situ
scapula, right, incomplete – superior-lateral portion
2 clavicles, left and right, incomplete – left missing sternal end; right missing sternal 1/2
ilium, left, incomplete
ischium, unsided, incomplete
humerus diaphysis, left – nearly complete; ends damaged
2 radius diaphyses, left and right – left complete; right nearly complete with distal end damaged
2 ulna diaphyses, left and right – distal ends broken
2 femur diaphyses, left and right – left nearly complete; right ends broken off
tibia diaphysis, left – ends slightly damaged
fibula diaphysis, unsided – one end missing

Possibly Subadult 8-2

4 ribs, left and right – 1 left, 3 right

Subadult 8-1 or 8-2

2 frontal fragments – right orbit area; unsided orbit area
2 parietals, left and right – nearly complete
occipital – most of squamous
2 maxillae, left and right, incomplete – fragmented
palatine fragment, unsided
66 cranial vault fragments – most appear to be frontal/parietal
7 loose teeth
28 ribs, left and right – 8 left ribs including larger 1st rib; 18 right ribs including 2 1st ribs of different sizes
51 rib fragments – body
14 cervical vertebra arches – 7 left, 7 right
40 thoracic or lumbar vertebra arches – 21 left; 19 right
39 vertebra arches – 6 left, 12 right; unsided: 21 unidentified with some incomplete
37 vertebra centra
innominate fragment – possible
sacrum – 1st & 2nd bodies
2 metacarpals/metatarsals
2 diaphyses, unsided, incomplete
2 diaphysis portions – possible
0.9 g fragments

Table 1. continued

Feature 8 continued

Subadult 8-3 (left in situ; not excavated) age estimate 3.5 to 5.5 years

innominates, left and right
femora, left and right
tibiae, left and right
fibula, right
loose tooth

Adult 8-1 (left in situ; not excavated)

possible radius, unsided
possible ulna, unsided
possible humerus, unsided

Feature 9

Adult 9-1 (left in situ; not excavated)

cranium – appeared to be nearly complete
mandible – complete
vertebrae – observed but not specified

Feature 10

Subadult 10-1 (left in situ; not excavated) – newborn to young infant

subadult cranium

Possibly Feature 10 Subadult 10-1

frontal fragment – orbit
2 temporals, unsided, incomplete- incomplete petrous portions
30 cranial vault fragments
scapula, right, incomplete – superior/lateral portion; 4 fragments
rib, incomplete
thoracic vertebra arch – unfused to body and probably unfused to other arch
vertebra centrum
ilium, left
2 femur diaphyses, possibly right and unsided – possibly right ends broken off ; unsided: incomplete
tibia diaphysis, unsided, incomplete
fibula diaphysis, unsided, incomplete
2 diaphysis fragments
metacarpal/metatarsal, unsided
phalanx
11 miscellaneous fragments

Possibly Feature 10 Subadult 10-2 – 2.5 to 3.5 years

frontal – superior portion plus 2 smaller fragments; right orbit area
cranial vault fragment
3 facial bone fragments
loose tooth
3 vertebra centra – unfused, 1 incomplete
2 metacarpals
2 hand phalanges
miscellaneous fragment

Possibly Feature 10 Subadult 10-1 or 10-2

vertebral arch – arch half unfused to body but probably fused to other arch, spine area missing

Possibly Feature 10 Subadult Miscellaneous Remains

2 cranial vault fragments – very small
rib fragment
4.3 g fragments

Possibly Feature 10 Miscellaneous Remains

cranial vault fragment – possible, very eroded
0.8 g miscellaneous fragments

Feature 11

Subadult 11-1 – 4-5 to 6.5 years

frontal, incomplete – central portion along crest; 2 fragments from left orbit area; left lateral fragment along coronal suture
parietal, left, incomplete – anterior-inferior portion
occipital fragment – inferior left lateral along lambdoidal suture
temporal, left, nearly complete

Table 1. continued

Feature 11 continued

Subadult 11-1 continued

2 zygomas, left and right – plus possible right temporal arch
maxilla, left
6 palatine/maxilla/alveolar bone fragments
15 sphenoid/facial bone fragments
20 cranial vault fragments
mandible, incomplete – left portion for deciduous and permanent molars with ascending ramus; body damaged; alveolus and body fragment containing left dm1 and dm2 and unerupted P1 and P2; central and right portion
21 loose teeth
scapula, left, incomplete – missing central and medial body
2 clavicles, left and right – left complete; right incomplete, from near lateral end
9-10 ribs, right – 8 nearly complete or complete including 1st
rib fragment
cervical vertebra, 1st – left portion unfused to body; articular facet from one side; 2 fragments
2 thoracic vertebrae – arches only
3 lumbar vertebrae – 1 fused to body; 2 others not completely fused to body
vertebra centrum – large; possibly lumbar
vertebra fragment – arch
ilium, left, nearly complete
pubis fragment
sacrum – first body and both alae
ischium, right
humerus diaphysis, left
humerus distal epiphysis, probably left – incomplete
radius diaphysis, left
ulna diaphysis, left
2 femora, left and right – left diaphysis and proximal epiphysis; right proximal epiphysis
tibia distal epiphysis, right
fibula diaphysis, unsided, incomplete – missing proximal 1/4
calcaneus, left
3 epiphyses, incomplete – unidentified
1.3 g fragments

Feature 12

Bundle Burial (left in situ; not excavated)

2 scapulae, left and right
radius, left
2 humeri, left and right
2 femora, left and right
patella, unsided
tibia, unsided
2 fibulae, unsided
foot bones, unsided – articulated

Adult Remains from Disturbed Context

3 frontals – central superior portion forming at least 1/2 of frontal and including portions of left and right parietals; central superior portion; central area with crest and part of sinuses
9 frontal fragments – left orbit with sharp margin, moderately pronounced torus (orbital foramen); left inferior/anterior 1/4 with sharp orbital margin, moderately pronounced torus (notch in orbital margin); 2 right orbits: lateral 1/3, complete with part of body superior to orbit with blunt margin, torus not present; 2 sinus area; 1 along coronal suture; anterior central with nasion and medial portion of both pronounced tori, possibly male; left 1/3 with blunt orbital margin, torus not present
parietal, right, incomplete – superior 1/2 missing anterior along coronal suture
2 parietals, left and right – left missing inferior 1/5-1/6; right nearly complete with small superior portion of left
2 parietals, left and right, incomplete – possible pair; left superoanterior 1/4 and posterior 1/3; right anteroinferior 1/5
parietal, right, incomplete – posterior-inferior with small portion of right squamous of occipital
17 parietal fragments, left and unsided – left: squamosal suture, posterior-inferior, anterior 1/4 missing margin; 4 unsided fragments, 1 with part of squamosal suture
occipital – left and central superior half of squamous, gracile
occipital, incomplete – missing superior right 1/5 and base; slight occipital protuberance
occipital, incomplete – superior right portion

Table 1. continued

Feature 12 continued

Adult Remains from Disturbed Context continued

occipital, incomplete – right and inferior/central portion of squamous without base; moderate occipital protuberance
occipital, incomplete – superior half, very thick; pronounced occipital protuberance
6 occipital fragments – base with partial condyle; base with right condyle; condyle fragment: inferior with part of margin of foramen magnum; inferior of squamous crest area
temporal, left (Temp L1) – missing petrous portion and part of arch and anterior suture margin
temporal, left (Temp L2) – missing superior suture margin; attached to fragment of posterior left parietal
temporal fragment, left (Temp L3) – fragment at base of zygomatic arch
temporal, right (Temp R1) – with small portion of sphenoid attached and 1 ossicle
temporal, right (Temp R2) – consists of petrous portion, external auditory meatus, mastoid process; large mastoid process
9 temporal fragments, left and unsided – left: superior portion of squamosal suture; unsided: 3 suture; 3 incomplete petrous portions; right base of arch, possible arch
2 zygomas, left and right (Zyg L1 and R1) – left superior 2/3s; right superior 1/3
zygoma, left (Zyg L2)
zygoma, left (Zyg L3) – included with left maxilla (Max L1)
zygoma, left (Zyg L4) – attached to left maxilla (Max L3)
zygoma, left (Zyg L5) – attached to left maxilla (Max L4); lateral margin broken
2 maxillae, left and right (Max L1 and R1) – left complete; right missing superior-lateral portion; portion of right sphenoid
2 maxillae, left and right (Max L2 & R2) – possible pair; left P2-M3 area; right I1-P2
maxilla, left (Max L3) – broken along angle so nasal area missing and incisor/canine area missing
maxilla, left (Max L4) – some alveolar damage; no teeth in situ
2 maxilla fragments, left and right – left superior fragment along nasal aperture; right superior fragment/sphenoid fragment
palatine bone, right
5 maxilla/zygoma fragments
3 sphenoid fragments
alveolar bone fragment
3 cranial ossicles
151 cranial vault fragments
78 facial bone fragments
mandible, nearly complete (Mand 1)
mandible, incomplete (Mand 2) – left body with I1-M2 area and right I1-partial C socket
mandible, incomplete (Mand 3) – left fragment containing P2-M2 sockets with M1 in situ
mandible, incomplete (Mand 4) – right portion from I1-M2 and partial socket for M3
7 mandible fragments – left condyle, coronoid process; right condyle, 2 coronoid processes, inferior body at chin; unsided
gonion area fragment
17 loose teeth
possible ossified cartilage fragment
2 hyoids – 1 in 3 portions; 1 greater horn
manubrium
2 clavicles, left and right (Clav L1 and R1) – missing sternal ends; possible pair
2 clavicles, left (Clav L2) – sternal half with sternal end broken
2 clavicles, right (Clav R2 and R3) – sternal & lateral 1/2; lateral 2/3s
scapula, left (Scap L1) – lateral portion including inferior 2/3s of glenoid fossa and part of spine and lateral margin
scapula, left (Scap L2) – superior portion of glenoid fossa with small portion of spine
scapula, right (Scap R1) – most of the acromion process
scapula, right (Scap R2) – acromion process end
38 scapula fragments, left and unsided – left 2 acromion process ends, coracoid process; unsided 3 spine; 7 body margin; 21 body; incomplete glenoid fossa, lateral margin, coracoid process, inferior portion
scapula or innominate fragment – body
4 ribs, left and unsided – 3 left: 1 nearly complete, 1 vertebral end, 2 missing sternal 1/3; unsided, incomplete 1st
142 rib fragments – 11 left: 9 vertebral ends, 2 sternal ends; 7 right: vertebral ends; remainder unsided
5 cervical vertebra – 1st, incomplete, 2 2nd, 2 3rd-7th
10 thoracic vertebrae – 2 nearly complete; 2 represented by 3 pieces; 6 incomplete
4 lumbar vertebrae, incomplete – posterior body; incomplete body portion; spine portion; body
71 vertebra fragments – 54 spine/process; 14 body, 3 miscellaneous
2 innominates, left and right (Inn L1 and R1) – left ischium/acetabulum portion and posterior-inferior ilium with incomplete auricular surface; right ilium fragment with inferior half of auricular surface, includes preauricular sulcus
innominate, left, incomplete (Inn L2) – incomplete ilium, plus ischium and acetabulum fragments

Table 1. continued.

Feature 12 continued

Adult Remains from Disturbed Context continued

innominate, left, incomplete (Inn L3)– iliac medial crest fragment and ischium fragment
innominate, right, incomplete (Inn R2) – crushed ilium, posterior 1/2 without crest, plus partial ischium/acetabulum portion
45 innominate fragments, left and right – left: superior ischial tuberosity; incomplete ilium missing crest and most of auricular and retroauricular surfaces; inferior 2/3s auricular surface; incomplete ischium in 2 pieces possibly from same element; most of acetabulum; right: posterior 1/2 of acetabulum with part of ilium; partial ischial tuberosity; anterior crest fragment; posterior-inferior of ilium with auricular surface broken off; unsided: 8 iliac crest fragments, 15 ilium body fragments, 8 acetabulum fragments, 4 ischium fragments, retroauricular surface fragment
sacrum (Sac 1) – missing part of left side
sacrum (Sac 2) – anterior 1/2 of proximal 1/2 missing right ala
7 sacrum fragments
2 humeri, left and right (Hum L1 and R1) – possible pair; left proximal 1/4; right distal 1/2
humerus, left (Hum L2) – missing proximal head/tubercle area
humerus, left (Hum L3)– proximal 1/3
humerus, left (Hum L4)– distal 2/3s of shaft
humerus, right (Hum R2) – distal 1/2 of shaft and lesser tubercle fragment
humerus, right (Hum R3) – distal 1/2 to 2/3s
3 humerus fragments, right and unsided – right: distal shaft with part of olecranon fossa; unsided part of distal 1/2 of shaft; distal end fragment
2 humerus or femur fragments – head
radius, left (Rad L1) – distal end only
radius, left (Rad L2) – missing distal 1/5
radius, left (Rad L3) – proximal 1/2
radius, right (Rad R1) – goes with right ulna UI R1
radius, right (Rad R2) – distal end only
radius, right (Rad R3) – proximal 2/3 of shaft
4 radius fragments – proximal end fragments
ulna, left (UI L1) – distal 1/2
ulna, left (UI L2)– distal 1/3
ulna, right (UI R1) – gracile
ulna, right (UI R2) – head
2 hamates, left and right – pair
greater multangular, right, incomplete
lesser multangular, right
lunate, right
pisiform, unsided
hand navicular, left
carpal bone, incomplete
capitate, left
5 metacarpals, 2 left, 1 right – left 2nd and 5th; right 1st, 2nd, and 5th proximal 1/2
metacarpal – missing proximal end; trauma
7 hand phalanges – 1 proximal row, 3 middle row, 2 distal row, 1 shaft (probably proximal row)
femur, left (Fem L1) – middle 2/3s of shaft; may pair with Fem R1
femur, left (Fem L2) – distal 2/3s of shaft, cracked, partially crushed
femur, left (Fem L3) – distal end; gracile
femur, right (Fem R1) – proximal 2/3s of shaft; may pair with Fem L1
femur, right (Fem R2) – shaft
femur, right (Fem R3) – proximal 1/2 and distal shaft, not contiguous, robust
femur portion, right (Fem R4) – from proximal 1/2 of shaft; smaller diameter than other right femur
36 femur fragments, left and right – left: anterior surface of proximal 1/4 missing most of head; distal end missing medial condyle, posterior surface near proximal 1/3 of shaft; posterior surface just below lesser trochanter; right: posterior shaft from proximal end, head, greater trochanter; unsided: 11 condyle fragments, 2 head fragments, greater trochanter; 15 shaft
5 humerus or femur fragments – head
patella, right
patella fragment
2 tibiae, left and right (Tib L1 and Tib R1) – missing distal 1/3s
2 tibiae, left and right (Tib L2 and Tib R2) – left proximal 1/2 of shaft plus distal end fragment; right missing proximal end
2 tibiae, left and right (Tib L3 and Tib R3) – left proximal end; right posterior proximal shaft fragment

Table 1. continued.

Feature 12 continued

Adult Remains from Disturbed Context continued

tibia, left (Tib L4) – proximal half with head damaged; distal fragment; does not pair with Tib R4
tibia, right (Tib R4) – distal 2/3s of shaft
27 tibia fragments, left and right – left (Tib L5) and right distal ends; left anterior along crest; unsided: 11 shaft; 6 proximal end, distal end portion, proximal fragment appeared to be smaller than adult but too damaged, possible proximal end; left distal end; anterior crest, 2 distal end, shaft portion
14 tibia or femur shaft fragments
fibula, left (Fib L1) – proximal 1/3
fibula, right (Fib R1) – proximal 1/2 with shaft crushed; robust
fibula, right (Fib R2) – proximal 1/3; robust
fibula, unsided (Fib U1) – about 2/3 of shaft
5 fibula fragments – shaft portion; 2 shaft fragments; 2 proximal ends
2 calcanea, left and right (Calc L1 and R1) – left inferior and medial surfaces missing
calcaneus, unsided, incomplete
talus, right, incomplete – missing head
talus fragment
2 1st cuneiforms, right
2nd cuneiform, right
3rd cuneiform, right
2 foot naviculars, right and unsided
6 metatarsals, 2 left, 3 right, 1 unsided – left 4th, 5th, right 2nd 3rd, 5th; unsided 1st
7 foot phalanges – 1st digit, proximal and distal; 3 proximal; 2 middle
368 long bone shaft fragments – mostly small fragments; 5 possible shaft
carpal or tarsal fragment
hand/foot sesamoid bone
2 hand/foot bone fragments – distal end and shaft of phalanx, metacarpal or metatarsal
331.4 g miscellaneous fragments

Subadult 12-1 – newborn to 0.5 years

frontal, incomplete
parietal, incomplete
temporal, right
4 cranial fragments
loose tooth
rib, incomplete
rib fragment
vertebral arch half
vertebral centrum
ilium, left
ischium, right
femur diaphysis, right
4 diaphyses, incomplete

Subadults 12-2 – ca. 0.65 to 0.75 years

loose tooth

Subadult 12-3 – ca. 1.25 to 1.30 years

2 loose teeth

Subadult 12-2 or 12-3

8 cranial fragments
possible maxilla fragment
loose tooth
scapula, left
clavicle, left, incomplete – missing sternal end
4 ribs, left and right – 3 left, 1 right
rib fragment
1st cervical vertebra arch half
5 vertebra portions – 2 arch halves, 3 centra (unfused)
humerus diaphysis, incomplete
hand phalanx – proximal row
femur diaphysis, incomplete

Table 1. continued.

Feature 12 continued

Subadult 12-2 or 12-3 continued

diaphysis, incomplete
2 metatarsals/metacarpals

Subadult 12-4 – 2 to 4 years

temporal, right, incomplete – missing most of superior and central portions
14 cranial vault fragments
mandible fragment – at gonion
2 ribs, incomplete
2 thoracic vertebrae
vertebral centrum
tibia distal epiphysis, right
diaphysis, incomplete

Subadult 12-5 – ca. 4 to 6 years

frontal fragment – along coronal suture
7 parietal fragments
2 occipital fragments
temporal, right – fragment with portion of arch
52 cranial vault fragments
maxilla, left – fragment with di1 and di2 sockets, no teeth in situ
mandible – anterior portion for di1 to dc, no teeth in situ
loose tooth
clavicle, right
3 ribs, unsided – 1st and unidentified, incomplete
22 rib fragments
lumbar vertebra – arches fused to body
6 vertebra fragments – 1 partial body with arch fused, 1 body, 4 arch/spine/facet
ilium fragment, right – part of crest/body and superior portion of auricular surface
ischium, right
sacrum body, incomplete
femur diaphysis, left – missing neck
femur diaphysis, unsided, incomplete – crushed, slightly smaller than Subadult 12-6
femur proximal epiphysis, unsided
4 diaphysis fragments – 1 contains portion of epiphyseal end
metacarpal/metatarsal, unsided, incomplete

Subadult 12-6 – ca. 6 to 11 years

2 loose teeth
rib, 1st, left
2 rib fragments
2 vertebrae – 1 thoracic, 1 lumbar
humerus proximal epiphysis, right
radius proximal epiphysis
femur diaphysis, left, incomplete – missing distal 1/4
tibia distal epiphysis, left

Subadult 12-7 – ca. 12 to 17 years

occipital, incomplete – squamous missing left side along lambdoidal suture
2 loose teeth
rib, left, incomplete – missing sternal end
clavicle, right – sternal end unfused, gracile
lumbar vertebra
ilium, incomplete – unfused
2 humeri, left and right – left complete; right distal 1/2
radius, left, incomplete – missing distal end
ulna, right, incomplete – proximal 1/3
femur diaphysis, left, incomplete – ends broken
tibia or femur diaphysis, unsided, incomplete – plus fragment
fibula, right, incomplete – missing proximal end
2 metatarsals, left and right – left: 3rd, right 2nd; both proximal ends unfused and absent
phalanx, incomplete – shaft only

Table 1. continued.

North Slope continued

Subadult Miscellaneous Remains

17 epiphyseal surface fragments

North Slope

Adult NS-1

femur, left, nearly complete (Fem L1) –missing head

Adult NS-2

femur, left, incomplete (Fem L2) – proximal 2/3s

Adult NS-3

femur, left, incomplete (FemL3) – proximal 2/3s with shaft cracked, distal third

Adult NS-4

femur, left, incomplete (Fem L4) – proximal 1/3

Adult NS-5

femur, left, incomplete (Fem L5) – proximal 1/5

Adult NS-6

femur, left, incomplete (Fem L6) – proximal third refit with distal 2/3

Adult NS-7

femur, left, incomplete (Fem L7) – missing distal end

Adult NS-8

femur, left, incomplete (Fem L8) – missing head and distal 1/3

Adult NS-9

femur, left, incomplete (Fem L9) – proximal ¼

Adult NS-10

femur, left, incomplete (Fem L10) – proximal posterior shaft – no metrics

Adult NS-11

femur, left, incomplete (Fem L11) – proximal ½; robust

Adult NS-12

femur, left, incomplete (Fem L12) – proximal 1/2

Adult NS-13

femur, left, incomplete (Fem L13) – proximal 1/2 of shaft

Adult NS-14

femur, left, incomplete (Fem L14) – proximal 1/4; head mostly intact; greater trochanter damaged

Adult NS-15

femur, left, incomplete (Fem L15) – proximal 1/3 of shaft, gracile

Adult NS-16

femur, left, incomplete (Fem L16) – fragment of greater trochanter, distal 2/3s of shaft, incomplete distal end

Adult NS-17

2 femora, left and right (Fem L17 & R17)– possible pair: left nearly complete shaft; right distal 3/4 of shaft

NS-Miscellaneous Adult Remains

frontal (Fr 1)

frontal (Fr 2) – most of central and right broken above nasion

12 frontal bone fragments – left orbit area with sharp margin and slight torus; left orbit area; 2 right orbit, 1 with portion of body has pronounced torus; fragment along coronal suture; with incomplete l & r nasal bones; inferior central portion with pronounced tori; central-inferior portion with part of left supraorbital margin, gracile, slight tori, sharp margin; central inferior portion with frontonasal suture and medial part of right torus; fragment with part of crest & orbit margin; right superolateral 1/3; right orbit area with sharp margin and flat torus; fragment along coronal suture

occipital – Occ 1: inferior body

occipital – Occ 2: central portion with moderately pronounced occipital protuberance

occipital – Occ 3: superior 1/3 with inferior portion of suture margin almost completely fused

occipital – Occ 4: central-superior portion and fragment of left parietal; very slight occipital protuberance

occipital – superior and left portion of squamous

occipital – left portion

occipital – right portion

occipital – portion of squamous and possible fragment at opisthion

occipital – 3 base fragments forming left and right condyles and area at opisthion

occipital – inferior left 1/3 of squamous with moderately pronounced incomplete occipital protuberance

17 occipital fragments – attached to fragment of left parietal; 3 fragments of squamous portion; 2 along lambdoidal suture; 2 and just superior to opisthion; left base area; 2 base; portion of left side along lambdoidal suture with small portion of left parietal; 2 left condyles; left inferior 1/4 of squamous with pronounced occipital protuberance; right condyle

Table 1. continued.

North Slope continued

NS-Miscellaneous Adult Remains continued

- 9 parietal portions, left and right – left: posterior 1/3; anterior 2/3s to 3/4s; posterior-inferior 1/4; posterior 1/4-1/3; anterior-superior fragment and posterior inferior fragment possibly from same element; right: posterior-inferior 1/5; posterior-inferior 1/3 with small portion of occipital; posterior 1/2; posterior 1/3 with occipital fragment
- 70 parietal fragments, left and right – left: superior-posterior 1/4 with portion of sagittal suture; fragment with fused sagittal suture and portion of lambdoidal suture; posterior fragment attached to occipital fragment; 2 un-sided; 2 with portion of squamosal suture; possible parietal with 1 foramen and 2 small holes (possibly pathological); posterior-inferior and anterior without coronal suture; 1 right posterior inferior 1/4; probably right anterior-superior fragment; un-sided with part of lambdoidal suture and small fragment of occipital; 2 left inferior along squamosal suture; 1 right central; un-sided: small fragment; small fragment along sagittal suture, 2 body; at bregma with small portions of left and right parietals and frontal; right central posterior portion; right 4 probable parietal fragments (1 with small of left and right parietals); 2 un-sided
- 2 temporals, left and right (Temp L1&R1)– possible pair: left nearly complete and attached to posterior-inferior fragment of left parietal; right petrous/auditory meatus area; both with small mastoid processes
- 2 temporals, left and right (Temp L2&R2) – possible pair; left suture margin, mastoid process, and part of petrous portion damaged; right nearly complete
- 2 temporals, left and right – possible pair - left incomplete petrous portion; right incomplete petrous portion, anterior-inferior fragment with portion of sphenoid, posterior fragment along lambdoidal suture
- temporal, left (Temp L3) –missing anterior-superior margin and part of arch; large mastoid process
- temporal, left (Temp L4) – anterior-inferior broken off; petrous portion damaged; large mastoid process; small fragment of occipital attached; includes incus and malleus
- temporal, left (Temp L5) – mastoid process posterior surface damaged and missing arch and anterior margin
- temporal, left – petrous portion
- temporal, right (Temp R3) – petrous portion slightly damaged; large mastoid process
- temporal, right (Temp R4) – inferior portion with mastoid process, part of styloid process, external auditory meatus and petrous portion; mastoid process
- temporal, right – missing petrous portion, temporomandibular fossa, and posterior superior margin; large mastoid process
- temporal, right – petrous portion
- 46 temporal fragments, left and right – left: posterior along squamosal suture, posterior to mastoid process with lambdoidal suture, 2 zygomatic arch; right: 4 zygomatic arch; un-sided: 6 incomplete zygomatic arch (1 possible), base of arch, part of auditory meatus, 6 petrous portion (1 with external auditory meatus), 5 squamous portion, 3 temporomandibular fossae, 12 squamosal suture, 1 mastoid process area, 1 anterior fragment
- 8 zygomas, left and right – 3 left: 1 complete; 1 attached to fragment of left maxilla; 1 attached to left maxilla; 5 right: nearly complete & attached to superior lateral portion of right maxilla; 2 superior portions; missing most of anterior surface; nearly complete with superior-lateral portion of r. maxilla
- 2 maxillae (Max L1&R1), left and right – with nearly complete left and right palatine bones; superior portion of both maxillae damaged and broken
- 2 maxillae (Max L2&R2), left and right – left anterior and portion of left molar area; superior-lateral left broken off; right broken posterior to canine socket
- 2 maxillae (Max L3&R3), left and right – left: anterior/inferior fragment with I1 and I2 and incomplete sockets for C and P1; right: nearly complete
- maxilla (Max L4), left – attached to left zygoma
- maxilla (Max L5), left – broken posterior to P2
- maxilla (Max L6), left – with portion of nasal margin, I1-C area
- maxilla (Max L7), left – superior fragment along nasal aperture, may go with inferior/posterior fragment with M1-M3 in situ; molars have enamel extensions
- maxilla (Max L8), left – anterior-medial fragment with 2 sockets for left I1 and either I2 or C
- maxilla (Max L9), left – inferior portion – all sockets present, only I1 socket damaged; no teeth in situ
- maxilla (Max L10), left – alveolus damaged; dental status could not be assessed
- maxilla (Max R4), right – I2-M2 present; P1 rotated buccal toward mesial about 30 degrees
- maxilla (Max R5), right –alveolus broken posterior to M1 with nearly complete right zygoma, plus 2 loose molars
- maxilla (Max R6), right – incisor sockets damaged and broken posterior to M1; loose incisor included
- maxilla (Max R7), right – M2 & M3 in situ; almost no wear, M3 rotated 180 degrees in socket, 2 rooted with buccal roots fused
- 21 maxilla fragments, left and right – left and right: from superior portion, around nasal aperture; left: superior fragment attached to complete left zygoma; right: superior surface with zygomaxillary suture; superior-lateral fragment attached to right zygoma; fragment attached to nearly complete right zygoma; un-sided: possible fragment from nasal area, alveolar bone containing 1 tooth socket, 11 possible (1 from superior portion along nasal margin)

Table 1. continued.

North Slope continued

North Slope NS-Miscellaneous Adult Remains continued

palatine bone, right
5 palatine bone fragments – includes left and right
12 nasal bones, left and right – 8 left, 4 right (2 pairs, 1 forming superior 1/3 only)
2 nasal concha bones
16 sphenoid fragments
110 facial bone fragments
6 cranial ossicles
399 cranial vault fragments – 1 possibly from posterior temporal; 3 possibly parietal; many small
mandible (Mand 1)
mandible (Mand 2) – left portion from P1-M3 including ramus
mandible (Mand 3), nearly complete – damaged left condyle, right coronoid, and right gonion area; mandibular left M2 has an enamel extension
mandible (Mand 4) – right superior body with sockets for right I1-P2 and left I1-I2; body fragment with 2 partial sockets
mandible (Mand 5) – right side; square chin; gonial angle male
mandible (Mand 6)– left posterior portion with ascending ramus without condyle; left body in area of molars damaged and mainly inferior margin, socket area for I2-P2 and partial socket for I1 and mesial root of M1; anterior and right portion damaged in area anterior to right P1 socket; the right M1 in situ and a loose M3 and left M1 appear to go with this mandible; 6 alveolar bone fragments probably from this element; enamel pearl on distal root of right M3
mandible (Mand 7) – anterior missing alveolar bone, left C-M2 in situ and broken at angle posterior to M2
mandible (Mand 8)– left portion from partial C socket thru M3; P2, M2, M3 in situ
mandible (Mand 9) – left body missing inferior border; broken anteriorly through socket for left I2 and posteriorly at approximated midline for left M1; foramen used to determine portion present relative to teeth; I2 lost postmortem; C, P2, and M1 lost antemortem; P1 socket partially resorbed
mandible (Mand 10)– left body portion with 2 sockets (probably M2 and M3) and ascending ramus missing superior part
mandible (Mand 11) – anterior and left portion, probably left I1-P2; all teeth lost antemortem
mandible portion, left (Mand Frag 1) – left ascending ramus, missing condyle
mandible portion – anterior and left body with all sockets broken off postmortem
mandible portion, left – lateral body in area of molars and posterior to gonion
16 mandible fragments – left and right condyle fragments; left 2 condyles; right coronoid process; unisided 2 possible mandible body fragments (1 with alveolar bone resorbed); 2 inferior margin; 2 at gonion; ramus margin/gonion fragment; coronoid process, incomplete condyle; anterior with 2 complete and 2 partial sockets
19 alveolar bone fragments – 1 with 3 sockets (probably mandibular); 2 with 2 partial sockets; 16 with 1 partial socket
70 loose teeth (NOTE: numbered 1 through 70 to distinguish each in the dental tables, dental metrics)
2 hyoids – 2 bodies, 1 lesser horn
6 sternal bodies – 1 complete; 2 incomplete; proximal half of body; most of body plus 2 fragments; distal 1/2 with left lateral margin damaged
7 manubria – 4 complete (1 misshapen and possibly pathological); proximal portion including clavicular notches; 3 manubrium fragments
scapula, left (Scap L1) – glenoid fossa, coracoid process, acromion process end
scapula, left (Scap L2) – coracoid process, acromion process end
scapula, left (Scap L3) – coracoid process, acromion process end
2 scapulae, left and right (Scap L4 & R4)- incomplete
2 scapulae, left and right (Scap L5 & R5) – incomplete
scapula, left, nearly complete (Scap L6) – missing end of acromion process and small fragments in central body
scapula, left (Scap L7) – missing medial and central portion of body, end of coracoid process, & medial margin below spine
scapula, left (Scap L8) – superior portion with most of spine and acromion process and incomplete glenoid fossa
scapula, right (Scap R1) – possibly female
scapula, right (Scap R2) – lateral 1/2 plus acromion process portion that may go with this element
scapula, right (Scap R3) – glenoid fossa and medial end of spine area
scapula, right (Scap R6) – missing medial portion of body; incomplete spine; gracile
scapula, right (Scap R7) – superior-lateral portion with glenoid fossa and coracoid and part of body
scapula, right (Scap R8) – proximal 4/5 of glenoid fossa and all of coracoid process
scapula, right (Scap R9) – superior portion with spine and body

Table 1. continued.

North Slope continued

North Slope NS-Miscellaneous Adult Remains continued

153 scapula fragments, left, right, unsided – left: inferior 2/3s, acromion process, spine fragment, coracoid and superior 1/3 of glenoid fossa, acromion process, medial end of acromion process; right: acromion process end, 2 spine fragments, 2 lateral end of acromion process, portion of body with inferior angle, glenoid fossa (Scap Frag R1), 3 coracoid processes, partial acromion process, acromion process and spine, most of spine; unsided: 11 spine fragments, 2 acromion process, 81 body/possible body fragments, 20 body with margin, 16 margin, 3 glenoid fossa (2 from same element), possible glenoid fossa
15 clavicles, 5 left and 10 right – left: left fragment from lateral 1/2 with end broken off; Clav-L1 gracile; complete (Clav L2); nearly complete & gracile (Clav L3); (Clav L4) 2 pieces probably from same element but do not conjoin, nearly complete; right: complete (Clav R1); nearly complete with acromial end damaged (Clav R2); nearly complete but missing sternal end (Clav R3); missing lateral end; lateral 1/3; lateral 1/3 to 1/2; lateral fragment and possibly right shaft portion; sternal end and lateral end (do not conjoin); lateral 1/2 with end broken off; unsided sternal end
3 clavicle fragments – 2 possible midshaft fragments; sternal end
19 ribs, left and right – left: 4 1st (1 with ca. 7mm diameter hole in cortex which may be antemortem), 11th or 12th; right: 2 1st, 11th or 12th; unsided: 1st; unidentified: 1 left; 6 right
577 rib fragments, left and right – left: 56 vert end, 8 sternal end (1 nearly complete); right: 60 vert end, 8 sternal end; unsided: 15 vert end, 7 sternal end; remainder body
38 cervical vertebrae – 6 1st (2 incomplete); 3 2nd (1 incomplete); 23 3rd-7th (17 complete/nearly complete, 6 incomplete); 6 unidentified: 1 missing left ½ and spine, 3 body, 1 partial body
2 cervical or thoracic vertebra fragments – spines
67 thoracic vertebrae – 21 complete or nearly complete (2 of complete and 1 body with slight lipping along posterior body margin; 8 with slight degenerative changes along body margin [lipping]); 3 arch/spine area; missing transverse processes and portion of spine; body with portion of right arch; body only; most of body, arches and superior articular facets; 2 incomplete with 2 fragments; 2 bodies only (both with slight lipping); arch and right spinous process; incomplete body with slight lipping; arches; 1 missing part of body; 2 anterior and spine only; 1 incomplete body plus spinous process; 3 missing arches; 1 right 1/2 and 1 articular facet that is probably thoracic; 1 missing left transverse process and spine
5 thoracic vertebra fragments – part of spinous process and inferior articular facets; spinous process; 2 possibly thoracic body, transverse process
3 cervical vertebra fragments – 2 arch; bifid spinous process
lumbar vertebra, 1st – probably 1st; congenital? absence of right transverse process
41 lumbar vertebrae – 1st missing right transverse process; 6 complete or nearly complete; 3 with slight degenerative changes; probable L5 with moderate degenerative changes; 1 missing right arch/spine; 1 body only; 2 arch fragments possibly lumbar; incomplete represented by 4 fragments: body with right transverse process; spine with inferior right articular facet; incomplete body with right transverse process; right superior and inferior articular facets with part of spine; 1 nearly complete; 1 incomplete body with slight compression and lipping; 2 represented by incomplete body, incomplete arches with incomplete body, and 3 superior articular processes; 2 nearly complete; 3 with partial or missing spines; 2 represented by 2 right superior articular surface fragments; most of body with left trans process and most of superior articular facet; part of arches; missing most of body; body with slight lipping; half of body with transverse process; arch fragment; 1 nearly complete; 2 in fragments; nearly complete one and 1 body portion with slight to moderate lipping; 1 nearly complete, 1 body only, 1 right half of arch which does not go with body; body and more complete vertebra with slight to moderate lipping along superior body margins; body and lumbar superior articular process; body and small portion of arch with unilateral lipping on body
4 lumbar vertebra fragments – body, possibly lumbar; 2 articular facets; arch/spine
thoracic or lumbar vertebra, incomplete – 1 probably lumbar
thoracic or lumbar vertebra fragment – partial arch/spine
339 vertebra fragments – 98 body; 237 spine/process/facet (at least 1 is cervical); 4 miscellaneous
2 innominate, (Inn L1 & R1) left and right – Inn-L1: probable pair: left missing pubis, part of ischium, and superior portion of ilium; deep and relatively narrow notch; right missing most of ischium and portion of retroauricular surface; narrow subpubic angle and sciatic notch, pubic symphysis and auricular surface eroded
innominate, left (Inn L2) – wide sciatic notch and subpubic angle; preauricular sulcus; possible pair with Inn R3
innominate, left (Inn L3) – reconstructed: ischium with part of acetabulum; left fragment along medial surface of greater sciatic notch; inferior portion of ilium including auricular surface; narrow sciatic notch; superior ramus of pubis could possibly go with this innominate
innominate, left (Inn L4) – ilium with crest damaged, wide sciatic notch
innominate, left (Inn L5) – anterior ilium with portion of the acetabulum proximal 2/3s of ischial tuberosity with portion of acetabulum; portion of iliac crest with small portion of superior retroauricular surface
innominate, right (Inn R2) – posterior portion of ilium missing sciatic notch area; auricular surface intact
innominate, right (Inn R3) – in two pieces with incomplete ilium; pubis separate but probably from this element; possible pair with Inn L2

Table 1. continued.

North Slope continued

North Slope Miscellaneous Adult Remains continued

innominate, right (Inn R4) – posterior ilium with auricular and retroauricular areas
innominate, right (Inn R5) – posterior ilium with retroauricular and partial auricular surfaces
innominate, right (Inn R4 or Inn R5?) – anterior crest of ilium with small portion of acetabulum; superior 1/2 of pubic symphysis (surface eroded) with part of superior ramus; could go with Inn R3 or R4
innominate, right (Inn R6) – ilium and superior portion of ischium; wide sciatic notch, preauricular sulcus
innominate, right (Inn R7) – fragments possibly from same element: ilium body fragment; part of acetabulum and ilio-pubic ramus; ischial tuberosity with part of acetabulum
82 innominate fragments, left and right – left: superior-posterior portion of pubic symphysis, most of pubis, auricular surface fragment, possible pubic symphysis, possible ilium body, possible acetabulum, anterior margin of ilium with part of acetabulum, incomplete acetabulum, superior 1/3 of pubic symphysis; right: superior ramus of pubis, auricular surface fragment; unsided: ischial tuberosity, inferior 1/3 of pubic symphysis with part of ramus below face, 3 pubic symphysis fragments, 42 probable/possible ilium body, 7 iliac crest, 4 ischium, 4 retroauricular surface, superior ramus of pubis fragment, 2 incomplete auricular surface, 7 acetabulum fragments
sacrum (Sac 1) – base wider than ala, slightly curved
sacrum (Sac 2) – proximal 1/5 (1st body and partial alae) body and alae about same breadth
sacrum (Sac 3) – missing distal 1/5, wide base with narrow alae
sacrum (Sac 4) – proximal body with alae
sacrum (Sac 5) – proximal 2 segments missing left ala; spine fragment
26 sacrum fragments – superior surface; left central portion; superior body; 2 body; 3 spine; 18 miscellaneous coccyx body segment
2 humeri, left and right (Hum L1 & R1) – left: missing proximal 1/4; right: shaft
2 humeri, left and right (Hum L2 & R2) – distal 1/3 to 1/2
2 humeri, left and right (Hum L14 & R14) – left distal 1/2 of shaft; right proximal 1/2 of shaft and complete head
2 humeri, left and unsided (Hum L15 & U1) – left midshaft, very gracile; unsided shaft portion
humerus, left (Hum L3) – distal 3/4s
humerus, left (Hum L4) – distal 1/2; pronounced areas of muscle attachment
humerus, left (Hum L5) – distal 1/2
humerus, left (Hum L6) – proximal 1/2
humerus, left (Hum L7) – missing head and trochlea, gracile
humerus, left (Hum L8) – about proximal 1/2
4 humeri, 2 left (Hum L9 & L10) and 2 right – Hum L9: distal 2/3s; Hum L10: head; right: 2 duplicate fragments from proximal end, proximal 1/2 of shaft, distal end fragment with trochlea and medial epicondyle
humerus, left (Hum L11) – middle 1/3 of shaft
humerus, left (Hum L12) – lateral distal end with medial epicondyle and trochlea
humerus, left (Hum L13) – proximal 2/3s of shaft
humerus, right (Hum R3) – proximal 1/2 of shaft
humerus, right (Hum R4) – distal 1/2, very robust
humerus, right (Hum R5) – distal third
humerus, right (Hum R6) – distal 1/3 to 1/2
humerus, right (Hum R7) – head with small portion of shaft; distal end; these 2 portions could be from same element
humerus, right (Hum R8) – very gracile, slight definition for muscle attachment
humerus, right (Hum R9) – proximal 1/3
humerus, right (Hum R10) – H-R3: proximal 1/5
humerus, right (Hum R11) – proximal 1/3
humerus, right (Hum R12) – missing proximal 1/4
humerus, right (Hum R13) – distal 1/4 with medial epicondyle and articular surfaces damaged
humerus, right (Hum R15) – middle 2/3 of shaft; anterior/lateral portion of proximal end
humerus, right (Hum R16) – proximal 1/2 of shaft
18 humerus fragments, right and unsided – right: proximal anterior shaft; unsided: capitulum, 6 head fragments, 2 incomplete heads, 5 distal end, 2 midshaft portions, possible shaft
2 radii, left and right (Rad L1 & R1) – probable pair, gracile, distal epiphysis line of fusion visible but completely fused
2 radii – left and right (Rad L2 & R2) – left missing proximal 1/4; right complete; possible pair
2 radii, left and right (Rad L3 & R3) – left incomplete distal end; right proximal shaft fragment with radial tuberosity and distal 1/3 with healed fracture on posterior surface just superior to distal end, cortex in poor condition
2 radii, left and right (Rad L4 & R4) – complete, probable pair
radius, left (Rad L5) – distal end slightly damaged, gracile

Table 1. continued.

North Slope continued

North Slope Miscellaneous Adult Remains continued

radius, left (Rad L6)– distal 1/2
radius, left (Rad L7)– distal ¼
radius, left (Rad L8) – missing distal 1/3
radius, left (Rad L9) – missing distal 1/3
radius, left (Rad L10) – proximal 1/4-1/3
radius, left (Rad L11) – proximal 1/2
radius, left (Rad L12) – proximal 1/2
radius, left (Rad L13) – proximal end
radius, left (Rad L14) – proximal 1/3, head damaged
radius, left (Rad L15) – proximal 2/3s, somewhat robust
radius, right (Rad R5) – distal end
radius, right (Rad R6) – missing proximal 1/3
radius, right (Rad R7) – shaft – no metrics
radius, right (Rad R8) – proximal 1/4 + distal end, gracile
radius, right (Rad R9) – proximal 1/3
radius, right (Rad R10) – proximal 1/4 + distal end, gracile
4 radius fragments, unside – proximal end; possible head fragment; fragment of proximal articular surface; shaft portion
ulna, left (Ul L1) – proximal 2/3s of shaft, gracile (does not refit Ul L2)
ulna, left (Ul L2) – distal 1/3, gracile
ulna, left (Ul L3) – distal 3/4
ulna, left (Ul L4) – missing superior half of head
ulna, left (Ul L5) – most of shaft, gracile
ulna, left (Ul L6) – proximal 2/3s
ulna, left (Ul L7) – distal 1/2, very eroded and damaged postmortem
ulna, left (Ul L8) – central 2/3s of shaft – no metrics
ulna, right (Ul R1) – proximal end; 2 head fragments possibly from this element
ulna, right (Ul R2) – distal 1/2; groove at distal end between process and articular surface
ulna, right (Ul R3) – proximal 1/3; distal 1/2 (metrics); possibly same element
ulna, right (Ul R4) – distal 2/3s, robust
ulna, right (Ul R5) – incomplete proximal end
ulna, right (Ul R6) – head
ulna, right (Ul R7) – proximal end
ulna, right (Ul R8) – proximal 1/3 of shaft – no metrics
ulna, right (Ul R9) – proximal end
ulna, right (Ul R10) – distal 1/4 with end damaged
ulna, unside (Ul U1) – possible distal shaft portion
13 ulna fragments, left and right – left: incomplete head; right: incomplete head; unside: 8 shaft portions (1 from proximal 1/2), shaft fragment, possible distal end, possible shaft portion
36 carpals – 5 capitates, 3 left, 2 right; 7 lunates, 6 left, 1 right; 2 pisiforms, right; 2 hand naviculars, 1 left, 1 right; 9 hamates, 5 left, 4 right; 5 greater multangulars, 1 left, 4 right; 3 lesser multangulars, right; 3 triquetrals, 1 left, 2 right
46 metacarpals, left and right – left: 6-1st (1 incomplete), 3 2nd, 6 3rd (1 incomplete), 2 4th (1 with proximal end broken off), 3 5th (1 missing distal 1/3); right 6 1st, 5 2nd (1 incomplete and very eroded), 7 3rd (1 eroded), 2 5th; unside: 2 distal 1/3, 2 distal end, distal 1/2, incomplete 1st fragments (distal end, proximal end)
66 hand phalanges – 26 proximal row (14 incomplete); 17 middle row (1 incomplete); 23 distal row (1 incomplete, 1 1st digit); middle row distal end fragment
femur, left (Fem Misc L18) – middle 2/3s of shaft
femur, left (Fem Misc L19) – distal 1/4; lightweight
femur, left (Fem Misc L20) – distal 1/4 of shaft; middle 1/3 of shaft
femur, left (Fem Misc L21) – distal 1/2 of shaft
femur, right (Fem R1) – middle 2/3s of shaft with vertical crack along anterior surface
femur, right (Fem R2) – shaft, estimated metrics; possibly male
femur, right (Fem R3) – proximal 2/3s with head damaged
femur, right (Fem R4) – proximal 1/2 of shaft with anterior of neck and greater trochanter
femur, right (Fem R5) – middle 2/3s of shaft, incomplete
femur, right (Fem R6) – proximal 1/5
femur, right (Fem R7) – distal 1/3 plus incomplete head and neck

Table 1. continued.

North Slope continued

North Slope Miscellaneous Adult Remains continued

femur, right (Fem R8) – proximal and middle shaft portions; proximal shaft fragment with lesser trochanter
femur, right (Fem R9) – proximal 1/2 of shaft; robust
femur, right (Fem R10) – distal end, robust
femur, right (Fem R11) – distal portion with articular patella surface and most of condyles
femur, right (Fem R12) – about 1/3 of shaft from midshaft distally
femur, unsided (Fem U1) – head with inferior portion of neck
femur, unsided (Fem U2) – midshaft portion
2 femora, left and right (Fem Misc L22 & R22)– most of shaft
2 femora, right and unsided (Fem R13 & U3)– right: incomplete distal 2/3s of shaft plus larger shaft fragment, greater trochanter fragment; unsided: trochanter fragment, 3 shaft portions, 2 condyle fragments
46 femur fragments, left and right – left: half of lateral condyle; right: posterior portion of medial condyle; posterior surface of proximal shaft with lesser trochanter and neck; unsided: 20 condyle, 2 incomplete heads, 2 heads (Fem U4 & Fem U5), 1 neck, 15 shaft, shaft portion with animal gnawing along linea aspera, 1 distal posterior shaft; 2 from superior shaft
3 humerus or femur fragments – head
14 convex articular surface fragments – 5 probably humerus or femur, 1 probably femur or talus
9 patellae, 5 left and 4 right
tibia, left (Tib L1) – proximal 2/3s, missing anterior shaft in middle third; robust
tibia, left (Tib L2) – proximal 1/3 missing most of medial 1/2; robust
tibia, left (Tib L1 or L2) – distal end, could go with Tib L1 or Tib L2; robust
tibia, left (Tib L3) – missing distal end; eroded, gracile
2 tibiae, left and right (Tib L4 & R4) – distal ends only, incomplete
tibia, left (Tib L5) – distal end slightly damaged; gracile
tibia, left (Tib L6) – approximately superior third of shaft
tibia, left (Tib L7) – most of shaft missing anterior in proximal 1/2
tibia, left (Tib L8) – distal 1/2 of shaft, eroded
tibia, right (Tib R1) – proximal end slightly damaged; gracile
tibia, right (Tib R2) – distal 2/3s; robust
tibia, right (Tib R3) – distal end
tibia, right (Tib R5) – missing distal 1/4; very lightweight
tibia, right (Tib R6) – posterior 1/2 of proximal end; distal end; gracile
tibia, right (Tib R7) – distal 1/2 to 2/3s of shaft missing part of lateral surface
tibia, unsided (Tib U1) – midshaft portion
31 tibia fragments, left and right – left: proximal articular surface, distal end fragment; right: 2 distal end, incomplete proximal end with posterior of shaft and posterior 1/2 of medial articular surface; medial malleolus of distal end; unsided: possible distal end fragment, 6 proximal surface, 2 anterior superior shaft, 17 shaft
fibula, left (Fib L1) – distal 2/3s
fibula, left (Fib L2) – distal half of shaft, very robust
fibula, left (Fib L3) – proximal 2/3s with head damaged
fibula, left (Fib L4) – missing distal end, eroded, gracile
fibula, left (Fib L5) – distal 1/2
fibula, left (Fib L6) – distal 1/2 of shaft
fibula, left (Fib L7) – proximal 1/3, robust
fibula, left (Fib L8) – distal 1/4; robust
fibula, left (Fib L9) – distal end
fibula, left (Fib L10) – distal end
fibula, right (Fib R1) – complete
fibula, right (Fib R2) – proximal half with head damaged
fibula, right (Fib R3) – proximal third
fibula, right (Fib R4) – proximal 1/5 with head damaged
fibula, right (Fib R5) – head damaged
fibula, right (Fib R6) – distal 1/5, proximal 1/5s, proximal fragment
fibula, right (Fib R7) – most of shaft
fibula, right (Fib R8) – distal 1/4
fibula, right (Fib R9) – possibly right, proximal 1/3 with head damaged and unsided 1/2 of shaft
fibula, right (Fib R10) – distal end
fibula, right (Fib R11) – distal end

Table 1. continued.

North Slope continued

North Slope Miscellaneous Adult Remains continued

fibula, right (Fib R12) – distal end
fibula, unsided (Fib U1) – ca. 1/2 of shaft
fibula, unsided (Fib U2) – central 1/3 of shaft
fibula, unsided (Fib U3) – distal 1/3 of shaft and ca. 1/2 of shaft probably from same element
fibula, unsided (Fibu U4) – about 1/2 of shaft
18 fibula fragments, left and unsided – 2 distal end (1 left); 10 shaft fragments, 6 unsided shaft portions
592 long bone shaft fragments – 1 femur or tibia; 24 possible femur or tibia
10 calcanea, 4 left, 6 right – left: Cal L1 goes with Talus L1; right: Calc R1 matches talus Tal R1; most of remaining left and right nearly complete
9 tali, 3 left, 6 right – left: Tal L1 goes with calcaneus Cal L1; right: Tal R1 goes with calcaneus Calc-R1; 1 very gracile & possibly juvenile; unsided 3 fragments (1 possible); remainder of left and right complete or nearly complete
8 calcaneus or talus fragments – calcaneus heel; 4 possible calcaneus or talus fragments; 3 possible talus
36 tarsals - 7 1st cuneiforms, 4 left, 3 right; 5 2nd cuneiforms, 1 left, 3 right, 1 unsided; 5 3rd cuneiforms, 2 left, 2 right, 1 unsided; 4 cuneiform fragments; 9 cuboids, 7 left, 2 right; 10 foot naviculars, 4 left and 4 right, 2 unsided
36 metatarsals, 20 left, 13 right – left: 5 1st, 6 2nd, 3rd, 6 4th, 2 5th (1 incomplete); right: 3 1st (1 head & most of shaft; 1 eroded), 5 3rd (1 incomplete), 2 4th (1 incomplete); 3 5th; unsided: 1st (incomplete), 2 distal 2/3s
19 metacarpal/metatarsal fragments – incomplete; complete but fragmented head; very bleached and eroded with distal end missing and proximal end damaged; possible fragment; 5 shaft; 4 heads; distal end of 1st; distal end, possible shaft, 2 proximal end; distal end
19 foot phalanges – 12 proximal (including 3 1st digits), 4 middle, 3 distal (2 1st digit)
hand/foot sesamoid bone
2 articular surface fragments
Subadult NS-1 – older fetus to newborn
temporal, left – body with zygomatic arch
2 cranial vault fragments
ilium, unsided
Subadult NS-2 – newborn to 0.5 years
2 ilia, left and right – probable pair
Subadult NS-3 – newborn to 0.5 years
ilium, left
Subadult NS-4 – newborn to 0.5 years
ilium, left, incomplete
Subadult NS-5 – newborn to 0.5 years
ilium, left, incomplete
Subadults NS-2-5
2 frontal fragments – left and right orbits
2 temporals, left and right – left body and petrous portion; right petrous portion
temporal, left
temporal fragment
zygoma, right
76 cranial vault fragments
mandible (Mand1), nearly complete – sockets for left and right di1-dm2; no teeth erupted, some unerupted teeth in situ
mandible (Mand2), incomplete – left portion from midline through partial socket for M1; unerupted dc-dm2 in situ
mandible (Mand3), incomplete – left half missing ascending ramus; di1 through dm2; no teeth erupted
mandible, incomplete – left 1/2 without ascending ramus; no teeth in situ; alveolar bone damaged
5 loose teeth
2 scapulae, left – 1 complete; 1 missing medial and inferior margins and acromion process
clavicle, left
5 ribs, 1 left, 1 right and 3 unsided – plus 3 unsided fragments
4 cervical vertebrae – 1st (left transverse process and part of pedicle); 2 1st or 2nd (right arch halves), 1 unidentified right arch
cervical vertebra or sacrum – body
2 thoracic vertebrae – left and right arches, not from same elements
thoracic or lumbar vertebra arch half, right
20 vertebra arch halves – 3 left, 11 right, 6 unsided
11 vertebral fragments
vertebra centrum

Table 1. continued.

North Slope continued

Subadults NS-2-5 continued

2 ischia, left
ilium or scapula fragment
humerus diaphysis, left
2 radius diaphyses, left and right – left: proximal 2/3s; right: missing ends
2 ulna diaphyses, left and right – left: distal end broken off; right: proximal 1/2
ulna diaphysis, unsided
ulna or fibula diaphysis, unsided, incomplete – diaphysis portion
4 femur diaphyses, 1 left, 3 right – left complete; right: distal end broken, distal end damaged, distal end missing
3 tibia diaphyses, 2 left, 1 unsided – left both complete; unsided proximal end
9 diaphyses, incomplete – 2 probably distal ends of tibia and femur; plus two diaphysis fragments; 5 unidentified portions

Subadult NS-6 – ca. 1 year

2 temporals, left and right, incomplete – petrous portions with right incus
2 loose teeth
femur diaphysis, right – proximal 2/3s

Subadult NS-7 – ca. 1 year

2 temporals, left and right, incomplete – right petrous portion
2 loose teeth
femur diaphysis, right, incomplete – proximal 1/2 (possible femur)

Subadult NS-8 – ca. 1 year

temporal, right, incomplete – petrous portion
2 loose teeth
femur diaphysis, right – proximal 2/3 with proximal end damaged

Subadults NS-6, 7, 8

2 frontals – central and left inferior plus fragment of right orbit; superior central and left portion
2 frontal fragments – 1 right orbit
parietal, left, incomplete – posterior-inferior 1/4
parietal fragment – central superior portion
occipital fragment – condyle
2 occipital basilars
temporal, left, incomplete – petrous portion
zygoma – possible
maxilla (MaxR1), right, nearly complete – sockets for di1-dm1 (in situ) and unerupted (absent) dm2
sphenoid – sella tursica
67 cranial vault fragments
mandible (Mand 1), incomplete – right portion with unerupted dm2 (Ri-Cli) and M1 (Cco-C0c)
mandible (Mand 2), incomplete – right portion unfused at midline contains partial di1 and di2 sockets, dc socket, dm1 (unerupted and in situ) and socket for dm2; posterior missing; dc probably not erupted
mandible (Mand 3), incomplete – right portion with socket for unerupted tooth
12 loose teeth (MNI:2)
scapula, left
clavicle, left – missing both ends
10+ ribs, 6 left, 2 right – sided ribs complete; 8 unsided portions
4 rib fragments
2 cervical vertebra arch halves, 1st
cervical vertebra, 2nd – dens
cervical vertebra arch half, left – left
thoracic vertebra – left arch half
13 vertebrae – 7 arch halves: 1 left, 6 unsided; 13 centra
4 vertebra arch fragments
2 ischia, left and right
ilium, left, incomplete
ilium, unsided, incomplete – 2 pieces
5 ilium or scapula fragments – 3 probable ilium
humerus diaphysis, left – distal 1/3
ulna diaphysis, unsided – proximal 1/3
3 femur diaphyses, 2 left, 1 unsided – left: ends missing; plus distal end fragment possibly from this element; left: missing ends; unsided: both ends missing

Table 1. continued.

North Slope continued

Subadults NS-6, 7, 8 continued

tibia diaphysis, right – proximal 1/4
4 diaphyses, incomplete
5 diaphysis fragments
possible talus, incomplete
5 metacarpals/metatarsals – 3 complete, 1 possible
phalanx
2 phalanges or metacarpals/metatarsals

Subadult NS-9 – ca. 2 years

loose tooth

Subadult NS-10 – 1.5-2.9 years

maxilla (MaxL1), left – posterior maxilla damaged; sockets for di1-dm1
2 loose teeth (possibly associated)

Subadults NS-9 or NS-10

4 frontal fragments – right orbit area; medial 1/2 of right orbit; central inferior with nasion and partial metopic suture
2 parietal fragments
2 occipital fragments – condyle fragment; lateral fragment of base
2 parietal or occipital fragments
2 temporals, 1 left, 2 right – 1 left and 2 right petrous portions; right area posterior to the external auditory meatus
temporal, unisided – incomplete petrous portion
temporal fragment – body
possible zygoma fragment
sphenoid fragment
maxilla (MaxL2), left – fragment with 4 partial root sockets and 2 sockets for unerupted teeth
maxilla (MaxL3), left – fragment with partial sockets
maxilla fragment, left – superior portion
122 cranial vault fragments
mandible fragment – possible body fragment
4 loose teeth
possible sternal body segment
4 ribs, left and unisided – 3 left nearly complete including 1st; unisided incomplete
36 rib fragments – 1 left
2 scapula fragments – body portion
clavicle, right – missing sternal end
3 thoracic vertebrae – arches only, not fused to body
thoracic vertebra fragment – superior articular facet
8 vertebral centra – plus 3 fragments
12 vertebra fragments
possible ischium fragment
3 ilium fragments – 2 crest
sacrum – 2nd body
sacrum fragment
2 humerus diaphyses, left and right – left: distal 2/3; right: distal 1/3
humerus proximal epiphysis, left, nearly complete
hand phalanx
femur diaphysis, unisided – proximal end damaged; missing distal 1/4-1/3
femur head epiphysis, unisided – probably
tibia diaphysis, unisided – midshaft portion
2 metatarsals/metacarpals – shafts
foot phalanx – 1st digit, proximal row
3 diaphyses, incomplete – plus 6 diaphysis fragments (2 from epiphyseal ends)
epiphyseal surface fragment
epiphysis or centrum fragment
Subadult NS-11 – 3-4 years
5 loose teeth
talus, right

Table 1. continued.

North Slope continued

Subadult NS-12 – 4.6-6.4 years

2 maxillae, left and right – unfused to each other; left anterior for I1 & I2 and anterior portion of left palatine; no teeth in situ; right inferior portion with complete I1 and I2 sockets; missing buccal surface of alveolus; sockets for dc, unerupted C, dm1, dm2, and unerupted M1, may be associated with mandible
mandible – left ascending ramus and partial molar socket and unerupted molar; unerupted molar probably M2
mandible – right half with condyle missing; erupted I2, dm1, dm2, and unerupted M2 in situ; di1 and I1 and di2, M1 lost postmortem

4 loose teeth – possibly associated

talus, right – 38 mm long

Subadult NS-13 – 4.6-5.2 years

maxilla, right – unerupted I2, M2 in situ; dm1 and dm2 present/erupted; other teeth lost pm

talus, right

Subadults NS-11-13

2 frontal fragments – right orbit and area superior to it

parietal, left – anterior 1/2 with inferior margin damaged

2 parietals, left and right – left: anterior superior fragment (ca. 1/4 of element); right: anterior-inferior 1/4

2 parietal fragments

occipital, incomplete – most of squamous and right lateral, unfused

occipital, incomplete – missing right 1/4; includes part of right lateral; fragment with 3 small ossicles

occipital, incomplete – portion of squamous, basilar

occipital fragment

temporal, left, incomplete – missing superior 1/3 along squamosal suture

temporal, left, incomplete – missing anterior suture portion of zygomatic process

temporal, right, incomplete – petrous portion

temporal, right, incomplete – missing most of body; incus

2 temporal fragments – zygomatic process, squamosal suture

zygoma, right

possible sphenoid fragment

cranial ossicle

4 facial bone fragments – 1 possible

48 cranial vault fragments

mandible – right ascending ramus and part of damaged right body; possibly associated with Subadult NS-11

mandible fragment – coronoid process

3 sternal body segments

manubrium fragment

scapulae, right and unsided, incomplete – 2 coracoid processes, unfused

3 scapula fragments – 1 body, 1 possible

clavicle – possible lateral end of clavicle

4+ ribs, left and right – 2 left, 2 right, 10 unsided portions

84 rib fragments

3 cervical vertebrae – 2nd with dens and part of superior surface; 2 3rd-7th, all portions fused; fragment of superior and inferior articular facets

9 thoracic vertebrae – 3 complete with body/arch fusion line still visible; 6 incomplete anterior without body, arches fused but incomplete, no centrum, 2 of the incomplete have arches fused to each other but not to body

thoracic vertebra fragment – arch fragment with unfused surface

5 lumbar vertebrae – 3 complete & fused; arches & centrum (unfused); 2 nearly complete with spine and left superior articular facet missing

9 vertebra fragments – 2 centra (1 incomplete), 4 arch fragments, 2 spines, 1 articular facet

pubis, unsided, incomplete – symphyseal surface broken off

ischium, left

ischium, left, incomplete

ischium fragment – possible

2 ilium fragments – crest

ilium or ischium fragment

innominate or scapula fragment – body

sacrum – 2nd body

sacrum – body; 2nd body, incomplete and unfused

humerus, left, incomplete – proximal 1/2 of diaphysis and proximal epiphysis

Table 1. continued.

North Slope continued

Subadults NS-11-13 continued

ulna diaphysis, left – proximal 2/3s with proximal end broken
lesser multangular, left
2 lesser multangulars, right
hamate, right
lunate, right
triquetral, left
2 metacarpals, left and right – left: incomplete 4th; right: incomplete 5th
7 hand phalanges – 2 proximal, 4 distal (1 incomplete); 1 missing ends; 2 proximal epiphyses
3 femur diaphyses, 2 right, 1 unsided – right: proximal 1/3 to 1/2 and incomplete distal 1/3; right: proximal half with head damaged; unsided proximal 2/3s of shaft
femur distal epiphyses, 2 right, 1 unsided, incomplete
2 patellae, right and unsided – right nearly complete; unsided incomplete
2 tibia diaphyses, 1 left, 1 unsided – left: proximal 3/4-4/5s; unsided: incomplete plus probable proximal end fragment
2 tibia proximal epiphyses, left
tibia or femur diaphysis fragment, unsided
3 fibula diaphyses portions, unsided – possible proximal or distal end of fibula diaphysis; portion of diaphysis; missing distal 1/4-1/3
8 diaphysis fragments – 3 with portion of epiphyseal surface
2 metatarsals, 2nd, 5th, right – distal end unfused
2 foot phalanges – middle row
2 metacarpal/metatarsal distal epiphyses
2 metacarpal/metatarsals – 1 probably 1st
5 metacarpal/metatarsal fragments – 2 shaft, proximal end fragment, 2 possible shaft
hand/foot epiphysis – metacarpal, metatarsal, phalanx
2 proximal phalanx epiphyses
2 epiphyses – incomplete, unidentified

Subadult NS-14 – 5.9 to 8.6 years

zygoma, right – attached to right maxilla
2 maxillae, left and right – left fragment with partial dm2 socket; right attached to right zygoma; right anterior and posterior alveolar areas broken

3 loose teeth

Subadult NS-15 – 6.4-9.3 years

mandible, incomplete – 8 fragments from left posterior body – with 2 loose teeth

3 loose maxillary teeth

Subadult NS-16 – 7.1-8.0 years

loose tooth

Subadult NS-17 – 9.2-11.2 years

maxilla, left – missing posterior to M1; P1-M1 in situ; small inferior fragment of left zygoma attached; in poor condition

loose tooth

Subadult NS-18 – 10.8-11.6

loose tooth

Subadult NS-17 or NS-18

loose tooth

Subadults NS-14 to NS-18

frontal – left 1/2 missing inferior orbit area

parietal, right – posterior-inferior corner

parietal fragment

occipital fragment – left base with condyle

2 temporal fragments, unsided – along squamosal suture

temporal, left – small fragment of left parietal attached at notch and a small ossicle along lambdoidal suture

12 cranial vault fragments

3 sphenoid fragments – including sella tursica fragment

7 loose teeth

hyoid, incomplete – lesser horn

sternal body – unfused

clavicle – possible

Table 1. continued.

North Slope continued

Subadults NS-14 to NS-18 continued

2 scapulae, left and right – pair: left glenoid fossa & coracoid process; right superior-lateral 1/3, incomplete acromion process
scapula, left, incomplete – superior 1/2
possible scapula fragment
rib, right – vertebral 1/2
7 rib fragments
thoracic vertebra, incomplete – part of body and part of left arch
lumbar vertebra, incomplete – fused
2 vertebral bodies – 1 incomplete, 1 fragment
ilium fragment
ischium, right, nearly complete
pubis, right – 2 conjoining pieces
ilium, right
ilium, left
coccyx – body
radius distal epiphysis, left
ulna distal epiphysis, left
radius or ulna diaphysis, unsided, incomplete
hamate, right
lesser multangular, right
greater multangular, left
hand navicular, right
2 metacarpals, 1 left, 1 right – left: 4th, distal end unfused; right: 3rd, distal end unfused
6 hand phalanges – 3 proximal (including 1st digit), 2 middle, 1 distal; proximal epiphyses unfused
2 femur distal epiphyses, right and unsided
ibia diaphysis, unsided, incomplete – distal end; proximal end with portion of either medial or lateral shaft
fibula diaphysis, unsided, incomplete
talus, right – Tal-R2
calcaneus, right – heel unfused; 58 mm long
2 cuboids, left and right
1st cuneiform, left
metatarsal, 1st left

Subadult NS-19 – older child to juvenile

frontal (Fr 1) – superior left and central portion
2 parietals (Par L1 & R1), left and right – left posterior-inferior portion; right missing superior portion and anterior along sutures (ca. 1/2 to 2/3s of element present)
clavicle, left and right – Clav L1 & Clav R1: left sternal 1/3; right lateral 1/2
patella, left, nearly complete
metatarsal, 2nd, left – distal end unfused

Subadult NS-20 – older child to juvenile

frontal (Fr 2) – about 1/2 of element; superior central and most of superior right
parietal (Par R2), right – attached to occipital portion; posterior 2/3s
occipital – attached to r. parietal; lateral-inferior portion along lambdoidal suture, with no base; 1 large and 2 small ossicles in suture
2 clavicles, left and right – Clav-L2 left, sternal half; Clav-R2 right, complete
patella, left
metatarsal, 2nd, left – distal end unfused

Subadult NS-19 or NS-20

frontal fragment – possible fragment along coronal suture
occipital fragment – base fragment in area of right condyle
temporal, left – posterior 1/3
cranial vault fragment
scapula, right, incomplete – medial spine/body fragment
rib, left, incomplete – missing sternal end
10 ribs, left and right – 5 left, 5 right
34 rib fragments – 2 left and 1 right vertebral end; 31 unsided portions
radius diaphysis, left – distal ½
hamate, left

Table 1. continued.

North Slope continued

Subadult NS-19 or NS-20 continued

mandible fragment, right – alveolar bone containing M2; M3 congenitally absent
metacarpal, 4th, right – distal end broken off
femur, right and unsided – right midshaft portion; unsided incomplete distal epiphysis
2 tibia diaphyses, right and unsided – right complete; unsided midshaft portion
2 fibula diaphyses, unsided – distal 1/3; proximal 2/3s, possibly from same element
calcaneus fragment – possible calcaneus heel fragment with unfused epiphysis
2 tali, left and right – left slightly smaller than right
1st cuneiform, left, incomplete
metatarsal, 1st, right – proximal epiphysis unfused
4 diaphysis fragments
metacarpal/metatarsal – incomplete, ends broken
phalanx proximal epiphysis – proximal row

Subadult NS-18, NS-19, or NS-20

4 loose teeth

Subadult NS-21 – juvenile

2 fibulae diaphyses, possibly right and unsided, incomplete – near adult size
loose tooth

Subadult NS-22 – juvenile

2 fibula diaphyses, unsided, incomplete – distal ½ with distal epiphysis unfused, close to adult size; possible distal fibula
loose tooth

Subadult NS-21 or NS-22

maxilla fragment, left – containing M1 and M2, M1: enamel extension; M2 no distal contact facet
mandible fragment, right – M1 and M2 in situ and partial socket for M3, no distal contact facet on M2; both teeth
with bits of circumferential enamel broken off; M2 antemortem enamel chipping on distolingual corner
4 loose teeth
2 ribs, 1st, left and right – left: complete; right: sternal 1/3
radius diaphysis, right – proximal 1/3; near adult size
metacarpal, 2nd, left – distal end unfused
2 hand phalanges – proximal row with fused epiphyses; middle row with proximal portion broken off; elements small
2 metatarsals, right – 1st distal epiphysis; 2nd with distal end unfused
2nd cuneiform, right

Subadult NS-23 – juvenile to young adult

mandible fragment – anterior right portion including sockets for left I1 and I2 through r. partial M1 socket. Right C-P2 in situ
loose tooth
clavicle, right – gracile but adult or near adult-size; sternal epiphysis not fused
innominate fragment, unsided – incomplete pubic symphysis (about 1/3 of face)
coccyx – body
talus, right – 47 mm long; possibly juvenile or gracile adult

NS-Miscellaneous Subadult Remains

Newborn/Infant to Older Child

2 loose teeth

Young Child

loose tooth

Child

2 loose teeth

Child to Juvenile

8 loose teeth

7 vertebra fragments – 6 arch, 1 spine

possible vertebra or sacrum fragment

14 diaphysis fragments

13 epiphyseal surface fragments

48 fragments, miscellaneous

Indeterminate Subadult

7 cranial fragments

Table 1. continued.

North Slope continued

NS-Miscellaneous Remains

maxilla, left – alveolar area with I1-P2 sockets, unerupted small tooth visible in superior surface of palatine bone may be supernumerary or deciduous tooth, situated between I1 and I2

loose tooth

910.9 g miscellaneous fragments

No Feature

96N88E

Adult

radius, right, incomplete – distal ½, gracile

innominate, right, incomplete – ilium portion

6 innominate fragments

lumbar vertebra, incomplete – two pieces

5 vertebral fragments

6.9 g tiny miscellaneous fragments

98N86E

Adult

9 cranial fragments – eight sun-bleached

3 rib fragments

2 cervical vertebrae

thoracic vertebra

2 vertebral fragments

metacarpal, right 4th

tibia fragment – proximal end

metatarsal, right 4th – missing distal end

2 small long bone fragments

8.3 g tiny miscellaneous fragments

100N90E

Adult, possibly male

temporal, left, incomplete – missing most of superior margin, includes part of sphenoid; large mastoid process

Adult, possibly female

temporal, right, incomplete – missing arch, fossa, and anterior body margin; small mastoid process; tympanic dehiscence

Adult, indeterminate

2 parietals, left and right, incomplete – left: 3 fragments refit into most of anterior ½; right: posterior third containing at least

5 lambdoidal ossicles

cranial vault fragment – possibly parietal

Miscellaneous

facial bone fragment

100N92E (ca. 4 m west of Features 1 and 2)

Adult

2 small cranial vault fragments

3 facial bone fragments

100N92E Adult continued

2 rib fragments

innominate fragment – possible ilium fragment, eroded

2 foot phalanges – proximal row, bleached

phalanx – shaft

Miscellaneous

1.2 g miscellaneous fragments

102N86E

Adult

parietal fragment, left – anterior-superior fragment with portion of coronal and sagittal sutures

4 sphenoid fragments

3 cranial vault fragments – small, 1 with suture

mandible, incomplete – anterior portion ca. right I1 through I. P1; most of alveolar bone broken off; left canine in situ

mandible fragment – alveolar bone fragment with left P in situ, vertical crack on buccal of crown and root; crown eroded

scapula fragment – body

thoracic vertebra, incomplete – body portion

Table 1. continued.

No Feature continued

102N86Econtinued

Subadult – ca. 4 to 6 years

scapula, left – portion of spine medial to acromion process

Miscellaneous

0.5 g miscellaneous fragments

102N88E

Adult

temporal, left – includes external auditory meatus, most of petrous portion, mastoid process, and inferior ½ of posterior margin of squamosal suture; large mastoid process

cranial fragment

2 scapula fragments, right and unsided – right coracoid process, unsided body

rib, 11th or 12th, left – anterior end broken off

3 rib fragments – 1 from vertebral end

thoracic vertebra, fragmented – most of body, 1 transverse process, posterior with spine broken off, several small fragments

0.3 g miscellaneous fragments

102N90E

Miscellaneous

<0.1 g miscellaneous fragments – 2 small, bleached

104N86E

Adult

innominate, right, incomplete – ilium with incomplete auricular surface, acetabulum area damaged; possibly narrow sciatic notch

104N88E

Subadult – Juvenile

thoracic vertebra, nearly complete

114N88E

Adult

2 rib body fragments

radius or ulna shaft portion

long bone shaft fragment – probably from smaller bone

114N92E

Adult

humerus or femur fragment – head or femur condyle

tibia shaft fragment, unsided – anterior crest

lunate, left

2 long bone shaft fragments

Subadult 1 – infant ca. 1 year

12 cranial vault fragments

2 rib fragments

Subadult 2 – 1.5 to 2.3 years

mandible, incomplete – right posterior with unerupted M1 and ascending ramus

Subadult 3 – older child, ca. 5 to 8 years

frontal fragment – right orbit area

3 rib fragments

metatarsal, 5th, right – distal end unfused

phalanx, incomplete – possible phalanx shaft

Subadult Miscellaneous

2 metacarpal/metatarsals – possibly subadult

0.1 g miscellaneous fragments – possibly subadult

Miscellaneous

1.0 g miscellaneous fragments

114N94E

Adult

cranial vault fragment

mandible – missing posterior to the mesial root socket for left M3

mandibular left C; worn; not from mandible; black somewhat circular stain on presumed mesial crown surface

2 single-rooted teeth – extremely worn

cervical vertebra, C3-C7, nearly complete – eroded

Table 1. continued.

No Feature continued

114N94E Adult continued

3 vertebra fragments – 2 body, 1 process
tibia, left, incomplete – distal end broken off and missing; lightweight, gracile
talus, right, incomplete – missing medial/posterior-inferior area; very eroded
Subadult 2 – 2.5 to 3.5 years

2 parietals, left and right, incomplete – anterior/superior portions
parietal fragment, unsided – reconstructed from 3 pieces
occipital fragment – part of lateral

11 cranial vault fragments
Subadult 3 – older child, ca. 5 to 8 years

loose tooth – maxillary right I2

Subadult Miscellaneous

epiphysis or centrum fragment

Miscellaneous

2.2 g miscellaneous fragments

16N92E and 116N94E

Adult 1 (all from 116N94E)

frontal – inferior central and right lateral portion with inferior/anterior edge broken off; right orbit somewhat rounded

parietal, right, incomplete – anterior-central portion, conjoins with frontal

parietal fragment

occipital, incomplete – missing base; moderately pronounced occipital protuberance

sphenoid fragment

32 cranial fragments

Adult 2 (all from 116N92E)

4 frontal bone fragments – from right orbit and torus area with somewhat blunt margin and rounded torus

zygoma fragment, unsided – arch

2 cranial vault fragments

2 facial bone fragments – from nasal area

2 loose single-rooted teeth

4 hand phalanges – 2 proximal row (1 incomplete); 2 distal row incomplete

long bone shaft fragment

9 miscellaneous fragments

116N88E

Miscellaneous

<0.1 g miscellaneous fragments

118N86E, 120N86E, 122N86E

Adult

temporal fragment – styloid process

mandible fragment – right coronoid process

2 loose teeth

thoracic vertebra, incomplete – missing body and right transverse process

tibia, left, incomplete – shaft only

fibula shaft portion, unsided

7 long bone shaft fragments

metatarsal, 3rd, left, incomplete – missing distal end

118N86E, 120N86E, 122N86E

Subadult - child

cranial vault fragment

2 rib fragments

humerus diaphysis, left, incomplete – most of distal 1/3 to 1/2 with distal end missing

Subadult - older child

radius diaphysis, unsided, incomplete

Miscellaneous

7.2 g miscellaneous fragments

Table 1. continued.

No Feature continued

118N90E

Miscellaneous

0.1 g miscellaneous fragments

118N92E

Adult

thoracic vertebra, incomplete – 3 fragments, no body

hand phalanx, incomplete – probably middle row, missing proximal end

120N92E

Miscellaneous Subadult

2 cranial vault fragments – small

2 rib fragments – body

3 miscellaneous fragments

102N96E

2 long bone shaft fragments – bleached

miscellaneous fragment – bleached

104N98E

Adult

rib fragment – fragmented body portion

Miscellaneous

3 miscellaneous fragments

106NN98E

Adult

occipital fragment – base fragment, bleached

vertebra fragment – possible inferior articular surface, bleached

convex articular surface fragment

Miscellaneous

15 miscellaneous fragments – small, bleached

110N98E

Adult

long bone shaft fragment – 10 pieces from same larger fragment

112N96E

Miscellaneous

cranial fragment – possible

116N96E

Miscellaneous

0.2 g miscellaneous fragments

118N96E

<0.1 g miscellaneous fragment

120N94E

Miscellaneous

2.0 g miscellaneous fragments

122N94E

Adult

patella fragment, unsided – partially bleached

122N98E

Adult

possible long bone shaft fragment – small

124N98E

Miscellaneous

3 miscellaneous fragments

126N96E

Adult

2 long bone shaft fragments – possible fragments from same element

126N98E

Miscellaneous

cranial vault fragment – possible

Table 1. continued.

Surface Collection

Adult 1

femur, left, nearly complete (Fem L1) – missing medial half of distal end

Adult 2

femur, left, nearly complete (Fem L2) – distal end damaged on medial and lateral surface; gracile, bleached and eroded head

Adult 3

femur, left, incomplete (Fem L3) – proximal half missing greater trochanter

Adult 4

femur, left, incomplete (Fem L4) – proximal third missing greater trochanter and head damaged

Adult 5

femur, left, incomplete (Fem L5) – proximal half of shaft

Adult 6

femur, left, incomplete (Fem L6) – proximal third of shaft; fusion line for head still visible

Adult 7

femur, left, incomplete (Fem L7) – proximal third of shaft

Adult 8

femur, left, incomplete – FL8: distal half to 2/3s of shaft, bleached; doesn't match Fem L6 or Fem L7, duplicates Fem L1-5

Miscellaneous Adult

frontal (Fr 1) – includes small anterior portion of right parietal

frontal, incomplete (Fr 2) – left 2/3s missing anterior-inferior right & right lateral portion; attached to anterior portion of left parietal

frontal, incomplete (Fr 3) – anterior-inferior portion including all of left and medial 2/3s of right orbital areas and tori

frontal, incomplete (Fr 4) – medial 2/3s of left orbital area

frontal, incomplete (Fr 5) – right 1/3 including lateral half of right superior orbit (overlaps other 4 frontals)

18 frontal bone fragments – 2 right superior orbital fragments (possibly associated with Fr2 and 4); 2 left superior orbit fragments; 6 fragments along coronal suture; 3 small fragments with part of superior orbital margin or supraorbital torus; 5 small fragments with part of frontal crest

8 parietals, left and right, incomplete – 4 left: inferior half, posterior-inferior fragments; right: 4 anterior-inferior fragment, 4 posterior-superior fragments at lambda, 4 posterior-inferior fragments (1 attached to right temporal)

25 parietal fragments, 2 left and 6 right, 17 unisided

occipital, incomplete (Occ 1) – right 3/4s of squamous missing base, posterior central fragment of r. parietal attached

occipital, incomplete (Occ 2) – right inferior squamous portion

occipital, incomplete (Occ 3) – right inferior squamous portion

occipital, incomplete (Occ 4) – right 1/3 of squamous portion attached to right temporal

15 occipital fragments – inferior left-central 1/3 of squamous portion; small inferior squamous fragment near foramen magnum; 2 foramen magnum margin fragment; left and right condyles, probably from same element; right condyle; 2 lambdoidal ossicles; 6 fragments containing portion of lambdoidal suture

11 temporals, 3 left and 8 right – left: inferior portion with temporomandibular fossa, auditory meatus; and mastoid process; fragments forming petrous and part of arch; incomplete petrous portion; right: posterior 3/4s with posterior-inferior right parietal and right inferior third of occipital with base missing; missing anterior-superior area; posterior-inferior with fossa, meatus, petrous and mastoid and arch; posterior-inferior with fossa, meatus, part of petrous, and arch; inferior portion of arch and fossa and anterior portion of meatus attached to part of sphenoid; inferior portion with meatus or petrous but including fossa; fossa and part of arch; fossa

12 temporal fragments, 2 left, 8 right, 2 unisided – left: body; right: posterior-superior fragment along lambdoidal suture, 3 incomplete petrous portions, 4 body; unisided: 2 body

6 zygomas, 4 left and 2 right – left: complete attached to superior-lateral portion of left maxilla; incomplete missing arch and attached to small superior-lateral portion of left maxilla; incomplete frontosphenoid process missing arch; frontosphenoid process; right: complete with small superior-lateral portion of right maxilla; frontosphenoid process with portion forming inferior orbital margin attached to small fragment of right maxilla

maxilla, left, incomplete (Max L1) – missing frontal process and area posterior to M1; M1 has carabelli's cusp

maxilla, left, incomplete (Max L2) – posterior portion with M3 socket and M2 socket resorbed

maxilla, right, incomplete (Max R1) – anterior-inferior portion with partial sockets for incisors and canines, no teeth in situ

maxilla, right (Max R2) – right anterior fragment with sockets for incisors and canine, with lateral incisor and canine in situ

2 maxillae, left and right, incomplete (Max L3 & R3) – inferior margin of nasal aperture and includes sockets for left I1, C, partial P1 and right I1

2 maxilla fragments, left and unisided – left: incomplete frontal process; unisided small fragment with 1 partial socket

3 possible palatine fragments

maxilla/palatine fragments, right – posterior portion

2 nasal bones, left and right, incomplete

Table 1. continued.

Surface Collection continued

Miscellaneous Adult continued

10 sphenoid fragments
3 facial bone fragments
163 cranial vault fragments
mandible, incomplete (Mand 1) – left and right portions with anterior area for left and right Is, Cs, and P1s; left and right M2-M3s in situ; enamel extension on l & r M1s, 1 M2 and M3; M3s rotated, crowded
mandible, incomplete (Mand 2) – incomplete right half missing ascending ramus
mandible, incomplete (Mand 3) – right portion missing condyle but including area for M1-M3 in situ
mandible, incomplete (Mand 4) – right fragment missing inferior body consisting of portion posterior to P2 socket through M3 with molars in situ
mandible, incomplete (Mand 5) – anterior area with partial sockets for left and right Is and right C, no teeth in situ
7 mandible fragments – left ascending ramus missing condyle; left and right coronoid processes; right inferior portion of ascending ramus; condyle fragment; 2 inferior body margin fragments
9 loose teeth (labeled Dentition A, B, C, D)
hyoid, incomplete – unsided greater horn
sternum – inferior third of body, manubrium, and mid portion of body
4 clavicles, left and right – 2 left: missing acromial end; sternal end and acromial end possibly from same element; 2 right: nearly complete with sternal end damaged and acromial end missing; acromial third
clavicle, unsided, incomplete – shaft
9 scapulae, 5 left and 4 right – 5 left: Scap L1 glenoid fossa with incomplete acromion process & coronoid process, Scap L2 and Scap L3 with glenoid fossa, coronoid process & superior-lateral portion of acromion process; superior lateral portion missing most of acromion process; all of glenoid fossa and all of coronoid process; nearly complete acromion process; 4 right: Scap R1 complete, Scap R2 lateral and superior portion missing most of body, acromion process and coracoid; lateral portion of spine; most of acromion process
54 scapula fragments, left and right – left: fragment of inferior glenoid fossa; superior half of glenoid fossa; right: 3 acromion process fragments; 2 coracoid processes; Scap R 3 glenoid fossa; lateral and inferior body margin fragment; lateral-medial body missing spine; inferior angle of body; unsided: 3 acromion process, 6 spine, 14 body, 12 margin, 8 glenoid fossa
41 ribs – 7 1st (3 left, 2 right, 2 unsided); 1 2nd (unsided); 32 3rd-10th (15 left, 17 right, most vertebral end only); 1 left 11th/12th
151 rib fragments, unsided
10 cervical vertebrae – 2 1st (incomplete), 1 2nd (incomplete), 7 3rd-7th (4 complete)
21 thoracic vertebrae – 9 complete; 2 nearly complete; 1 body with partial arch; 9 arch/spine portions; miscellaneous: 6 bodies
7 thoracic vertebra fragments – 6 spine, 1 incomplete body
10 lumbar vertebrae – 4 complete; 1 missing left process and spine; 2 left spine fragments; 1 posterior half with left transverse process and all of vertebral foramen, body and right transverse process missing postmortem; 1 partial body with right transverse process; miscellaneous: partial body
103 vertebrae fragments – 23 body, 75 spine/process/facet including 1 bifurcated spine
sacrum, nearly complete – missing proximal end, distal end slightly damaged
9 sacrum fragments – superior surface, portion of right ala; 7 possible
innominate, right, incomplete (Inn R1) – ilium with 2/3s of acetabulum; narrow sciatic notch
innominate, right, incomplete (Inn R2) – posterior half of ilium
innominate, right, fairly complete (Inn R3)
3 innominate portions, left – ischial tuberosity; 2 portions with inferior half of acetabulum and superior part of ischial tuberosity
3 innominate portions, right – fragment with part of auricular surface and greater sciatic notch (very eroded); 2 auricular surface fragments; fragment with acetabulum, greater sciatic notch, and incomplete auricular surface; superior half of acetabulum with small portion of ilium
37 innominate fragments, unsided – 4 pubis, 3 acetabulum, 4 ischium, 10 ilium body, 6 iliac crest, possible ilium fragment
humerus, left, incomplete (Hum L1) – proximal 1/2 with greater tubercle slightly damaged and most of surface bleached
humerus, left, incomplete (Hum L2) – proximal 1/3
humerus, left, incomplete (Hum L3) – proximal 1/4
humerus, left, incomplete (Hum L4) – proximal 1/5
humerus, left, incomplete (Hum LMisc) – distal 1/3
humerus, right, nearly complete (Hum R1) – slight postmortem damage to posterior of head; line of fusion visible
humerus, right, incomplete (Hum R2) – distal 1/2
humerus, right, incomplete (Hum R3) – distal 1/2
humerus, right, incomplete (Hum R4) – distal end with posterior surface damaged

Table 1. continued.

Surface Collection continued

Miscellaneous Adult continued

humerus, right, nearly complete (Hum R5) – nearly complete but missing head and distal articular portion, bleached, robust
humerus, right, incomplete (Hum R6) – distal 1/5 missing capitulum, trochlea, and epicondyles
humerus, right, incomplete (Hum R7) – distal 1/2 missing capitulum and trochlea; very gracile; possibly juvenile or female
humerus, right, incomplete (Hum RMisc) – proximal end; 2 shaft portions from 2 different elements; distal shaft fragment
humerus fragments, unside – 4 shaft, 1 head
radius, left, incomplete (Rad L1) – proximal 2/3s
radius, left, incomplete (Rad L2) – middle 1/3
radius, left, incomplete (Rad L3) – middle 1/3
radius, left, incomplete (Rad L4) – distal 1/2
radius, left, incomplete (Rad LMisc) – distal 1/3; could go with Rad L1 or Rad L2
radius, right, incomplete (Rad R1) – proximal 1/3
radius, right, incomplete (Rad R2) – proximal 2/3s, missing head and bleached and eroded
radius, right, incomplete (Rad RMisc1) – most of distal end and medial half of distal 1/3 of shaft
radius, right, incomplete (Rad RMisc2) – distal half, gracile
5 radius fragments, unside – incomplete head with 1-2 cm of shaft; 3 incomplete heads; small shaft portion
ulna, left, incomplete (Ul L1) – proximal 1/2, robust
ulna, left – incomplete (Ul L2) – nearly complete with proximal end incomplete and distal end missing, gracile, very eroded
ulna, left, incomplete (Ul L3) – proximal half of head and proximal fragment containing radial notch
ulna, right, incomplete (Ul R1) – proximal half, robust
ulna, right, incomplete (Ul R2) – proximal 1/4, robust
ulna, right, incomplete (Ul RMisc) – distal third
2 ulna fragments, unside – proximal end
capitate, right, nearly complete
6 carpals – left and right hand naviculars, lunates, hamates
9 metacarpals, 3 left, 3 right, 3 unside – left: 1st, 3rd, 5th; right: 2nd, 4th, 5th (5th gracile, possibly from juvenile); unside:
3 incomplete; distal half; complete except proximal end damaged; missing most of shaft and proximal end
20 hand phalanges – 13 proximal row (2 incomplete); 4 middle row; 1 distal row; 3 incomplete
6 femur fragments, left – (Fem LMisc: distal half, robust; large posterior shaft portion; proximal end with head and neck
damaged (could go with Fem L8); 2 distal end fragments from anterior; lateral condyle fragment
femur, right, nearly complete (Fem R1) – damage on posterior of medial condyle and greater trochanter, possibly female (length
head and bicondylar length in female range, circumference in male range)
femur, right, incomplete (Fem R2) – proximal third, line of fusion visible on head, possibly male (head in male range)
femur, right, incomplete (Fem R3) – proximal end with head and neck and small portion of anterior shaft
femur, right, incomplete (Fem R4) – proximal end including head, neck, and superior portion of lesser trochanter, line of
fusion visible on head, possibly male (head in male range)
femur, right, incomplete (Fem R5) – shaft; bleached and mildly eroded surface, possibly male (circumference in male range)
4 femur fragments, right – (Fem RMisc) posterior shaft fragment; central shaft portion (14 cm long); distal 1/3 with posterior
of lateral condyle and medial surface of medial condyle damaged; proximal 2/3s of shaft (may go with Fem R4)
15 femur fragments, unside – 4 heads (duplicate portions of left and right femora), 2 complete; 2 incomplete femoral heads
possibly associated with one of unidentified left or right femora; 7 shaft fragments; 4 condyle fragments
9 femur or humerus fragments, unside – 2 neck, 7 head
4 patellae, 2 left, 2 right – 1 complete right
3 patella fragments
tibia, left, incomplete (Tib L1) – proximal 1/4, very robust
tibia, left, incomplete (Tib L2) – distal third
tibia, left, incomplete (Tib L3) – distal third
5 tibia fragments, left – (Tib LMisc) distal end fragment, 3 proximal end fragments; midshaft portion
tibia, right, nearly complete (Tib R1) – missing medial half of proximal 1/5
tibia, right, nearly complete (Tib R2) – missing proximal end
tibia, right, incomplete (Tib R3) – shaft
tibia, right, incomplete (Tib R4) – distal 1/4 to 1/3
tibia, right, incomplete (Tib R5) – distal 1/4 to 1/3
5 tibia fragments, right – Tib RMisc: medial 2/3s of 2 distal ends with incomplete articular surfaces; proximal end fragment;
2 shaft portions

Table 1. continued.

Surface Collection continued

Miscellaneous Adult continued

19 tibia fragments, unsided – 2 proximal end; 13 shaft; 3 proximal anterior shaft; 1 distal end
19 tibia or femur shaft fragments, unsided
4 fibulae, 3 left, 1 right – left: complete except for proximal end; distal end; distal 1/4 to 1/3; right: distal end
11 fibula fragments, unsided – 9 shaft portions (1 robust), 1 incomplete distal end, distal end
260 long bone shaft fragments
5 tali, 3 left, 2 right – pair (Tal L1 & R1); 2 left: robust (Tal L2), gracile (Tal L3); right (Tal R2)
6 calcanea, 3 left, 3 right – 1 pair; 1 left missing anterior 1/4 and part of inferior surface and very eroded
3 possible talus or calcaneus fragments
7 tarsals – 2 right cuboids, right foot navicular, 1 left and 2 right 1st cuneiforms, 2 cuboids, right
13 metatarsals, left and right – left: 4 3rd (2 incomplete), 5th; right 2 1st (1 incomplete, 2nd, 3 5th (2 incomplete)
foot phalanx – middle row
3 metacarpal/metatarsal fragments – 2 distal end, 1 shaft
13 articular surface fragments – 3 concave, 10 convex

Subadult A – newborn to 0.5 years

2 temporal fragments
6 cranial vault fragments
2 loose teeth
rib, left, nearly complete
2 rib fragments, 1 right
humerus diaphysis, left, incomplete – proximal 2/3 with proximal end damaged
femur diaphysis, left, nearly complete

Subadult B-1 – 0.5 to 1.5 years

frontal fragment – left superior orbit margin
occipital base – unfused
temporal fragment, right – area of external auditory meatus with partial petrous portion
6 cranial vault fragments
mandible fragment – possible condyle
2 loose teeth
rib, left, incomplete
7 rib fragments
2 thoracic vertebrae, incomplete – right arches, unfused
ilium, right
radius diaphysis, left, incomplete – ends missing, bleached
ulna diaphysis, left, nearly complete – ends broken off
humerus diaphysis, left
femur diaphysis, right, incomplete – proximal end

Subadult B-2 – 0.5 to 1.5 years

loose tooth
thoracic vertebra, incomplete – arches only, fused to each other but not to centrum; centrum fragment
ilium, right, incomplete – notch area, same size as Subadult B1 ilium

Subadult C – 2.5 to 4.5 years

frontal fragment – right orbit
parietal, left, incomplete – missing anterior-superior corner
2 parietal fragments – possible
occipital fragment – possible
21 cranial vault fragments
mandible, incomplete – left half complete with dm1, dm2, and unerupted M1 & M2 in situ; right half from partial dm2
socket through ascending ramus with dm2 and unerupted M1 and M2 in situ
mandible fragment
loose tooth

rib, left, incomplete – sternal end

3 rib fragments

radius diaphysis, left, incomplete – distal 2/3s

Subadult D – Area D – 1.15 to 1.55 years

cranium, incomplete – missing left maxilla and temporal

mandible fragment – left body fragment

6 loose teeth

Table 1. continued.

Surface Collection continued

Subadult D – Area D continued

1st cervical vertebra – unfused portions

Subadult E – 3.0 to 5.5 years

frontal bone fragment – left superior orbit

parietal, left – superior-posterior 1/4 with sagittal and lambdoidal sutures

temporal fragment – with squamosal suture

4 cranial vault fragments

2 mandible fragments – right ascending ramus missing coronoid process, condyle damaged; inferior body fragment

rib, left, incomplete – missing sternal end

rib fragment

3 thoracic vertebrae – 1 complete but arches not fused to body; fused arches, 2 incomplete centra

lumbar vertebra, incomplete – body, unfused to arches

lumbar vertebra fragment – arch

vertebra fragment – arch

2 ilia, left and right, incomplete – left posterior 1/2; right fragment

4 innominate fragments

radius diaphysis, left, incomplete – proximal 1/3-1/2

humerus diaphysis, left, nearly complete – ends missing

hand phalanx

Subadult F – 5.5 to 7.5 years

parietal, right, incomplete – posterior-inferior portion; posterior-superior fragment with ca. 3 cm of sagittal suture, ca. 6 cm of lambdoidal suture

occipital/parietal fragment – containing 2 lambdoidal ossicles

maxilla, right, nearly complete – with most of right palatine bone; I1 & I2 unerupted but visible through damaged alveolar bone; di1 & di2 lost postmortem

palatine bone, right, nearly complete – attached to right maxilla

loose tooth

scapula, left, incomplete – acromion process/spine

scapula fragments – body margin, spine

rib, 1st, left, incomplete

cervical vertebra, 7th, nearly complete – spinous process slightly damaged; arches fused to centrum

4 thoracic vertebrae – 1st nearly complete, spinous process slightly damaged, fusion of arches to centrum visible but nearly complete; 1 nearly complete in 4 pieces; 1 with fused arches; 1 with small portion of arches

humerus diaphysis, left

radius diaphysis, left, incomplete – proximal end

tibia diaphysis, probably left, incomplete – middle 2/3s

fibula diaphysis, unisided, incomplete – 3 shaft portion, probably from same element

Subadult G-1 – 8 to 12 years

frontal bone fragment – lateral 2/3s of right superior orbit

zygoma, right, nearly complete

4 sphenoid fragments – probably from same element

cranial vault fragment

3 loose teeth

clavicle, left, incomplete – lateral end

2 clavicle fragments – shaft portion; fragment near sternal end

4 ribs, left, incomplete – vertebral ends, includes 1st

innominate fragment – possible; epiphyseal surface

capitate, left, incomplete

hand navicular, left

2 metacarpals, left and unisided – left 5th, distal end unfused; unisided incomplete

femur diaphysis, right, nearly complete – both ends damaged

patella, left

tibia diaphysis, right, incomplete – proximal half with proximal end damaged

tibia fragment – from distal end of diaphysis

fibula, right – diaphysis and unfused distal end

2 metatarsals, left – 3rd, 5th, distal ends unfused

Table 1. continued.

Surface Collection continued

Subadult G-2 – 8 to 12 years

metatarsal, right – 3rd, distal end unfused; larger than 3rd metatarsal of Subadult G-1

Subadult G-1 or G-2

parietals/occipital fragment, left and right – left: posterior-superior 1/4 with small fragment of occipital, anterior-superior fragment with sagittal and coronal suture; probably left superior fragment along sagittal suture; right: anterior 1/3 with inferior margin missing; unsided fragment

Subadult C, E, F, G-1, G-2

2 frontal fragments – probably subadult

parietal, right, incomplete – anterior 1/3 with inferior margin missing postmortem

temporal fragment, right – mastoid process area

39 cranial vault fragments

6 facial bone fragments

loose tooth

8 rib fragments – 5 from younger child, 3 from older child

9 diaphysis fragments

4 epiphyseal surface fragments

metacarpal/metatarsal, incomplete

Subadult H – juvenile, ca. 13 to 16 years

2 occipital fragments – left condyle; left basilar area fragment

maxilla, right, incomplete – from I1 to P2 with P2 alveolar bone damaged; I2-P2 in situ; superior margin broken lateral to nasal aperture

9 cranial vault fragments

3 loose teeth

2 ribs, left and right, incomplete – left missing vertebral end; right missing sternal end

thoracic vertebra – unfused epiphyseal rings, near adult size

3 sacrum fragments – right superior portion; 2 ala fragments

3 innominate fragments – acetabulum, 2 ilium

2 carpals, left – hamate, greater multangular

metacarpal, unsided, incomplete

4 hand phalanges – 2 proximal row, 2 distal row; proximal epiphysis incompletely fused

humerus, right, incomplete – distal 2/3s of shaft missing capitulum and trochlea; either very gracile adult or juvenile

ulna, left, incomplete – missing proximal half of head and distal end; very gracile, proximal end may have been unfused

femur, right, incomplete – part of proximal end with unfused head and greater trochanter; distal epiphysis

tibia distal epiphysis, left

tibia proximal epiphysis, right

talus, left – from 2 pieces

2 tarsals, left - foot navicular, cuboid

2 metatarsals, left – 2nd, 5th, distal ends unfused but near adult size

Subadult G or H – 8 to 18 years

3 loose teeth

rib fragment

Subadult I – older juvenile to young adult

zygoma, right – attached to right maxilla

maxilla, right, nearly complete – damaged on superior half of nasal margin and anterior alveolar bone associated with incisors; P1, M1, M2 in situ; anomalous supernumerary tooth

palatine bone, right – attached to right maxilla

manubrium

clavicle, right, nearly complete – sternal end unfused and slightly damaged

thoracic vertebra, incomplete – epiphyseal rings incompletely fused

lumbar vertebra – epiphyseal rings incompletely fused

innominate, left, incomplete – missing pubis, iliac crest unfused and absent, ischial tuberosity partially fused

radius, right, incomplete – distal ¼, distal end not completely fused, adult-sized

2 metatarsals, left and right – left 4th, right 3rd, distal ends not completely fused

Subadult Miscellaneous

18 miscellaneous fragments

Miscellaneous

910 miscellaneous fragments

151.3 g miscellaneous fragments

Table 2. Cranial Metrics (mm), 13PM248, Plymouth County, Iowa.

Measurement	Left/Right
Feature 1, Adult 1-1	
Bigonial breadth	95
Maximum breadth of ramus	(47)/-
Minimum breadth of ramus	38/-
Height of mandibular body	(38)/-
Length of mandibular body	(89)
Height of symphysis	(34)
Breadth of mandibular body	11/-
Gonial angle	approximates 90°
Feature 1, Adult 1-3	
Maximum cranial length	180
Maximum cranial breadth	132
Porion-bregma height	131
Auricular height	128
Minimum frontal breadth	98
Total facial height	120
Upper facial height	76
Bizygomatic breadth	132
Upper facial breadth	132
Mastoid length	28/27
Nasal height	49
Nasal breadth	28
Orbital height	34/34
Orbital breadth	42/42
Bimaxillofrontale diameter	22
Maxilloalveolar length	58
Maxilloalveolar breadth	73
Palatal length	46
Palatal breadth	43
Bicondylar breadth	129
Bigonial breadth	96
Length of ramus	68
Maximum breadth of ramus	51/50
Minimum breadth of ramus	36/37
Height of mandibular body	32/32
Length of mandibular body	84
Height of symphysis	35
Breadth of mandibular body	13/14
Gonial angle	126°
Condyle mesiolateral length	29/-
Condyle anteroposterior length	10/-
Naso-occipital length	179
Vertex radius	132
Lambda radius	106
Bregma radius	131
Biauricular breadth	126
Maximum frontal breadth	113
Bijugal breadth	118
Dacryon radius	97
Ectoconchion radius	(78)
Zygo-orbitale radius	85
Zygomaxillare radius	(84)
Nasion radius	100
Subspinale radius	99
Prosthion radius	106
Frontomalare radius	(85)
Nasion-prosthion height	73

Table 2. continued.

Measurement	Left/Right
Feature 1, Adult 1-3 continued	
Bimaxillary breadth	116
Zygomaxillary subtense	24
Bifrontal breadth	105
Nasiofrontal subtense	17
Biorbital breadth	100
Dacryon subtense	12/13
Frontal chord	107
Frontal subtense	20
Frontal fraction	57
Parietal chord	121
Parietal subtense	27
Parietal fraction	63
Naso-maxillo frontal subtense ^a	8
Maxillo frontal breadth ^a	22
Naso-zygoorbital subtense ^a	19
Zygoorbital breadth ^a	63
Naso-alpha subtense ^a	11
Alpha cord ^a	34
<i>Indices</i>	
Cranial index	73.33
Mean porion-height index	83.97
Auricular mean height index	82.05
Frontoparietal index	74.24
Total facial index	90.91
Upper facial index	57.58
Nasal index	57.14
Orbital index	80.95
Maxilloalveolar index	125.86
Palatal index	93.48
Maxillofrontal index ^a	36
Zygoorbital index ^a	30
Alpha index ^a	32
Feature 2, Adult 2-1	
Mastoid length	20/19
Maxilloalveolar length	50
Maxilloalveolar breadth	63
Palatal length	44
Palatal breadth	37
Bicondylar breadth	(116)
Bigonial breadth	99
Length of ramus	53
Maximum breadth of ramus	-/44
Minimum breadth of ramus	34/34
Height of mandibular body	29
Length of mandibular body	79
Height of symphysis	33
Breadth of mandibular body	9/10
Gonial angle	136°
Condyle mesiolateral length	-/18
Condyle anteroposterior length	-/10
Foramen magnum length	37
Foramen magnum breadth	29

Table 2. continued.

Measurement	Left/Right
Feature 2, Adult 2-1 continued	
<i>Indices</i>	
Maxilloalveolar index	126.00
Palatal index	84.09
Feature 2, Adult 2-2	
Mastoid length	22/-
Bigonial breadth	98
Minimum breadth of ramus	30/-
Height of mandibular body	(28)
Length of mandibular body	(77)
Height of symphysis	31
Breadth of mandibular body	10/9
Gonial angle	(144°)
Foramen magnum length	34
Foramen magnum breadth	30
Feature 3: Miscellaneous Adult	
Minimum breadth of the ramus	34
Breadth of mandibular body	12/-
Feature 4, possibly, Miscellaneous Adult	
Maximum breadth of ramus	50/-
Minimum breadth of ramus	32/-
Condyle AP length	10/-
Feature 7: Miscellaneous Adult, Cranium 1	
Minimum frontal breadth	(100)
Upper facial breadth	(109)
Mastoid length	29/-
Maxilloalveolar breadth	(65)
Palatal breadth	40
Bigonial breadth	118
Length of ramus	57/-
Maximum breadth of ramus	50/-
Minimum breadth of ramus	34/-
Height of mandibular body	(30)
Length of mandibular body	85
Height of symphysis	40
Breadth of mandibular body	12/-
Gonial angle	125°
Condyle mesiolateral length	21/20
Condyle anteroposterior length	10/-
Maximum frontal breadth	(124)
Parietal chord	(106)
Feature 7: Miscellaneous Adult, Cranium 2	
Minimum frontal breadth	91
Upper facial breadth	104
Mastoid length	28/-
Feature 7: Miscellaneous Adult, Cranium 3	
Mastoid length	28/-
Feature 7: Miscellaneous Adult, Mandible	
Bigonial breadth	99
Length of ramus	51
Maximum breadth of ramus	-/45
Minimum breadth of ramus	-/35
Length of mandibular body	77
Breadth of mandibular body	10/10
Gonial angle	131°
Condyle mesiolateral length	-/19
Condyle anteroposterior length	-/9

Table 2. continued.

Measurement	Left/Right
Feature 12, Max L1/R1	
Nasal breadth	27
Maxilloalveolar length	53
Maxilloalveolar breadth	64
Palatal length	43
Palatal breadth	39
Feature 12: Mand 1	
Bicondylar breadth	123
Bigonial breadth	102
Length of ramus	61
Maximum breadth of ramus	45/-
Minimum breadth of ramus	34/33
Length of mandibular body	76
Height of symphysis	(35)
Breadth of mandibular body	12/12
Gonial angle	122°
Condyle mesiolateral length	20/21
Condyle anteroposterior length	9/9
Feature 12: Mand 2	
Height of symphysis	32
Breadth of mandibular body	12/-
Feature 12: Temp L1	
Mastoid length	31
Feature 12: Temp L2	
Mastoid length	29
Feature 12: Temp R1	
Mastoid length	26
North Slope: Miscellaneous Adult Remains	
<i>Frontal 1</i>	
Minimum frontal breadth	90
Upper facial breadth	105
Maximum frontal breadth	121
Bifrontal breadth	98
Nasiofrontal subtense	16
<i>Maxillae L1 & R1</i>	
Maxilloalveolar length	52
Maxilloalveolar breadth	40
Palatal length	40
Palatal breadth	40
<i>Mandible 1</i>	
Bicondylar breadth	123
Bigonial breadth	98
Length of ramus	56/(61-pathological)
Maximum breadth of ramus	47/42
Minimum breadth of ramus	33/31
Height of mandibular body	26/28
Length of mandibular body	86
Height of symphysis	36
Breadth of mandibular body	11/11
Gonial angle	126°/119°
Condyle mesiolateral length	10/(15-pathological)
Condyle anteroposterior length	20/19

Table 2. continued.

Measurement	Left/Right
North Slope: Miscellaneous Adult Remains continued	
<i>Mandible 2</i>	
Maximum breadth of ramus	48/-
Minimum breadth of ramus	36/-
Breadth of mandibular body	11/-
Condyle mesiolateral length	17/-
Condyle anteroposterior length	11/-
<i>Mandible 3</i>	
Bicondylar breadth	120
Bigonial breadth	(102)
Length of ramus	63
Maximum breadth of ramus	46/-
Minimum breadth of ramus	34/32
Height of mandibular body	29/31
Length of mandibular body	83
Height of symphysis	38
Breadth of mandibular body	12/13
Gonial angle	120°
Condyle mesiolateral length	-/9
Condyle anteroposterior length	-/22
<i>Mandible 5</i>	
Minimum breadth of ramus	-/38
Height of symphysis	38
Breadth of mandibular body	-/12
<i>Mandible 7</i>	
Height of mandibular body	36/-
Breadth of mandibular body	14/-
<i>Mandible Fragment 1</i>	
Minimum breadth of ramus	34/-
<i>Temporals Temp L1 & R1 (not a pair)</i>	
Mastoid length	20/31
<i>Temporals Temp L2 & R2</i>	
Mastoid length	(28)/29
<i>Temporal Temp L3</i>	
Mastoid length	32/-
<i>Temporal Temp L4</i>	
Mastoid length	27/-
<i>Temporal Temp L5</i>	
Mastoid length	(23)/-
<i>Temporal Temp R3</i>	
Mastoid length	-/28
<i>Temporal Temp R4</i>	
Mastoid length	-/27
No Feature 100N90E	
<i>Adult, possibly male</i>	
Mastoid length	30/-
<i>Adult, possibly female</i>	
Mastoid length	-(24)
No Feature 102N88E	
<i>Adult</i>	
Mastoid length	28/-
No Feature 116N92E	
<i>Adult</i>	
Length of ramus	(63)
Maximum breadth of ramus	-/43

Table 2. continued.

Measurement	Left/Right
No Feature 116N92E continued	
Minimum breadth of ramus	-/32
Height of mandibular body	-/27
Length of mandibular body	(78)
No Feature 116N92E, Adult, continued	
Height of symphysis	(31)
Breadth of mandibular body	12/11
Gonial angle	(114°)
No Feature 116N94E	
<i>Adult</i>	
Length of ramus	(63)
Maximum breadth of ramus	-/43
Minimum breadth of ramus	-/32
Height of mandibular body	-/27
Length of mandibular body	(78)
Height of symphysis	(31)
Breadth of mandibular body	12/11
Gonial angle	(114°)
Surface Collection	
<i>Fr 1</i>	
Minimum frontal breadth	93
Upper facial breadth	(104)
Maximum frontal breadth	(119)
<i>Temp 1</i>	
Mastoid length	29
<i>Temp 2</i>	
Mastoid length	29
<i>Temp 3</i>	
Mastoid length	26
<i>Temp 4</i>	
Mastoid length	28
<i>Mandible A</i>	
Maximum breadth of ramus	41
Minimum breadth of ramus	32
Height of mandibular body	31/29
Breadth of mandibular body	11/11
Condyle mesiolateral length	19
Condyle anteroposterior length	8
<i>Mandible C</i>	
Minimum breadth of ramus	37
Mandible Misc L	
Minimum breadth of ramus	38

Note: () indicates approximated measurements

Table 3. Cranial Nonmetric Characteristics, 13PM248, Plymouth County, Iowa.

Trait	Feature 1		Feature 2		Surface Collection							
	Adult 1-1	Adult 1-3	Adult 2-1	Adult 2-2	Fr 1	Fr 3	Fr 4	Temp R1	Temp R2	Temp R3	Temp R4	
	Left/Right	Left/Right	Left/Right	Left/Right								
Epipteric bone		A/A										
Asterionic bone		A/A	A/-									
Parietal notch bone		A/A	P/-	A/-								
Os lambdoidal suture		P/P	P/P									
Os coronal suture		A/A	A/-									
Os japonicum		A/A										
Inca bone		A	A	A								
Bregma bone		A										
Metopic suture		A	A									
Supraorbital foramen		F/F	F/-									
Pterion shape		A/A										
Parietal foramen		A/A										
Superior sagittal sulcus direction		R	?	?								
Mastoid foramen exsutural		PI/PO	PO/-	PO/-								
Postcondylar foramen			P/A	P/P								
Hypoglossal canal bipartite			A/A	A/A								
Auditory exostosis		A/A	A/A	A/-								
Tympanic dehiscence		A/A	A/A	A/-								
Multiple infraorbital foramen		A/A										
Infraorbital suture		A/A										
Multiple zygomatic foramen		A/P	P/-									
Palatine torus		A	A									
Mandibular torus	A/A	P/P	A/A	P/P								
Mylohyoid bridge	A/-	A/A	A/A	P-C/P-C								
Multiple mental foramen	A/A	A/A	A/A	A/A								
Supraorbital foramen	N/N	F/-	N/-									
Auditory exostosis				A	A	A	A					
Tympanic dehiscence				P	A	A	A					

Key:

A = absent

F = foramen

N = notch

P = present

P-C = present, complete

PI = present, inside suture

PO = present, outside suture

Pterion shape = letter code refers to Fig. 26 (El-Najjar and McWilliams 1978:125)

R = right

Table 4. Postcranial Metrics (mm), 13PM248, Plymouth County, Iowa.

Measurement	Left	Right
Feature 1: Adult 1-1		
<i>Humerus</i>		
Maximum length	(330) ¹	
Least circumference of shaft	65	
Epicondylar width	58	
Articular width	43	
<i>Radius</i>		
Maximum length	260	
Anteroposterior diameter at midshaft	11	
<i>Ulna</i>		
Least circumference of shaft	40	42
Dorsovolar diameter	19	20
Transverse diameter	13	13
<i>Femur</i>		
Maximum length	468	
Bicondylar length	467	
Anteroposterior diameter at midshaft	33	(32)
Mediolateral diameter at midshaft	27	(24)
Maximum diameter of head	46	
Vertical diameter of head	46	
Circumference at midshaft	96	(92)
Subtrochanteric anteroposterior diameter	26	
Subtrochanteric mediolateral diameter	35	
Bicondylar breadth	(80)	
<i>Tibia</i>		
Maximum length	(390) ¹	
Anteroposterior diameter at nutrient foramen	37	
Mediolateral diameter at nutrient foramen	(28)	
Circumference at nutrient foramen	(100)	
Distal breadth	(46)	
<i>Fibula</i>		
Maximum length	383	
Maximum diameter at midshaft	(18)	
<i>Talus</i>		
Maximum length	51	
<i>Calcaneus</i>		
Maximum length	78	
Middle breadth	42	
Feature 1: Adult 2-1		
<i>Scapula</i>		
Glenoid cavity length		39
Maximum breadth		(105)
<i>Clavicle</i>		
Maximum length		(163)
Circumference at midshaft		34
Anteroposterior diameter at midshaft		10
Superoinferior diameter at midshaft		9
<i>Humerus</i>		
Maximum length	-/316	
Maximum diameter at midshaft ^a	-/24	
Maximum diameter at midshaft ^b	-/24	
Minimum diameter at midshaft ^a	-/19	
Minimum diameter at midshaft ^b	-/19	
Maximum diameter of head	-/48	
Vertical diameter of head	-/48	
Transverse diameter of head	-/44	
Least circumference of shaft	-/71	

Table 4. continued.

Measurement	Left	Right
Feature 1: Adult 2-1 continued		
<i>Humerus, continued</i>		
Epicondylar width		63
Articular width		45
<i>Radius</i>		
Anteroposterior diameter at midshaft	(12)	
Mediolateral diameter at midshaft	(17)	
<i>Ulna</i>		
Least circumference of shaft	34	
Dorsovolar diameter	17	
Transverse diameter	13	
Feature 1: Adult 1-3		
<i>Scapula</i>		
Glenoid cavity length	38	37
<i>Clavicle</i>		
Maximum length	161	159
Circumference at midshaft	34	34
Anteroposterior diameter at midshaft	11	11
Superoinferior diameter at midshaft	9	9
<i>Humerus</i>		
Maximum length	310	311
Maximum diameter at midshaft ^a	21	21
Maximum diameter at midshaft ^b	23	24
Minimum diameter at midshaft ^a	15	16
Minimum diameter at midshaft ^b	14	17
Maximum diameter of head	46	46
Vertical diameter of head	46	46
Transverse diameter of head	42	42
Least circumference of shaft	64	66
Epicondylar width	58	57
Articular width	44	44
<i>Radius</i>		
Maximum length	245	247
Maximum transverse distal width	32	33
Anteroposterior diameter at midshaft	10	10
Mediolateral diameter at midshaft	13	14
<i>Ulna</i>		
Maximum length	266	266
Physiological length	235	235
Least circumference of shaft	34	35
Dorsovolar diameter	17	18
Transverse diameter	12	12
<i>Innominate</i>		
Maximum height	210	209
Pubis length	77	77
Ischium length	87	87
<i>Sacrum</i>		
Maximum anterior breadth		119
<i>Femur</i>		
Maximum length	441	440
Bicondylar length	435	435
Anteroposterior diameter at midshaft	28	29
Mediolateral diameter at midshaft	26	27
Maximum diameter of head	46	46
Vertical diameter of head	46	46
Circumference at midshaft	88	89

Table 4. continued.

Measurement	Left	Right
Feature 1: Adult 1-3 continued		
<i>Femur continued</i>		
Subtrochanteric anteroposterior diameter	26	26
Subtrochanteric mediolateral diameter	33	33
Bicondylar breadth	78	78
<i>Tibia</i>		
Maximum length	370	371
Anteroposterior diameter at nutrient foramen	36	37
Mediolateral diameter at nutrient foramen	21	20
Circumference at nutrient foramen	93	94
Proximal breadth	(73)	74
Distal breadth	47	47
<i>Fibula</i>		
Maximum length		359
Maximum diameter at midshaft	16	16
Feature 2: Adult 2-1		
<i>Scapula</i>		
Glenoid cavity length	33	35
<i>Clavicle</i>		
Maximum length	144	
Circumference at midshaft	28	28
Anteroposterior diameter at midshaft	8	8
Superoinferior diameter at midshaft	7	7
<i>Humerus</i>		
Maximum length	300	305
Maximum diameter at midshaft ^a	18	19
Maximum diameter at midshaft ^b	18	19
Minimum diameter at midshaft ^a	15	14
Minimum diameter at midshaft ^b	15	14
Maximum diameter of head	36	37
Vertical diameter of head	36	37
Transverse diameter of head	35	36
Least circumference of shaft	50	51
Epicondylar width	50	50
Articular width	37	36
Feature 2: Adult 2-1		
<i>Radius</i>		
Maximum length	232	(230)
Maximum transverse distal width	28	
Anteroposterior diameter at midshaft	10	10
Mediolateral diameter at midshaft	13	13
<i>Ulna</i>		
Maximum length	248	252
Physiological length	221	226
Least circumference of shaft	33	36
Dorsovolar diameter	15	16
Transverse diameter	10	11
<i>Innominate</i>		
Maximum breadth	(141)	141
Ischium length		(81)
<i>Femur</i>		
Maximum length	419	414
Bicondylar length	408	407
Anteroposterior diameter at midshaft	24	24
Mediolateral diameter at midshaft	20	22
Maximum diameter of head	39	39
Vertical diameter of head	(38)	(38)

Table 4. continued.

Measurement	Left	Right
Feature 2: Adult 2-1 continued		
<i>Femur continued</i>		
Circumference at midshaft	71	72
Subtrochanteric anteroposterior diameter	20	20
Subtrochanteric mediolateral diameter	29	31
Bicondylar breadth	(69)	69
<i>Tibia</i>		
Maximum length		328
Anteroposterior diameter at nutrient foramen	29	31
Mediolateral diameter at nutrient foramen	18	18
Circumference at nutrient foramen	74	79
Proximal breadth	65	66
Feature 2: Adult 2-2		
<i>Scapula</i>		
Glenoid cavity length	(35)	(35)
<i>Humerus</i>		
Maximum length		(320) ¹
Maximum diameter at midshaft ^a		(21)
Maximum diameter at midshaft ^b		(21)
Minimum diameter at midshaft ^a		(14)
Minimum diameter at midshaft ^b		(14)
Least circumference of shaft		54
Articular width	(39)	40
<i>Radius</i>		
Anteroposterior diameter at midshaft		(10)
Mediolateral diameter at midshaft		(13)
<i>Ulna</i>		
Least circumference of shaft		32
Dorsovolar diameter		14
Transverse diameter		11
<i>Femur</i>		
Maximum length		(400) ¹
Anteroposterior diameter at midshaft		25
Mediolateral diameter at midshaft		24
Maximum diameter of head	(39)	40
Vertical diameter of head	39	40
Circumference at midshaft		(78)
Subtrochanteric anteroposterior diameter		22
Subtrochanteric mediolateral diameter		33
<i>Tibia</i>		
Maximum length	(380) ¹	
Feature 3: Adult 3-1		
<i>Femur</i>		
Anteroposterior diameter at midshaft	(28)	
Mediolateral diameter at midshaft	(25)	
Maximum diameter of head		48
Vertical diameter of head		48
Circumference at midshaft	(84)	
Bicondylar breadth	79	83
<i>Tibia</i>		
Anteroposterior diameter at nutrient foramen	35	
Mediolateral diameter at nutrient foramen	25	
Circumference at nutrient foramen	94	
Distal breadth	50	

Table 4. continued.

Measurement	Left	Right
Feature 3: Adult 3-3		
<i>Scapula</i>		
Glenoid cavity length		(32)
<i>Radius</i>		
Maximum transverse distal width	(31)	
Feature 4: Adult 4-1		
<i>Scapula</i>		
Glenoid cavity length		32
Feature 4: Miscellaneous Adult		
<i>Humerus, unsided</i>		
Maximum diameter of head		(47)
Vertical diameter of head		42
<i>Radius</i>		
Midshaft subperiosteal diameter		(11)
<i>Ulna</i>		
Least circumference of shaft		33
<i>Femur</i>		
Subtrochanteric AP diameter		26
Subtrochanteric ML diameter		35
Feature 5: Adult 1		
<i>Radius</i>		
Maximum length	240	
Maximum transverse distal width	32	
Midshaft subperiosteal diameter	13	
Anteroposterior diameter at midshaft	13	
Mediolateral diameter at midshaft	11	
<i>Ulna</i>		
Physiological length	228	
Least circumference of shaft	32	
<i>Innominate</i>		
Maximum height	207	
Pubis length	(81)	
Ischium length	(82)	
<i>Femur</i>		
Maximum length	436	
Bicondylar length	435	
Anteroposterior diameter at midshaft	29	(29)
Mediolateral diameter at midshaft	27	(28)
Vertical diameter of head	(46)	
Circumference at midshaft	89	(89)
Subtrochanteric anteroposterior diameter	(25)	26
Subtrochanteric mediolateral diameter	(38)	37
Bicondylar breadth	83	82
<i>Tibia</i>		
Anteroposterior diameter at nutrient foramen	(35)	35
Mediolateral diameter at nutrient foramen	26	25
Circumference at nutrient foramen	(94)	99
Distal breadth	78	(77)
Feature 5: Miscellaneous Adult		
<i>Radius</i>		
Maximum transverse distal width	34	
Feature 7: Miscellaneous Adult		
<i>Calcaneus</i>		
Maximum length	66	
Middle breadth	40	

Table 4. continued.

Measurement	Left	Right
Feature 7: Miscellaneous Adult continued		
<i>Scapula</i>		
Glenoid cavity length		35
Maximum breadth		108
<i>Clavicle</i>		
Maximum length	135	160
Circumference at midshaft	29	36
Anteroposterior diameter at midshaft	9	12
Superoinferior diameter at midshaft	9	9
<i>Humerus, more complete</i>		
Vertical diameter of head		41
Epicondylar width		61
Articular width		46
<i>Humerus, distal portion</i>		
Articular width		37
<i>Ulna</i>		
Least circumference of shaft	34	
Dorsovolar diameter	15	
Transverse diameter	11	
<i>Femur FR1</i>		
Maximum length		412
Bicondylar length		409
Anteroposterior diameter at midshaft		25
Mediolateral diameter at midshaft		22
Maximum diameter of head		41
Vertical diameter of head		414
Circumference at midshaft		76
Subtrochanteric anteroposterior diameter		21
Subtrochanteric mediolateral diameter		31
Bicondylar breadth		(69)
<i>Femur FR2</i>		
Vertical diameter of head		(41)
Subtrochanteric anteroposterior diameter		22
Subtrochanteric mediolateral diameter		31
<i>Femur FR3</i>		
Subtrochanteric anteroposterior diameter		26
Subtrochanteric mediolateral diameter		33
<i>Tibia (1)</i>		
Anteroposterior diameter at nutrient foramen		31
Mediolateral diameter at nutrient foramen		17
Circumference at nutrient foramen		78
<i>Tibia (2)</i>		
Anteroposterior diameter at nutrient foramen		32
Mediolateral diameter at nutrient foramen		18
Circumference at nutrient foramen		80
Possible Feature 6 or 7		
<i>Tibia Fragment</i>		
Distal breadth		(56)

Table 4. continued.

Feature 12: Adults and Subadult 12-7.						
Humerus	Hum L1/R1	Hum L2	Hum L3	Hum R2	Hum R3	Subadult 12-7 ^a
Maximum length						294
Maximum diameter at midshaft ^a		(23)/-				20
Maximum diameter at midshaft ^b		(24)/-				20
Minimum diameter at midshaft ^a		(21)/-				17
Minimum diameter at midshaft ^b		(19)/-				15
Maximum diameter of head	45/-		48/-			38
Vertical diameter of head	45/-		48/-			38
Transverse diameter of head	40/-		44/-			36
Least circumference of shaft	-/57				-/63	53
Epicondylar width	-/56	68/-				50
Articular width	-/37	(59)/-				39
		43/-				
Radius	Rad L1	Rad R1	Rad R2			
Maximum length		-/237				
Maximum transverse distal width	34/-	-/31	-(33)			
Midshaft subperiosteal diameter		-/15				
Anteroposterior diameter at midshaft		-/12				
Mediolateral diameter at midshaft		-/15				
Ulna	Ul L1	Ul R1				
Maximum length		UI R1				
Physiological length		-/266				
Least circumference of shaft	37/-	-/226				
Dorsovolar diameter		-/34				
Transverse diameter		-(16)				
		-/14				
Sacrum						
Maximum anterior height	111					
Maximum anterior breadth	110					
Maximum transverse diameter of base	41					

Table 4. continued.

Feature 12 continued						
	Fem L1	Fem R1	Fem R2	Fem R3		
Femur						
Anteroposterior diameter at midshaft	(28)/-	-(28)	-(31)			
Mediolateral diameter at midshaft	(28)/-	-(28)	-(29)			
Maximum diameter of head				-/47		
Vertical diameter of head				-/46		
Circumference at midshaft	(88)/-	-(87)	-(93)			
Subtrochanteric anteroposterior diameter		-/29		-/29		
Subtrochanteric mediolateral diameter		-/38		-/38		
Bicondylar breadth						
Tibia						
	Tib L1/R1	Tib L4	Tib R4			
Anteroposterior diameter at nutrient foramen	34/36		-/37			
Mediolateral diameter at nutrient foramen	23/21		-/24			
Circumference at nutrient foramen	90/92		-/97			
Proximal breadth	(74)/(70)	78/-				
Distal breadth		(44)	-/52			
Calcaneus	Calc L1	Calc R1				
Maximum length	(74)/-	-/80				
Middle breadth		-/44				
	North Slope					
Scapula	Scap L1	Scap L6	Scap L7	Scap R1	Scap R2	Scap R3
Scapula length		145		144		
Glenoid cavity length	(37)	34	38	33	40	(34)
Maximum breadth		100	102	104		33
	Scap R6	Scap R7	Scap R6	Scap R7	Scap R6	Scap R7
					42	32
Clavicle	Clav L1	Clav L2	Clav L3	Clav R1	Clav R2	Clav R3
Maximum length	141	151	143	151	(138)	
Circumference at midshaft	32	37	29	32	(34)	(38)
AP diameter at midshaft	11	12	10	10	(11)	(12)
SI diameter at midshaft	10	10	8	9	(9)	(10)

Table 4. continued.

North Slope continued													
	Hum L1/R1	Hum L2/R2	Hum L3	Hum L4	Hum L5	Hum L6	Hum L7	Hum L8	Hum L9	Hum L10	Hum R3		
Humerus													
Maximum diameter at midshaft ^a	21												
Maximum diameter at midshaft ^b	(20)						20				(22)		
Minimum diameter at midshaft ^a	18						20						
Minimum diameter at midshaft ^b	(17)						16				(19)		
Maximum diameter of head						46	13	45		39			
Vertical diameter of head						46		45		39			
Transverse diameter of head								44		35			
Least circumference of shaft		(65)/-	57	53			53						
Epicondylar width	62/60	59/60	56	54	64		55		64				
Articular width	43/44	42/43	40	38	45				45				
	Hum R4	Hum R5	Hum R6	Hum R7	Hum R8	Hum R9	Hum R10	Hum R11	Hum R12	Hum R14			
Maximum length					306								
Maximum diameter at midshaft ^a					21								
Maximum diameter at midshaft ^b					21								
Minimum diameter at midshaft ^a					13								
Minimum diameter at midshaft ^b					13								
Maximum diameter of head				45	39			41		46			
Vertical diameter of head				45	39			38					
Transverse diameter of head				(42)	36								
Least circumference of shaft					54		45		41				
Epicondylar width	64	61	56		50		45		41		55		
Articular width	43	46	39	40	(35)		43		39		38		
	Rad L1/R1	Rad L2	Rad L4/R4	Rad L5	Rad L6	Rad L7	Rad L8	Rad R3	Rad R5	Rad R6			
Maximum length	255/256		244/246	245									
Max. transv. distal width	32/33	(34)	(31)/32	(29)	34	33		34	(32)	38			
Midshaft subperio. dia.	14/14		15/13	13									
AP diameter at midshaft	11/12		11/11	10									
ML diameter at midshaft	14/14		15/13	13									

Table 4. continued.

North Slope continued													
	UI L1	UI L2	UI L3	UI L4	UI L5	UI R1	UI R2	UI R3	UI R4				
Ulna													
Maximum length				229					267				
Physiological length				35		35			235				
Least circumference of shaft		23	35	17	15	19	38	30	31				
Dorsovolar diameter	15		18	12	11	15			25				
Transverse diameter	11		13						12				
Innominate		Inn L2	Inn R1	Inn R2	Inn R6								
Maximum height		200			149								
Maximum breadth			(145)	159									
Pubis length		80	67										
Ischium length		82			(85)								
Sacrum		Sac 1	Sac 2	Sac 3	Sac 4								
Maximum anterior height		131											
Maximum anterior breadth		(130)	120	115	114								
Max. transverse diameter of base		54	41	51	45								
Femur	Fem L1	Fem L2	Fem L3	Fem L4	Fem L5	Fem L6	Fem L7	Fem L8	Fem L9	Fem L10	Fem L11	Fem L12	Fem L13
Maximum length			456		403								
Bicondylar length			450		399								
AP diameter at midshaft	(33)	(31)	26		23		(24)	(23)	26				
ML diameter at midshaft	(29)	(28)	30		22		(26)	(24)	33				
Maximum diameter of head		(44)	43	(42)	39	43	42	43	44	43			
Vertical diameter of head		(44)	43	(42)	39	43	42	43	44	43	(48)		
Circumference at midshaft	(89)	(93)	79	(42)	73		(80)	(78)					
Subtrochanteric AP diameter	25	26	23	24	24		25	20	24	29	24		
Subtrochanteric ML diameter	34	32	33	35	32		32	32	33	39	32		
Bicondylar breadth	79		77		67								

Table 4. continued.

North Slope continued										
	Fem L14	Fem L17/R17	Fem L18	Fem R1	Fem R2	Fem R3	Fem R4	Fem R8	Fem R10	
AP diameter at midshaft		29/29	(29)		(30)	(25)		(29)		
ML diameter at midshaft		31/26	(27)		(24)	(25)		(30)		
Maximum diameter of head	(46)									
Vertical diameter of head	(46)			48						
Circumference at midshaft		91/87	(88)	48	(87)	(78)		(95)		
Subtrochanteric AP diameter	25	24/-			(27)	25	27			
Subtrochanteric ML diameter	(36)	36/-			(35)	31	33			87
Bicondylar breadth										

	Fem U1	Fem U4	Fem U5		Tib L1	Tib L2	Tib L1orL2	Tib L3	Tib L5	Tib R1	Tib R2	Tib R4	Tib R6
Maximum diameter of head	(41)								368	341			
Vertical diameter of head	39	46	(44)						345	321			
								29	30	30		31	
Maximum length					32			19	20	18		21	
Physiological length					24			78	77	76		85	
Anteroposterior diameter at nutrient foramen					97			65	64	64		(74)	
Mediolateral diameter at nutrient foramen					75	77	51	(43)	42	42			42
Circumference at nutrient foramen											57		
Proximal breadth													
Distal breadth													

	Fib R1			Tal R1	Tal R2	Tal R3	Tal R4	Tal R5	Tal R6	Tal R7
Maximum length	324			50	44	61	46	56	51	53
Maximum diameter at midshaft	13									

	Tal L1	Tal L2	Tal L3	Cal R1	Cal R2	Cal R3	Cal R4	Cal R5
Maximum length	47	51	68	70	80	71	82	77

	Cal L1	Cal L2	Cal L3	Cal R1	Cal R2	Cal R3	Cal R4	Cal R5
Maximum length	68	68	68	70	80	71	82	77

Table 4. continued.

	Left	No Feature	Right
96N88E			
<i>Adult, Radius</i>			
Maximum transverse distal width			(30)
AP diameter at midshaft			(9)
ML diameter at midshaft			(13)
<i>Innominate</i>			
Maximum breadth			(151)
104N86E			
<i>Misc. Adult, Innominate</i>			
Maximum breadth			(161)
114N94E			
<i>Adult, Tibia</i>			
Anteroposterior diameter at nutrient foramen	31		
Mediolateral diameter at nutrient foramen	20		
Circumference at nutrient foramen	83		
Proximal breadth	(67)		
18N86E-122N86E			
<i>Adult, Tibia</i>			
Anteroposterior diameter at nutrient foramen	37		
Mediolateral diameter at nutrient foramen	22		
Circumference at nutrient foramen	95		

Table 4. continued.

Surface-Collection continued														
	Fem L1	Fem L2	Fem L3	Fem L4	Fem L5	Fem L6	Fem L7	Fem L8	Misc	Fem R1	Fem R2	Fem R3	Fem R4	Fem R5
Femur														
Maximum length	(458)	409								433				
Bicondylar length	(455)	405								425				
Anteroposterior diameter at midshaft	(32)	24								26				(33)
Mediolateral diameter at midshaft	(28)	21								27				(29)
Maximum diameter of head	48	41	44							41	46	(42)	46	
Vertical diameter of head	47	40	44	(46)						41	46	(41)		
Circumference at midshaft	(95)	75								84				(93)
Subtrochanteric anteroposterior diameter	27	22	25	30		(23)				25	27			26
Subtrochanteric mediolateral diameter	33	29	31	36	35	35	(31)			36	35			35
Bicondylar breadth								82		71				
Tibia	Tib L1	Tib L2	Tib L3	Tib R1	Tib R2	Tib R3								
Maximum length				361										
Anteroposterior diameter at nutrient foramen				36		35								
Mediolateral diameter at nutrient foramen				20		21								
Circumference at nutrient foramen				85		94								
Proximal breadth	77													
Distal breadth		(51)		47										
Talus	Tal L1	Tal L2	Tal L3	Tal R1	Tal R2									
Maximum length	54	60	52	55	58									
Calcaneus	Calc L1	Calc R1	Calc R2	Calc R3										
Maximum length	(76)	75	76	80										
Middle breadth		41	42	46										

Note: () indicates approximated measurements

¹in situ estimated measurement

^aBass 1995

^bMoore-Jansen et al. 1994

^colder juvenile subadult with fused epiphyses

Table 6. Postcranial Nonmetric Characteristics, 13PM248, Plymouth County, Iowa.

	Feature 1		Feature 2		
	Adult 1-1 L/R	Adult 1-2 L/R	Adult 1-3 L/R	Adult 2-1 L/R	Adult 2-2 L/R
Allen's fossa	A/-		A/A		-/A
Poirier's facet	A/-		A/A	-/A	-/A
Plaque	P/-		A/A	-/A	-/A
Hypotrochanteric fossa	A/-		A/A	A/A	
Trochanteric fossa exostosis	A/-		A/A	A/A	
Third trochanter	A/-		A/P	P/A	
Medial tibial squatting facet	P/-		A/P	A/A	
Lateral tibial squatting facet	P/-		P/A	A/A	
Supracondyloid process	A/-	-/A	A/A	A/A	-/A
Septal aperture	A/-	-/A	A/A	A/P	A/-
Acetabular crease			A/A	A/A	
Sacralization of L-5			A		A
Vastus notch			P/P	P/P	-/A
Vastus fossa			A/A	A/A	-/A
Emarginate patella			A/A	A/A	-/A
Os trigonum	A/-			-/A	
Medial talar facet	A/-			-/A	
Lateral talar extension	A/-			-/P	
Inferior talar articular surface	D/-			-/D	
Anterior calcaneal facet	P/-			P/P	
Peroneal trochlea	P/-			P/-	
Atlas facet form	S/-		S/-	S/S	S/S
Transverse foramen bipartite			P/-	P/P	A/A
Atlas posterior bridge	A/-		A/A	A/A	A/A
Atlas lateral bridge	A/-		A/-	A/A	A/P
Acromial articular facet			P/P		
Suprascapular foramen			A/A	A/A	
Circumflex sulcus			A	A/A	
Sternal foramen	A				

Table 6 continued.

		Surface Collection continued						
Innominate	Inn R1	Inn R2						
Accessory sacral facet	A	P						
Patella	Pat R1	Pat R2						
Vastus notch	P	P						
Vastus fossa	A	A						
Emarginate patella	A	A						
Talus	Tal L1	Tal L2	Tal L3	Tal R1	Tal R2			
Os trigonum	A	A	A	A	A			
Medial talar facet	A	A	A	A	A			
Lateral talar extension	A	A	A	A	P			
Inferior talar articular surface	S	S	S	S	S			
Calcaneus	Calc L1	Calc R1	Calc R2	Calc R3				
Anterior calcaneal facet	P	P	A	A				
Peroneal trochlea	A	A	A	P				
Cervical Vertebrae (C3-C7)	Unidentified 1		Unidentified 2					
Transverse foramen bipartite	A		A					

Table 6 continued.

Surface Collection continued			
Scapula	Scap L1	Scap R1	Scap R2
Acromial articular facet			P
Suprascapular foramen	A	A	A
Circumflex sulcus	A	P	P

Key:

- A = absent
- D = double
- P = present
- S = single

Table 7. Dental Inventory and Pathologies, 13PM248, Plymouth County, Iowa.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm)	
							degree/form Left	degree/form RightLeft	type/no. Right	type/no. L/R		
Feature 1: Adult 1-1												
<i>Maxillary</i>												
I2	1/-	3/-	2/-	-/-	1/-	-/-	8/-		9			
C	1/-	0/-	0/-	-/-	1/-	2/-	4-5/2		9			
P2	1/-	0/-	0/-	-/-	0/-	1/-	5/2		0			
M1	1/1	1oc/4	0/-	-/-	0/-	2/-	6/2		0			
M2	1/-	0/-	0/-	-/-	0/-	2/-	3/2		0			
<i>Mandibular</i>												
I1	1/1	0/1int	0/0	9/9	1/1	2/3	6+8/2	6+8/2	9	9		
I2	1/1	0/1int	0/0	9/9	0/0	9/3	6+8/2	6+8/2	9	9		
C	2/5	0/-	0/-	1/1	1/-	3/-	5/2		3/2			
P1	2/2 ^a	0/-	0/-	1/1	1/-	2/-	4-5/2		0			
P2	2/2	1int/4	0/2	1/1	9/9	2/-	3/2		0			
M1	2/2	1int/3	0/2	1/3	9/9	9/1	4/2				2.8/-	
M2	3/2	-/0	-/0	4/1	-/0	-/9	1/1	4/2		0		
M3	2/2	0/1int	0/0	1/1	9/0	9/1	2-3/2	2/2	0	0		
Feature 1: Adult 1-2												
<i>Undetermined</i>												
C?	1	2?r	0		1			6-7/3				
P?	1	0	0		9	2		4-5/2				
single-rooted	1	0	0		0	0		8/4				
Feature 1: Adult 1-3												
<i>Maxillary</i>												
I1	2/2	0/0	0/0	1/1	0/0	1/2	6/2	6/2	0	0	(3.8)/-	
I2	2/2	0/0	0/0	1/1	0/0	2/2	6/2	6/2	0	4/1	3.5/-	
C	2/2	0/0	0/0	1/1	9/9	2/2	5/2	5/2	4/1	4/2	3.3/3.2	
P1	2/2	0/0	0/0	1/1	0/0	2/2	5/2	5/2	4/2	0	3.5/2.7	
P2	2/2	0/0	0/0	1/1	0/0	2/2	5/2	5/2	0	0	4.9/2.1	
M1	2/2	0/0	0/0	1/1	9/9	9/9	6/3	6/3	9	9	(4.5)/3.1	
M2	2/2	0/0	0/0	1/1	9/9	2/2	4/2	4/2	4/1	4/1	2.0/1.4	
M3	2/2	0/0	0/0	1/1	9/9	2/2	2/2	3/2	4/1	4/1	1.1/1.3	
<i>Mandibular</i>												
I1	2/2	0/0	0/0	1/1	0/0	3/2	7+8/2	7+8/2	9	9	4.9/4.3	
I2	2/2	0/0	0/0	1/1	0/0	3/3	7+8/2	7+8/2	9	9	5.4/5.2	
C	2/2	0/0	0/0	1/1	0/0	3/3	6/2	6/2	9	9	3.9/3.2	
P1	2/2	0/0	0/0	1/1	9/9	3/3	4/2	4/2	9	9	2.6/2.5	

Table 7 continued

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
Feature 1: Adult 1-3 continued											
<i>Mandibular continued</i>											
P2	2/2	0/0	0/0	1/1	1/9	2/2	4/2	4/2	0	0	1.5/2.3
M1	2/2	4/0	2/0	1/1	9/9	-/2	5/2-3	5/2-3	0	9	-/2.3
M2	2/2	0/0	0/0	1/1	9/9	2/2	3/2-3	3/2-3	0	0	1.5/2.0
M3	2/2	0/0	0/0	1/1	9/9	2/1	2/1	2/2	0	0	1.2/1.6
Feature 1: Subadult 1-1											
<i>Maxillary</i>											
di1	2/1	0/0	0/0	1/1	0/0	1/1	2/1	2/1	0	0	
di2	5/2	-/0	-/0	-/1	-/0	-/1	1/1	1/1	0	0	
dc	2/2	0/0	0/0	1/1	0/0	1/1	2/1	1/1	0	0	
dm1	2/2	0/0	0/0	1/1	0/0	1/1	1/1	1/1	0	0	
dm2	2/2	0/0	0/0	1/1	0/0	1/1	1/1	1/1	0	0	
I1	7+1/										
I2	7/										
C	7/										
P1	9/										
P2	9/										
M1	7+1/										
<i>Mandibular</i>											
di1	5/8?										
di2	5/5										
dc	2/2	0/0	0/0	1/1	0/0	1/1	1/1	1/1	0	0	
dm1	2/2	0/0	0/0	1/1	0/0	1/1	1/1	1/1	0	0	
dm2	2/2	0/0	0/0	1/1	0/0	1/1	1/1	1/1	0	0	
I1	7/9										
I2	7+1/9										
C	9/9										
P1	9/9										
P2	9/9										
M1	7/7										
M2	7/-										

Table 7. continued.

Tooth	Status		Caries		Pulp Exposure		Alveolar Abscess		Hyper-cementosis		Calculus		Attrition		Enamel Defects		Alveolar Resorption (mm)		
	L/R		L/R		L/R		L/R		L/R		L/R		Left	Right	Left	Right	L/R		
Feature 2: Adult 2-1																			
<i>Maxillary</i>																			
I1	2/2		0/0		0/0		1/1		0/0		1/1		3/2	3/2	9	4/2			
I2	2/2		0/1oc		0/0		1/1		0/0		1/1		2/2	2/2	9	9			
C	2/2		0/0		0/0		1/1		0/0		1/1		3/2	3/2	9	9			
P1	2/2		0/0		0/0		1/1		0/9		1/1		1-2/1	1-2/1	4/1	4/1			0.6/1.6
P2	2/2		0/0		0/0		1/1		9/9		1/1		3/2	2/2	0	9			0.5/-
M1	2/2		0/0		0/0		1/1		9/9		1/1		3/2-3	3/2-3	9	4/1			1.0/0.9
M2	2/2		0/0		0/0		1/1		9/9		1/1		2/1	1/1	9	4/1			0.5/0.6
M3	9/9						1/1												
<i>Mandibular</i>																			
I1	2/2		0/0		0/0		1/1		0/0		2/2		3/2	3/2	0	4/2			2.0/2.0
I2	2/2		0/0		0/0		1/1		0/0		2/2		3/2	3/2	0	0			1.4/-
C	2/2		0/0		0/0		1/1		0/0		2/2		3/2	3/2	9	9			
P1	2/2		0/0		0/0		1/1		9/0		2/2		2/2	2/2	4/1	9			1.7/-
P2	2/2		0/0		0/0		1/1		0/0		1/2		1/1	2/2	4/1	9			1.0/1.4
M1	2/2		0/0		0/0		1/1		9/9		2/2		3/2	3/2	0	9			1.4/0.9
M2	2/2		0/0		0/0		1/1		9/9		1/1		2/2	2/2	4/1	9			0.8/0.5
M3	9/2		-0		-0		1/1		-9		-1		1/1	1/1	0	0			-0.0
Feature 2: Adult 2-2^a																			
<i>Maxillary</i>																			
M3	-1		-0		-0				-2		-1			2/1		0			
<i>Mandibular</i>																			
I1	5/4																		
I2	5/4																		
C	5/4																		
P1	4/5																		
P2	5/4																		
M1	4/4																		
M2	4/4																		
M3	4/4																		
<i>Undetermined</i>																			
single-rooted	1		4						2										
single-rooted	1		4						2										

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
Feature 2: Adult 2-2^a continued											
<i>Undetermined continued</i>											
single-rooted	1	4	0		2	9					
single-rooted	1	0	0		9	9		7-8/?			
single-rooted	1	0	0		9	9		7-8/?			
Feature 3: Miscellaneous Adult											
<i>Mandibular</i>											
I1	2/2	0/0	0/0	1/1	9/9	2/2-3	6+8/2	6+8/(3)	9	9	
I2	2/2	0/0	0/0	1/1	9/9	2/2	5+8/2	6+8/4	9	9	
C	2/-	0/0	0/0	1/-	9/9	2/-	5/2		9		
P1	2/-	0/-	0/-	1/-	9/-	2/-	6/3-4		9		
P2	2/-	0/-	0/-	1/-	9/-	2/-	5/3		9		
M1	4/-			5/-							
M2	4/-			5/-							
M3	4/-			5/-							
Feature 3: Subadult 3-2											
<i>Maxillary</i>											
I1	1/-	0/-	0/-		0/-	0/-	2/2		9		
M1 or M2	-1	-9	-0		-0	-0		1/1		0	
Feature 4: Adult 4-2											
<i>Maxillary</i>											
M3	1/-	1r, 2int/-	0/-		0/-	3/-	1-2/1		9		
Feature 4: Possibly Subadult 4-2											
dt1, unisided	1	0	0		0	0		1/1		0	
Feature 4: Subadult 4-5											
<i>Maxillary</i>											
I1	-1	-0	-0		-0	-0		1/1		9	
<i>Mandibular</i>											
I	-1	-0	-0		-9	-0		1/1		0	
Feature 5: Subadult 5-2											
<i>Maxillary</i>											
dc	1/-	0/-	0/-		0/-	0/-	3-4/2		0		
dm2	1/-	0/-	0/-		0/-	0/-	1/1		0		

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
Feature 5: Subadult 5-2 continued											
<i>Maxillary continued</i>											
I2	1+7/-									4/2	
C	1+7/-									4/2	
P1	1+7/-									8/1	
P2	1+7/-									4/1	
Feature 5: Subadult 5-1 or 5-2											
<i>Unidentified</i>											
possible m/M, unisided 1+7											
Possibly Feature 5: Adult Miscellaneous Remains											
<i>Mandibular</i>											
I1	-/4										
I2	-/3										
C	-/3?										
P1	-/2	-/4	-/2								
P2	-/4										
I, unisided	1	0	0		0	1-2		4-5+8/2			9
Possibly Feature 5: Possibly Adult											
<i>Maxillary</i>											
I2	1/-	0/-	0/-		0/-	1-2/-		3-4/2		9	
<i>Mandibular</i>											
M1 or M2	-/1	-/0	-/0		-/0	-/1		2-3/1			9
<i>Unidentified</i>											
single-rooted tooth 1											
Possibly Feature 5: Subadult 5-3											
<i>Mandibular</i>											
di2	5/-										
dc	5/-										1/-
dm1	6/-										1/-
dm2	7/-										1/-
M1	7/-										
Possibly Feature 5: Subadult 5-4 or 5-5											
<i>Unidentified</i>											
C, unisided	1+7										

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
Possibly Feature 5: Subadult 5-7											
<i>Maxillary</i>											
C	1/-	0/-	0/-		0/-	1/-	1-2/2		0		
P1	1/-	0/-	0/-		0/-	1-2/-	1/1		9		
P2	1/-	0/-	0/-		0/-	0/-	1/1		0		
M3	1/1	0/9	0/0		0/0	0/9	1/1	9	0		9
<i>Mandibular</i>											
M1	-/5			-/9							
M2	-/2	-/1int	-/0	-/9	-/0	-/0		2/1			9
Feature 6: Subadult 6-1											
<i>Mandibular</i>											
di1	-/7										
di2	-/7										
dc	-/7										
dm1	-/5+7										
dm2	-/7										
M1	-/7										
Feature 6: Subadult 6-2											
<i>Maxillary</i>											
di1	5/-										0
di2	5/-										0
dc	7/1+7								0		
dm1	6?/1+7										
dm2	1+7/-								0		
Feature 6: Subadult 6-5											
<i>Maxillary</i>											
di1	-/1	-/2, oc; 3but&int	-/2		-/0	-/9	-/9		9		
dm2	-/1	-/0	-/0		-/9	-/0	1/1		9		
I1	1+6/1+6								4/2		4/2
I2	1+7/-								4/2		
C	7/-										
P1	1+7/-								4/1		
P2	1+7/-								4/1		
M1	1/1	0/0	0/0		9/9	0/0	1/1	1/1	4/1		9
M2	-/1+7								4/1		

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R	
							degree/form Left	degree/form Right	type/no. Left	type/no. Right		
Feature 6: Subadult 6-5 continued												
<i>Mandibular</i>												
I1	2/2	0/0	0/0	9/9	0/0	0/0	1/1	1/1	0	9		
I2	7/7											
dc	2/2	0/3oc, bu, li, int	0/2	9/9	0/0	1/1	2/1-2	2/9	9	9		
P1	7/7											
P2	7/7											
dm1	2/2	3oc, bu, li, int/0	2/0	9/1	0/9	9/1	9	1-2/1	9	0		
dm2	2/2	4/3oc, bu, li, int	2/2	9/1	0/9	9/9	9	9/9	9	9		
M1	2/2	0/0	0/0	1/1	0/9	0/1	1/1	1/1	9	9		
M2	7/7											
<i>Unidentified</i>												
di or dc	1	4	2		9	9	9	9		9		
Feature 6: Subadult 6-6												
<i>Maxillary</i>												
di1	-2	-3 li	-0	-1	-0	-9		2/2		9		
di2	1/2	0/3oc, bu, li, int	0/0	-1	0/0	0/9	2/2	9	9	9		
dc	-5			-1								
dm1	-4			-5								
dm2	-2	-1loc	-0	-1	-9	-0		1-2/1		0	4/1	
M1	-6			-1								
M2	-7			-1								
C	1+7/-								9			
<i>Mandibular</i>												
di1	5/5			1/1								
di2	2/2	0/0	0/0	1/1	0/0	0/0	2/2	1-2/2	0	0		
dc	2/2	0/0	0/0	1/1	0/9	0/0	2/2	1-2/1	0	0		
dm1	2/2	0/0	0/0	1/1	0/9	0/0	1/1	2/1-2	0	0		
dm2	2/2	1oc/1, 1, 1oc	0/0	1/1	9/9	0/1	1/1	2/1	0	0		
M1	2/2	0/0	0/0	1/1	9/9	0/0	1/1	1/1	0	0		
M2	7/7			1/1			1/1	1/1	0	0		
Feature 6: Subadult 6-7												
<i>Mandibular</i>												
P, unsided	1+7											

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
Feature 6: Subadult 6-3 through 6-7											
<i>Maxillary</i>											
M											
Feature 6: Subadult 6-5, 6-6, or 6-7											
<i>Unidentified</i>											
molar root	1	4	2								
Feature 7: Adult 7-1											
<i>Maxillary</i>											
I1	2/2	0/0	0/0/	1/9	0/0	0/(1)	6+8/3	6/3	9	9	
I2	2/1	0/0	0/0/	1/9	9/0	0/(1)	5+8/2	6+8/3	9	9	
C	2/2	3int/0	0/0/	1/9	9/0	0/0	5+8/2	5+8/2	9	9	
P1	2/9	2-3oc, int, r/-	0/-	3/9	9/-	0/-	7+8/2		9		
P2	2/9	0/-	0/-	2/9	9/-	0/-	6+8/2		9		
M1	3-4/9			4-5/9							
M2	4/2	-3int r	-2	5/2	-2	-0		5-6/2	9		
M3	2/3 or 5	2int, r/-	0/-	2/2	1/-	1/-	2/2		9		
<i>Mandibular</i>											
I1	2/2	0/0	0/0	1/1	9/9	2-3/2-3	5+8/2	5+8/2	9	9	
I2	2/2	0/0	0/0	1/1	9/9	2-3/2-3	5+8/2	5+8/2	9	9	
C	2/2	0/2oc	0/2	1/9	9/1	2/2	5+8/2	5+8/2	9	9	
P1	2/2	0/0	0/0	1/9	9/1	(1)/(1)	6+8/2	6+8/2	9	9	
P2	2/2	0/0	0/0	1/1	9/9	(1)/2-3	6+8/2	6+8/2	9	9	
M1	3 or 5/2	-0	-0	2/2	-1	-1		6/3	9		
M2	2/4	0/-	0/-	2/5	2/-	(1)/	5-6/2		9		
M3	8?/2	-0	-0	9/2	-9	-1-2		6/3	9		
Feature 7: Miscellaneous Adult											
<i>Maxillary</i>											
M2	-1	-1int, 1int, 1oc	-0		-0	-9		3/2		9	
<i>Mandibular</i>											
I1	9/9										
I2	9/9										
C	5/5			1/1							
P1	5/2	-/4	-2	1/1							
P2	5/5			1/1.							

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R	
							degree/form Left	degree/form Right	type/no. Left	type/no. Right		
Feature 7: Miscellaneous Adult continued												
<i>Mandibular continued</i>												
M1	5?/5			2 or 4/9								
M2	4/4			5/5								
M3	5?/4			2 or 4/5								
<i>Unidentified</i>												
I, unisided	1	0	0		0	9	8/5			9		
single-rooted tooth	1	4	2									
single-rooted tooth	1	4	2									
Feature 7: Subadult 7-1 or 7-2												
dm, unisided	1+7											
Possibly Feature 7: Adult 7-4												
<i>Maxillary</i>												
I1	-/5			-/9								
I2	-/5			-/9								
C	-/5			-/9								
P1	-/5			-/9								
P2	-/2	-/0	-/0	-/1	-/9	-/1-2		2/1-2		0		
M1	-/2	-/0	-/0	-/1	-/9	-/2-3		3/1-2		9	-/3.7	
M2	2/2	0/0	0/0	9/1	9/9	2-3/2-3	2-3/2	2-3/2	0	9	-/2.7	
M3	2/2	0/0	0/0	9/1	9/9	1-2/2-3	1-2/1	1/1	9	9	-/1.6	
Possibly Feature 7: Miscellaneous Adult												
<i>Unidentified</i>												
possible P, unisided	1	2int	0		9	9	7+8/4			9		
Possibly Subadult 7-5												
<i>Maxillary</i>												
I2	1/-	0/-	0/-		0/-	1-2/-	1/1		0			
Possibly Subadult 7-5 or 7-6												
<i>Maxillary</i>												
I2	-/1	-/0	-/0		-/0	-/0		1/1		0		
Feature 8: Subadult 8-1												
<i>Mandibular</i>												
di1	7/5+7											
di2	5+7/5+7											
dc	5+7/5+7											

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
Feature 8: Subadult 8-1 continued											
<i>Mandibular continued</i>											
dm1											
dm2											
Feature 8: Subadult 8-2											
<i>Mandibular</i>											
di1											
di2											
dc											
dm1											
dm2											
Feature 8: Subadult 8-1 or 8-2											
<i>Maxillary</i>											
dc											
dm1											
M1											
<i>Mandibular</i>											
dm1											
<i>Unidentified</i>											
di, unisided											
dc, unisided											
dm, unisided											
possibly Feature 10: Subadult 10-2											
<i>Maxillary</i>											
di1											
Feature 11: Subadult 11-1											
<i>Maxillary</i>											
di1											
dc											
dm1											
dm2											
I1											
I2											
C											
P1											
P2											

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
Feature 11: Subadult 11-1 continued											
<i>Maxillary continued</i>											
M1	1+6/1+7									0	
M2	1+7/-									0	
<i>Mandibular</i>											
di1	1/1	0/0	0/0		0/0	0/0	2-3/2	2-3/2		0	0
dc	1/2	0/0	0/0	-1	0/0	0/0	2/1	2/1		0	0
dm1	2/2	0/0	0/0	1/1	0/0	0/0	1-2/1	1-2/1		0	0
dm2	2/2	0/0	0/0	1/1	0/0	0/0	1-2/1	1-2/1		0	0
I1	1+7/7									0	0
I2	1+7/7									0	0
C	1+7/7								4/1		
P1	7/7										
P2	7/7										
M1	1+6/-								0		
M2	7/-										
Feature 12: Max L1/R1											
<i>Maxillary</i>											
I1	5/2	-0	-0	9/1	-9	-(1)		4/2		0	0
I2	5/2	-0	-0	9/1	-9	-(1)		4/2		9	9
C	2/2	0/0	0/0	1/1	9/9	2/(1)	4/3	4/2	9	9	9
P1	2/2	0/0	0/0	1/1	9/9	(1)/2	4/3	5/3	9	9	9
P2	2/2	0/0	0/0	1/1	9/9	(1)/2	3/2	4/2	9	9	9
M1	2/2	0/0	0/0	1/1	9/9	(1-2)/2	4/1-2	7/3	9	9	9
M2	5/2	-0	-0	1/1	-9	-2-3		3/2		9	9
M3	5/8?			1/1							
Feature 12: Max L2/R2											
<i>Maxillary</i>											
I1	-5			-1							
I2	-5			-1							
C	-5			-1							
P1	-2	-4	-2	-3	9/-	1/-	2-3/1-2				
P2	2/5	0/-	0/-	1/3					0		
M1	4/-			5/-							
M2	2/-	1int, r/-	0/-	2/-	9/-	1-2/-	1/1		7		5.2/-
M3	3?/-			2/-							

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm)	
							degree/form Left	degree/form RightLeft	type/no. Right	type/no. L/R		
Feature 12: Max L3												
<i>Maxillary</i>												
C	9/-			9/-								
P1	3?/-			4?/-								
P2	4/-			5/-								
M1	4/-			5/-								
M2	2/-	4/-	2/-	2/-								
M2	4/-			5/-								
Feature 12: Max L4												
<i>Maxillary</i>												
C	5/-			1/-								
P1	5/-			1/-								
P2	5/-			1/-								
M1	5/-			1/-								
M2	5/-			1/-								
M2	5/-			1/-								
M3	5/-			1/-								
Feature 12: Mand 1												
<i>Mandibular</i>												
I1	5/5			9/9								
I2	2/5	0/-	0/-	9/9	0/-	0/-	8/5	9	9			
C	2/2	0/0	0/0	9/1	0/9	1/0	7+8/3	9	9			
P1	5/2	-/4	-/2	1/2-3	-/9							
P2	4/4			5/5								
M1	4/4			5/5								
M2	4/4			5/5								
M3	3/2	-/2bu	-/2	4/2	-/9	-/0	3-4/1	9	9			-(4.0)
Feature 12: Mand 2												
<i>Mandibular</i>												
I1	5/5			1/1								
I2	2/2	0/0	0/0	1/1	9/0	1/1	2/2	2/2	0			0
C	2/5	0/-	0/-	1/9	9/-	1-2/-	1/1	4/3	0			
P1	2/-	0/-	0/-	1/-	9/-	0/-	1/1	0	0			
P2	2/-	0/-	0/-	1/-	0/-	0/-	1/1	0	0			
M1	5/-			1/-			1/1	1/1	0			

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R	
							degree/form Left	degree/form Right	type/no. Left	type/no. Right		
Feature 12: Mand 2 continued												
M2	2/-	2oc, bu, 3int/-	0/-	1/-	9/-	1/-	1-2/1		9			
M3	5/-			9/-								
Feature 12: Mand 3												
<i>Mandibular</i>												
P2	5/-			9/-								
M1	2/-	0/-	0/-	1/-	0/-	1/-	4-5/2-3		0		1.9/-	
M2	5/-			9/-								
Feature 12: Mand 4												
<i>Mandibular</i>												
I1	-2	-0	-0	-1	-9	-1	5/2		9			
I2	-2	-0	-0	-1	-9	-1	4/2		9			
C	-2	-0	-0	-1	-9	-1	4/2		9			
P1	-2	-0	-0	-1	-9	-1	3/2		0			
P2	-2	-0	-0	-1	-9	-1	2-3/2		0			
M1	-2	-0	-0	-1	-9	-1	4/2		0		1.7/-	
M2	-2	-0	-0	-1	-9	-1	4/2		9		1.9/-	
M3	-5	-0	-0	-9								
Feature 12: Adult Loose Teeth, Slight Wear												
<i>Maxillary</i>												
I2, unsided	1	0	0		0	1		2/2		0	0	
M3	-1	-0	-0		-1	-1		1/1				
<i>Mandibular</i>												
I	1/-	0/-	0/-		0/-	0/-	2/2		9			
M2	1/-	0/-	0/-		0/-	0/-	1/1		0			
Feature 12: Adult Loose Teeth, Moderate to Severe Wear												
<i>Maxillary</i>												
I1	1/-	0/-	0/-		0/-	1-2/-	3-4/2		4/2			
C	1/-	0/-	0/-		0/-	1-2/-	2-3/2		0			
P	-1	-0	-0		-0	-1		3/2			4/1	
P	-1	-0	-0		-0	-1		5/2-3			0	
P, unsided	1	0	0		2	1	6/2		0			
<i>Possibly Maxillary</i>												
I, unsided	1	0	0		1	1-2	5/2				9	

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R	
							degree/form Left	degree/form Right	type/no. Left	type/no. Right		
Feature 12: Adult Loose Teeth, Moderate to Severe Wear continued												
<i>Mandibular</i>												
M1 or M2	1/-	2int, 2int/-	0/-		1/-	0/-	5-6/2-3		0			
M1 or M2	-/1	-/0	-/0		-/0	-/1		5/2-3		9		
M1 or M2	-/1	-/0	-/0		-/0	-/1-2		4/2		0		
<i>Unidentified</i>												
I, unisided	1	0	0		0	1-2	4/3			9		
I, unisided	1	0	0		0	1	5+8/2			9		
single-rooted, unisided	1	4	2		0							
root	1	4	2		0							
Feature 12: Subadult 12-1												
<i>Maxillary</i>												
dm2	1+7/-											
Feature 12: Subadult 12-2												
<i>Mandibular</i>												
dm1	-/1+7									0		
Feature 12: Subadult 12-3												
<i>Mandibular</i>												
dc	1+(6)/-									0		
dm1	-/1	-/0	-/0		-/9	-/0		1/1		0	0	
Feature 12: Subadult 12-2 or 12-3												
<i>Maxillary</i>												
di2	1/-	0/-	0/-		0/-	0/-	1/1		0			
Feature 12: Subadult 12-5												
<i>Maxillary</i>												
di1	5/-											
di2	5/-											
dm2	1/-	0/-	0/-		0/-	0/-	2-3/1-2		0			
<i>Mandibular</i>												
di1	5/5											
di2	5/5											
dc	5/5											
C	5+7/5+7											

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
Feature 12: Subadult 12-6											
<i>Maxillary</i>											
dm2	1/-	2-3int/-	0/-		9/-	1/-	1/1		0		
P	-/1+7										0
Feature 12: Subadult 12-7											
<i>Maxillary</i>											
M3	-/1+(6)?	-/0	-/0		-/9	-/0		1/1			0
<i>Mandibular</i>											
M1 or M2	-/1	-/0	-/0		-/0	-/0		1-2/1			0
North Slope: Max L1&R1											
I1	5/2	-/0	-/0	1/1	-/1	-/1		4/2			4/2
I2	5/2	-/0	-/0	1/1	-/0	-/2		3/2			4/2
C	5/2	-/0	-/0	1/1	-/9	-/2		2/1-2			9
P1	2/2	0/0	0/0	1/1	9/0	1/2	4/2	3/2	0		9
P2	5/2	-/0	-/0	1/1	-/9	-/2		3/2			9
M1	2/2	0/0	0/0	1/1	9/9	2/2	6/3	6/3	9		9
M2	2/2	1int, r/3oc, int	0/2	1/3	9/9	2/2	3/2	9	9		9
M3	5/5			1/1							3.2/3.4 2.5/4.0
North Slope: Max L2&R2											
I1	2/2	0/0	0/0	1/1	9/9	1/1	5+8/2	5+8/2	9		9
I2	5/2	-/0	-/0	1/1	-/9	-/1		5+8/2			9
C	2/5	1int/-	0/-	1/9	9/-	2/-	5+8/3		9		
P1	4/-			5/-							
P2	5/-			2/-							
M1	2/-	0/-	0/-	9/-	9/-	3/-	1/1		9		
North Slope: Max L3&R3											
I1	2/-	0/-	0/-	1/-	0/-	0/-	2/1		4/3		
I2	2/5	0/-	0/-	1/9	0/-	1/-	2/1		9		
C	5/5			9/9							
P1	5/2	-/-	-/0	9/9	-/9	-/2		1/1			0
P2	-/5			-/1							
M1	-/2	-/0	-/0	-/1	-/9	-/2		2/1-2			0
M2	-/2	-/0	-/0	-/1	-/9	-/2		1/1			0
M3	-/8?										-/1.5

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R	
							degree/form Left	degree/form Right	type/no. Left	type/no. Right		
North Slope: Max L4												
I1	5/-			9/-								
I2	2/-	0/-	0/-	1/-	9/-	1/-	4/3		0			
C	2/-	0/-	0/-	1/-	0/-	1/-	5/3		0			
P1	2/-	0/-	0/-	1/-	9/-	0/-	4/3		0			
P2	2/-	2li/-	0/-	1/-	9/-	0/-	3-4/2		0			
M1	2/-	0/-	0/-	1/-	9/-	0/-	6/2		0			4.4/-
M2	2/-	3/-	2/-	2/-	0/-	0/-	9		9			
M3	5/-			3/-								
North Slope: Max L5												
I1	2/-	0/-	0/-	1/-	0/-	1/-	5+8/2		9			
I2	2/-	0/-	0/-	1/-	0/-	1/-	5+8/2		9			
C	2/-	0/-	0/-	1/-	0/-	1/-	6+8/3		9			
P1	2/-	0/-	0/-	1/-	0/-	1/-	6/3		9			
P2	2/-	2-3/-	2/-	3/-	0/-	0/-	4/2		9			
North Slope: Max L6												
I1	5/-			1/-								
I2	2/-	0/-	0/-	1/-	9/-	1/-	2/2		4/1			
C	5/-			9/-								
North Slope: Max L7												
M1	2/-	0/-	0/-	9/-	9/-	4/-	3/2		9			(2.5)/-
M2	2/-	0/-	0/-	1/-	9/-	4/-	2-3/1/2		9			2.2/-
M3	2/-	0/-	0/-	1/-	9/-	(3)/-	2-3/2		9			2.0/-
North Slope: Max L8												
I1	5/-			9/-								
I2 or C	5/-			3/-								
North Slope: Max L9												
I1	5/-			9/-								
I2	5/-			1/-								
C	5/-			1/-								
P1	5/-			1/-								
P2	5/-			1/-								
M1	5/-			1/-								
M2	5/-			1/-								
M3	5/-			1/-								

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm)
							Left degree/form	RightLeft degree/form	Left type/no.	Right type/no.	
North Slope: Max R4											
I2	-2	-0	-0	-9	-9	-1		5+8/2		9	
C	-2	-0	-0	-1	-9	-1		5+8/3		9	
P1	-2	-0	-0	-1	-9	-1		4/2		0	
P2	-2	-0	-0	-1	-9	-1		4/2		0	
M1	-2	-0	-0	-1	-9	-1		6/3		9	
M2	-2	-0	-0	-1	-9	-1		4-5/2		0	
M3	-8			-1							
North Slope: Max R5											
I1	-2	-0	-0	-1	-0	-1		2-3/2		4/1	
I2	-5			-1							
C	-5			-9							
P1	-2	-0	-0	-1	-9	-2		2/1		0	
P2	-2	-0	-0	-1	-9	-2		2/1-2		0	
M1	1/2	0/0	0/0	-9	0/9	2/2	2/1-2	3/1-2		9	
M2	1/-	0/-	0/-		0/-	2/-	3/1			9	
North Slope: Max R6											
I1	-5	2oc, int/-	0/-	-9	0/-	1/-	4/2			9	
I2	1/5	-0	-0	-1	-0	-1		4/2		9	
C	-2	-0	-0	-1	-0	-1		5/2		9	
P1	-2	-0	-0	-1	-0	-1		4-5/2		9	
P2	-2	-0	-0	-1	-0	-1		6/4		9	
M1	-2	-0	-0	-9	-0	-1					
North Slope: Max R7											
M2	-2	-0	-0	-9	-0	-2		1/1		9	
M3	-2	-0	-0	-9	-0	-2		1/1		9	
North Slope: Mandible 1											
I1	2/2	0/0	0/0	1/1	9/9	1/1	5+8/2	5+8/2		9	
I2	2/5	0/-	0/-	1/1	9/-	1/-	5+8/2			9	
C	2/5	0/-	0/-	1/1	9/-	1/-	5/2			9	
P1	2/5	0/-	0/-	1/1	9/-	1/-	4/2			0	
P2	2/2	0/0	0/0	1/1	9/9	1/1-2	3/2	3/2		9	
M1	4/4			5/5							
M2	2/2	0/1-2int	0/0	1/1	9/9	1/1-2	2-3/2	3/2		0	2.0/2.4
M3	2/2	0/1bu, 1int	0/0	1/1	9/9	1/1-2	2/2	2-3/2		9	1.9/2.2

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm)	
							degree/form Left	degree/form RightLeft	type/no. Right	type/no. L/R		
North Slope: Mandible 2												
P1	2/-	0/-	0/-	1/-	9/-	2/-	3/2		2/1			
P2	2/-	0/-	0/-	1/-	9/-	0/-	3/2		0			
M1	2/-	2bu, 2int/-	0/-	1/-	9/-	0/-	4/2		0		3.3/-	
M2	2/-	0/-	0/-	1/	9/-	0/-	3/2		0		2.9/-	
M3	2/-	0/-	0/-	1/-	9/-	1/-	2-3/2		0		1.9/-	
North Slope: Mandible 3												
I1	2/5	0/-	0/-	1/1	0/-	3/-	5+8/2		9			
I2	2/2	0/0	0/0	1/1	0/0	3/3	5+8/2	3-4/2	9		9	
C	2/2	0/0	0/0	1/1	0/0	4/3	5/2	3/2	9		9	
P1	5/2	-/4	-/2	1/2	-/2							
P2	2/2	0/0	0/0	1/1	0/9	4/3	4/2	2-3/1-2	9		0	
M1	2/2	3/0	2/0	1/1	9/9	3/1	9	3-4/1-2	9		0	
M2	2/2	0/0	0/0	1/1	9/9	4/1	2-3/1-2	2-3/2	9		9	
M3	2/2	2 oc, bu, r/0	2/0	1/1	9/9	4/1	1/1	2/1	9		0	
North Slope: Mandible 4												
I1	2/2	0/0	0/0	1/1	1/1	3/2-3	3-4/2	3-4/2	0		0	
I2	5/2	-/0	-/0	9/1	-/1	-/2-3		2-3/2			4/1	
C	-/2	-/0	-/0	-/1	-/1	-/2		2-3/1			4/2	
P1	-/2	-/0	-/0	-/1	-/9	-/2		2/1			0	
P2	-/2	-/0	-/0	-/1	-/0	-/2		2-3/1-2			9	
North Slope: Mandible 5												
I1	2/2	0/0	0/0	1/1	9/9	1-2/2	5+8/2	5+8/2	9		9	
I2	2/2	0/0	0/0	1/1	9/0	1-2/4	5+8/2	5+8/2	9		9	
C	-/2	-/0	-/0	-/1	-/9	-/3-4		5/2			4/2	
P1	-/2	-/0	-/0	-/1	-/9	-/3		3/2			0	
P2	-/2	-/0	-/0	-/2	-/9	-/2		2/1-2			0	
M1	-/3			-/4								
M2	-/5			-/9								
M3	-/5			-/9								

Table 7. continued.

Tooth	Status		Caries L/R	Pulp Exposure L/R		Alveolar Abscess L/R		Hyper- cementosis L/R		Calculus L/R		Attrition degree/form Left Right		Enamel Defects type/no. Left Right		Alveolar Resorption (mm) L/R	
	L/R			L/R	L/R	L/R	L/R	L/R	L/R	L/R	L/R	L/R	L/R	L/R	L/R	L/R	L/R
North Slope: Mandible 6																	
I1		5/5				1/1											
I2		5/5				1/1											
C		9/5				-/1											
P1		9/5				-/1											
P2		9/5				-/1											
M1		1/2	2oc/0	0/0		-/1	0/9		9/1-2		2/1-2		2-3/1-2		9		-(3.6)
M2		9/4				-/5											
M3		9/2				-/3	-/0										
North Slope: Mandible 7																	
C		2/-	0/-	0/-		9/-	9/-		3/-		4/2		4/3				
P1		2/-	0/-	0/-		1/-	9/-		2/-		3/2		0				
P2		2/-	0/-	0/-		1/-	9/-		2/-		3/2		0				
M1		2/-	1oc/-	0/-		1/-	9/-		2/-		3/2		0				2.2/-
M2		2/-	1int/-	0/-		9/-	0/-		1/-		2-3/2		9				
North Slope: Mandible 8																	
C		9/-				9/-											
P1		5/-				1/											
P2		2/-	0/-	0/-		1/-	0/-		2/-		3/2		9				
M1		4/-				5/-											
M2		2/-	0/-	0/-		1/-	9/-		2/-		3-4/2		9				3.1/-
M3		2/-	0/-	0/-		1/-	9/-		2/-		3/3		9				1.5/-
North Slope: Mandible 9																	
I2		5/-				9/-											
C		4/-				5/-											
P1		3/-				4/-											
P2		4/-				5/-											
M1		4/-				4/-											
North Slope: Mandible 10																	
M2		5/-				1/-											
M3		5/-				1/-											

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
North Slope: Mandible 11											
I1	4/-			5/-							
I2	4/-			5/-							
C	4/-			5/-							
P1	3/-			4/-							
P2	4/-			5/-							
North Slope: Adult Loose Teeth (numbered 1-70 to distinguish each tooth in dental tables)											
<i>Maxillary</i>											
I1, probably (1)	1/-	0/-	0/-		0/-	0/-	3-4/2-3		0		
I2 (2)	-1/	-0	-0		-0	-1		2-3/1			9
I2 (3)	-1/	-0	-0		-0	-(1-2)		3/2			4/1
I2, unisided (4)	1	0	0		0	4	4-5/2			9	
I2, unisided (5)	1	0	0		0	2-3	4/2			9	
I2, unisided (6)	1	0	0		0	1	4-5/2			9	
I2, unisided (7)	1	0	0		0	2	4-5/2			9	
I, unisided (8)	1	0	0		0	2	4/2			9	
I, unisided (9)	1	loc, (1-2int)	0		1	0	4+8/2			9	
I, unisided (10)	1	0	0		1	0	5+8/2			9	
I, unisided (11)	1	0	0		1	0	5+8/2			9	
I, unisided (12)	1	0	0		0	1	5+8/2			9	
C (13)	1/-	0/-	0/-		0/-	0/-	4-5/2		9		
C (14)	1/-	0/-	0/-		0/-	0/-	5/3		9		
C (15)	1/-	0/-	0/-		0/-	2/-	5/2		0		
C, unisided (16)	1	0	0		9	9	5+8/4			4/1	
C, unisided (17)	1	9	0		0	2	4/2			9	
I or C, unisided (18)	1	0	0		0	2	5+8/2			9	
I or C, unisided (19)	1	0	0		0	2	5+8/2			9	
P, left? (20)	1/-	0/-	0/-		0/-	1/-	3/2		0		
P, right? (21)	-1/	-0	-0		-0	-1		2/2			0
P, unisided (22)	1	0	0		9	1-2		3/2		9	
P, unisided (23)	1	4	2		9					0	
P, unisided (24)	1	1int	0		(1)	1	6/2-3			9	
P, unisided (25)	1	9	9		0	0	2-3/1-2			9	
P, unisided (26)	1	9	0		0	0	3/2			9	
P, unisided (27)	1	0	0		0	0	3/2			9	
P, unisided (28)	1	0	0		0	0	3/2			0	

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R	
							degree/form Left	degree/form Right	type/no. Left	type/no. Right		
North Slope: Adult Loose Teeth continued												
P, unsided (29)	1	0	0		9	0	3/2		0			
M1 or M2 (30)	1/-	9/-	0/-		2/-	1/-	3/2		9			
M1 or M2 (31)	1/-	2int/-	0/-		1/-	0/-	3-4/2		0			
M1 or M2 (32)	1/-	0/-	0/-		0/-	1-2/-	5/3		0			
M1 or M2 (33)	1/-	0/-	0/-		0/-	2/-	6/3		0			
M1 or M2 (34)	-1	-0	-0		-0	-1	3/1-2		0			
M3 (35)	1/-	0/-	0/-		0/-	1/-	2-3/1-2		0			
M3 (36)	1/-	0/-	0/-		0/-	1-2/-	3/2-3		0			
M3 (37)	-1	-0	-0		-0	-0	1-2/1		0			
<i>Mandibular</i>												
I2 (38)	-1	-0	-0		-0	-2	2-3/2			4/2		
I2 (39)	-1	-0	-0		-0	-1-2	3/2			0		
I, unsided (40)	1	0	0		0	3-4	5+8/2		9			
C (41)	-1	-0	-0		-9	-0	4/2			0		
C (42)	-1	-0	-0		-0	-1	4/2			9		
C, unsided (43)	1	0	0		0	3-4	4/4		9			
C, unsided (44)	1	0	0		0	9	4-5/3		0			
P2 (45)	-1	-0	-0		-0	-0	1-2/1-2			0		
P, unsided (46)	1	0	0		0	1	4/2		0			
P, unsided (47)	1	0	0		1	0	4/2		0			
P, unsided (48)	1	0	0		9	2	4/2		0			
P, unsided (49)	1	0	0		0	2	4/2-3		9			
P, unsided (50)	1	9	0		0	4	3-4/2		9			
P, unsided (51)	1	9	0		0	4	3-4/2		9			
M2 (52)	1/-	0/-	0/-		0/-	1-2/-	2/1-2		0			
M1 or M2 (53)	1/-	2oc, int/-	0/-		0/-	1/-	4/1-2		0			
M1 or M2 (54)	1/-	0/-	0/-		9/-	1/-	2-3/1-2		9			
M3 (55)	1/-	0/-	0/-		0/-	1-2/-	2/1-2		0			
<i>Unidentified</i>												
I, unsided (56)	1	0	0		0	1	5+8/3		9			
I, unsided (57)	1	0	0		0	1	6+8/2		9			
I, unsided (58)	1	(1oc)	0		9	9	3-4/3		9			
C, unsided (59)	1	9	9		0	9	4/2		9			
I or C, unsided (60)	1	0	0		1	9	6+8/4		9			
M, unsided (61)	1	4	2		9	9						

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
North Slope: Adult Loose Teeth continued											
single root, unsided (62)	1	0	0		0	9	6+8/5			9	
single root, unsided (63)	1	0	0		0	9	7+8/3			9	
single root, unsided (64)	1	4	2		0						
single root, unsided (65)	1	4	2		0						
single root, unsided (66)	1	4	2		0						
<i>Unidentified</i>											
single root, unsided (67)	1	0	0		1-2	1	6+8/5			9	
single root, unsided (68)	1	0	0		0	1	5+8/2			9	
single root, unsided (69)	1	0	0		0	1	5+8/2			9	
single root, unsided (70)	1	4	2		0						
North Slope: Subadults NS-2-5											
<i>Mand 1 – Mandibular</i>											
di1											
di2											
dc											
dm1											
dm2											
<i>Mand 2 – Mandibular</i>											
di1											
di2											
dc											
dm1											
dm2											
M1											
<i>Mand 3 – Mandibular</i>											
di1											
di2											
dc											
dm1											
dm2											
<i>Loose Teeth: Maxillary</i>											
dc											
dm2											
dm2											

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
North Slope: Subadults NS-2-5 continued											
<i>Loose Teeth: Mandibular</i>											
dm1	1+7/-										
North Slope: Subadult NS-6											
<i>Maxillary</i>											
dc	1+7/-										
dm2	1+7										
North Slope: Subadult NS-7											
<i>Maxillary</i>											
dc	1+7/-										
dm2	1+7/-										
North Slope: Subadult NS-8											
<i>Maxillary</i>											
dc	1+7/-										
dm2	1+7/-										
North Slope: Subadults NS-6 to NS-8											
<i>MaxRI - Maxillary</i>											
di1	-5			-1							
di2	-5			-1							
dc	-5			-1							
dm1	-2	-0	-0	-0	-9	-0					
dm2	-5+7			-9							0
<i>Mand 1 - Mandibular</i>											
dm1	-9										
dm2	-7										
M1	-7										
<i>Mand 2 - Mandibular</i>											
di1	-5+7										
di2	-5+7										
dc	-5+7										
dm1	-7										
dm2	-5+7										

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
North Slope: Subadults NS-6 to NS-8 continued											
<i>Loose Teeth: Maxillary</i>											
di1	1/1	0/0	0/0		0/0	0/0	1/1	1/1	0	0	0
di1	1/-	0/-	0/-		0/-	0/-	1/1	1/1	0	0	0
di2	-1/	-0	-0		-0	-0	2/1		0	0	0
dm1	1+7/1+7										
dm1	-1/	-0	-0		-0	-0		2-3/1		0	0
<i>Loose Teeth: Mandibular</i>											
dm1	1+7/-										
dm1	1+7/-										
<i>Loose Teeth: Mandibular; slightly older child</i>											
dc											
dm2											
dm2											
North Slope: Subadult NS-9											
<i>Maxillary</i>											
di	1/-	0/-	0/-		0/-	0/-	2/1-2		0	0	0
North Slope: Subadult NS-10											
<i>Maxillary</i>											
di1	2/-	0/-	0/-	1/-	0/-	0/-	1-2/1		0	0	0
di2	5/-			1/-							
dc	5/-			1/-							
dm1	2/-	0/-	0/-	1/-	0/-	0/-	1/1		0	0	0
dm2	1+7/-								0	0	0
C	1+7/										
North Slope: Subadult NS-10, possibly											
<i>Maxillary</i>											
di2	1/-	0/-	0/-		0/-	0/-	2/1		0	0	0
dc	-1/	-0	-0		-0	-0		1/1		0	0
North Slope: Subadult NS-9 or NS-10											
<i>Maxillary</i>											
I2	-1+7										
I2, unisided	1+7										
<i>Mandibular</i>											
di2	1/1	0/0	0/0		0/0	0/0	1/1	2-3/2	0	0	0

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
North Slope: Subadult NS-11											
<i>Maxillary</i>											
I1, unisided	1+7										
dm2	1/-	0/-	0/0		0/-	1-2/-	1/1		0		
<i>Mandibular</i>											
I	1+7/-								4/2		
dm1	1/-	3/-	0/-		0/-	9/-	9		9		
dm2	1/-	0/-	0/-		0/-	0/-	2-3/1		0		
North Slope: Subadult NS-12											
<i>Maxillary</i>											
I1	5/5										
I2	5/5										
dc	-/5										
dm1	-/5										
dm2	-/5										
C	-/5+7										
M1	-/5+7										
<i>Mandibular</i>											
di1	-/5			9							
di2	-/5			9							
I2	-/7			9							
dc	-/5			1							
dm1	-/2	-/0	-/0	1	-/9	-/1		3/2		0	
dm2	-/2	-/0	-/0	1	-/9	-/1		2-3/1-2		0	
M1	-/5+7			1							
M2	-/7			1							
<i>Maxillary loose teeth, possibly associated</i>											
I1	1+7/-										
C	1+7/-										
<i>Mandibular loose teeth, possibly associated</i>											
dm2, unisided	1	9	0		9	9	4/2-3		9		
P, unisided	1+7										

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R	
							degree/form Left	degree/form Right	type/no. Left	type/no. Right		
North Slope: Subadult NS-13												
<i>Maxillary</i>												
I2	-/1	-/0	-/0	1	-/9	-/0		2-3/1		0		
dc	-/2	-/0	-/0									
C	-/1	-/0	-/0									
dm1	-/2	-/0	-/0	1	-/9	-/0		2/1		0		
dm2	-/2	-/0	-/0	1	-/0	-/1		1/1		0		
P1	-/1											
P2	-/1											
M1	-/5			1								
M2	-/1											
North Slope: Subadult NS-14												
<i>Maxillary</i>												
I1	1+7/-	-/0	-/0	-/9	-/0	-/0			4/2	0		
dm2	-/2			-/9				6/2-3	4/2	4/2		
C	1+7/1+7			-/9						0		
P1	-/1+7			-/9					0	9		
P2	1+7/7			-/9					0	0		
M1	2/2	0/0	0/0	1/9	0/0	1/0	1/1	1/1	0	0		
M2	-/5+7			-/9								
<i>Mandibular</i>												
dm2	-/1	-/0	-/0		-/0	-/0		3-4/1-2		0		
I1	1+7/-											
P, unisided	1+7									0		
North Slope: Subadult NS-15												
<i>Maxillary</i>												
C	1+7/-										4/1	
P1 or P2	-/1+7											
P1 or P2	-/1+7											
<i>Mandibular</i>												
P1 or P2	1+7/-								4/2			
M2	1+7/-											
North Slope: Subadult NS-16												
<i>Maxillary</i>												
C	1+7/-										4/2	

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
North Slope: Subadult NS-17											
<i>Maxillary</i>											
I1	5/-			1/-							
I2	5/-			1/-							
C	5/-			1/-							
P1	2/-	0/-	0/-	1/-	9/-	0/-	1/1		0		
P2	6/-	0/-	0/-	1/-	0/-	0/-	1/1		0		
M1	2/-	0/-	0/-	1/-	9/-	1/-	1/1		9		
M3	-1+7										
North Slope: Subadult NS-18											
<i>Maxillary</i>											
M3	-1+7										
North Slope: Subadult NS-17 or NS-18											
<i>Maxillary</i>											
P2	-1+7										
Subadult NS-14 through NS-18											
<i>Maxillary</i>											
dm2	1/-	0/-	0/-		0/-	1/-	1-2/1		0		
dm2	-1	-3int	-0		-0	-1		3/1-2		9	
dm2	-1	-0	-0		-9	-0		6-7/2		9	
M1 or M2	1+6/1	-0	-0		-0	-9		1-2/1	4/1	9	
<i>Mandibular</i>											
dm1	1/-	9/-	0/-		0/-	9/-	4/2-3		9		
M1 or M2	1/-	0/-	0/-		0/-						
North Slope: Subadult NS-19 or NS-20											
<i>Mandibular</i>											
M1	-5		-0	-9	-0	-2-3				9	
M2	-2	-0	-0	-9	-0			1/1			
M3	-8										
North Slope: Subadult NS-18, NS-19, or NS-20											
<i>Maxillary</i>											
I2	-1	-0	-0		-0	-1		2-3/1-2		9	
P	-1	-0	-0		-0	-0		1/1		4/1	
<i>Mandibular</i>											
I1 or I2	1/-	0/-	0/-		9/-	9/-	1-2/1		9		
M1	-1	-0	-0		-9	-1	1-2/1-2			0	

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
North Slope: Subadult NS-21											
<i>Maxillary</i>											
C	-1	-0	-0	-0	-0	-1		2/1		0	
North Slope: Subadult NS-22											
<i>Maxillary</i>											
C	-1	-0	-0	-0	-0	-1		2-3/1		9	
North Slope: Subadult NS-21 or NS-22											
<i>Maxillary</i>											
C	1/-	0/-	0/-		0/-	2/-	2/1-2		4/1		
M1	2/-	0/-	0/-	9/-	0/-	(1-2)/-	1/1		9		
M2	2/-	1oc/-	0/-	9/-	0/-	0/-	1/1		0		
M2	1/-	0/-	0/-		1/0	1/-	2/1-2		0		
<i>Mandibular</i>											
M1	-2	-0	-0	-1	-0	-0		3/2		0	
M2	1/2	1oc/0	0/0	-1	0/0	1/1-2	3/1-2	1-2/1	9	9	
M3	-1+7										
North Slope: Subadult NS-23											
<i>Maxillary</i>											
P	-1	-0	-0		-0	-1		2/1		0	
<i>Mandibular</i>											
I1	5/5			1/1							
I2	5/2	-0	-0	9/1	-1	-1		2-3/2		9	
C	-2	-0	-0	-1	-1	-1		3/2		9	
P1	-2	-0	-0	-1	-0	-0		2/1		9	
P2	-2	-0	-0	-1	-0	-0		1-2/1		4/2	
M1	-5			-9							
North Slope: Miscellaneous Subadult NS-newborn to older child											
<i>Mandibular</i>											
M	1+7										
<i>Unidentified</i>											
dm or M, unside	1+7										
North Slope: Miscellaneous Subadult NS-young child											
<i>Maxillary</i>											
dm1	1/-	0/-	0/-		0/-	0/-	2-3/1		0		

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
North Slope: Miscellaneous Subadult NS-child											
<i>Maxillary</i>											
I1	-/1	-/0	-/0		-/0	-/0		2/1		0	0
<i>Mandibular</i>											
M1 or M2	-/1	-/1oc	-/0		-/0	-/0		1/1		0	0
North Slope: Miscellaneous Subadult NS-child to juvenile											
<i>Maxillary</i>											
C	1/-	0/-	0/-		0/-	0/-	3/2		0		
M	1+7/-										
M1 or M2	-/1	-/0	-/0		-/0	-/9		3/1-2		9	
<i>Mandibular</i>											
P	-/1	-/0	-/0		-/0	-/1		2/1		0	
M1 or M2	1/1	0/2oc, bu, int	0/0		0/0	0/9	2-3/2	1-2/1		9	
M1 or M2	-/1	-/0	-/0		-/0	-/1		3/1-2		0	
<i>Unidentified</i>											
I, unside	1	9	0		9	9	3/2			9	
North Slope: Miscellaneous Subadult or Adult, North Slope											
<i>Maxillary</i>											
I1	5/-									9/-	
I2	5/-									9/-	
C	5/-									9/-	
P1	5/-									9/-	
P2	5/-									9/-	
supernumerary	7/-										
<i>Unidentified</i>											
single-rooted, unside	1	4	2		9	9	9			9	
No Feature 102N86E											
<i>Adult incomplete mandible</i>											
<i>Mandibular</i>											
I1	5/5									9/9	
I2	5/-									9/-	
C	2/-	0/-	0/-		9/-	1/-	2/1-2		0		
P1	5/-									9/-	
<i>Adult Mandible fragment</i>											
<i>Mandibular</i>											
P	2/-	0/-	0/-		9/-	1/-	2/1		0		

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R	
							degree/form Left	degree/form Right	type/no. Left	type/no. Right		
No Feature 114N92E												
<i>Subadult 2</i>												
<i>Mandibular</i>												
M1	-/7											
<i>Subadult 3</i>												
<i>Maxillary</i>												
I2	-/1	-/0	-/0		-/0	-/0		1/1			4/2	
No Feature 114N94E												
<i>Adult</i>												
<i>Mandibular</i>												
I1	5/5			1/1								
I2	5/5			1/9								
C	5/5			1/9								
P1	2/2	0/-	0/-	1/9	0/-	2/-	1-2/1-2		0			
P2	2/2	0/0	0/0	1/1	9/0	2/2	1-2/1-2	1-2/1-2	0			
M1	2/2	0/0	0/0	1/1	9/9	2/2	2/2	2/1-2	0			
M2	2/2	1oc/1oc (x2)	0/0	1/1	0/9	2/2	1/1	1/1	0			1.9/1.9
M3	2/2	1oc (x3)/1oc	0/0	1/1	1/9	1/1	1/1	1/1	0			
<i>Miscellaneous Adult</i>												
<i>Mandibular</i>												
C	1/-	0/-	0/-		0/-	1/-	5+8/2					
<i>Undetermined</i>												
single-rooted	1	9	0		0	9		8/2		9		
single-rooted	1	9	0		0	3/4		5+8/2		9		
<i>Subadult 3</i>												
<i>Maxillary</i>												
I2	-/1	-/0	-/0		-/0	-/0		1/1			4/2	
No Feature 116N92E												
<i>Adult 2</i>												
<i>Undetermined</i>												
single-rooted	1	0	0		0	0		8/2				
single-rooted	1	0	0		0	2-3		5+8/2				

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
No Feature 118N86E to 122N86E											
<i>Adult</i>											
<i>Mandibular</i>											
M3	1/-	1r/-	0/-		0/-	1/-	6/2-3		9		
<i>Undetermined</i>											
single-rooted 1 ^d											
Surface Collection: Max L1											
<i>Maxillary</i>											
I2	5/-			9/-							
C	5/-			9/-							
P1	2/-	0/-	0/-	1/-	9/-	1-2	1-2/1		0		
P2	2/-	0/-	0/-	1/-	9/-	1-2	2-3/2		0		
M1	2/-	0/-	0/-	1/-	9/-	1-2	3/2		0		
Surface Collection: Max L2											
<i>Maxillary</i>											
M2	4/-			5/-							
M3	5/-			1/-							
Surface Collection: Max R1											
<i>Maxillary</i>											
I1	-/5										
I2	-/5										
C	-/5										
Surface Collection: Max R2											
<i>Maxillary</i>											
I1	-/5			-/9							
I2	-/2	-/0	-/0	-/0	-/9	-/9	5/3		9		
C	-/2	-/9	-/0	-/9	-/0	-/9	(5)/3		9		
Surface Collection: Max L3/R3											
<i>Maxillary</i>											
I1	5/5			9/1							
I2	4/4			5/5							
C	5/-			9/-							
P1	5/-			9/-							

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
Surface Collection: Mand 1											
<i>Mandibular</i>											
P1	-9		0/0	-9	9/9	1/1	2/1	2/1-2	0	9	
P2	2/2	0/0	0/0	1/1	9/9	1/1	2/1	2/1-2	9	9	-1.6
M1	2/2	1bu/0	0/0	1/1	9/9	1/1	2-3/1-2	2-3/1-2	9	9	
M2	2/2	2oc/0	0/0	1/1	9/9	0/1	2/2	1/1	9	9	
M3	2/2	0/0	0/0	1/1	9/9	1/1	1/1	1/1	9	0	1.2/0
Surface Collection: Mand 2											
<i>Mandibular</i>											
I1	-5			-9							
I2	-5			-9							
C	-5			-9							
P1	-(3)			-(2)							
P2	-2	-4	-2	-2							
M1	-4			-5							
M2	-4			-5							
M3	-2	-9	-0	-1	-9	-9		6-7+8/3		9	
Surface Collection: Mand 3											
<i>Mandibular</i>											
M1	-2	-0	-0	-1	-9	-(1-2)		6+8/3		9	-3.6
M2	-2	-0	-0	-1	-9	-(1-2)		4+8/2		9	-3.2
M3	-2	-1oc	-0	-1	-9	-(1-2)		3/2		9	-2.6
Surface Collection: Mand 4											
<i>Mandibular</i>											
P2	-5			-9							
M1	-2	-0	-0	-1	-9	(1)		5/3		9	-3.5
M2	-2	-0	-0	-1	-9	(1)		4/2		9	-3.4
M3	-2	-1oc	-0	-1	-9	(1)		4-5/2		9	
Surface Collection: Mand 5											
<i>Mandibular</i>											
I1	5/5			9/9							
I2	5/5			9/9							
C	-5			-9							
Surface Collection: Loose Teeth – Dentition A											
<i>Maxillary</i>											
M1 or M2	1/-	1int/-	0/-		1/-	0/-	6/3		9		

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
Surface Collection: Loose Teeth – Dentition B											
<i>Maxillary</i>											
M1	-1	-1,2oc	-2		-0	-2-3		7+8/4			9
M2	-1	-0	-0		-0	-9		6+8/3			9
Surface Collection: Loose Teeth – Dentition C											
<i>Maxillary</i>											
I1	1/-	0/-	0/-		9/-	1-2/-	3/2		4/3		
P1, possible	-1	-0	-0		-0	-1		3/1-2			9
M3	-1	-0	-0		-0	-0		1/1			0
Surface Collection: Loose Teeth – Dentition D											
<i>Maxillary</i>											
P2, possible	-1	-0	-0		-0	-1		3/2			9
M2 or M3	-1	-0	-0		-0	-0		2-3/1-2			
<i>Mandibular</i>											
M, unisided	1	3oc	2		0	9	1?/9		9		
Surface Collection: Subadult A											
<i>Maxillary</i>											
dc	1+7/-										
<i>Indeterminate</i>											
di, unisided	1+7								0		
Surface Collection: Subadult B-1											
<i>Maxillary</i>											
dm1	-1	-0	-0		-0	-0		1/1			0
<i>Mandibular</i>											
dm1	1/-	0/-	0/-		0/-	0/-	1/1		0		
Surface Collection: Subadult B-2											
<i>Mandibular</i>											
dm1	1/-	0/-	0/-		0/-	0/-	1/1		0		
Surface Collection: Subadult C											
<i>Maxillary</i>											
M1	-1+7										
<i>Mandibular</i>											
di1	5/9										1/9
di2	5/9										1/9
dc	5/9										1/9

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
Surface Collection: Subadult C continued											
<i>Mandibular continued</i>											
dm1	2/5	0/-	0/-	1/9	0/-	0/-	1/1	1/1	2		
dm2	2/2	2oc/1oc	0/0	1/9	9/9	0/0	1/1	1/1	2	0	
M1	7/7			1/1							
M2	7/7			1/1							
Surface Collection: Subadult D											
<i>Maxillary</i>											
di1	-2	-0	-0	-9	-0	-0		1/1		9	
di2	1/2	0/0	0/0	-9	0/0	0/0	1/1	1/1	9	9	
dc	-2	-0	-0	-1	-0	-0		1/1		9	
dm1	1/2	0/0	0/0	-1	0/9	0/0	1/1	1/1	9	9	
dm2	1/2	0/0	0/0	-1	0/9	0/0	1/1	1/1	9	9	
M1	-5+7										
I1	-7										
<i>Mandibular</i>											
dc	1/-	0/-	0/-		0/-	0/-	1/1		9		
dm1	1/-	0/-	0/-		0/-	0/-	1/1		9		
dm2	1/-	0/-	0/-		0/-	0/-	1/1		9		
Surface Collection: Subadult F											
<i>Maxillary</i>											
di1	-1	-9	-0		-0	-9		2-3/1-2		9	
di2	-5			-1							
dc	-2	-0	-0	-1	-0	-0		4/2			
dm1	-2	-0	-0	-1	-9	-0		2-3/1			
dm2	-2	-0	-0	-1	-9	-0		1-2/1			
M1	-2	-1li	-0	-1	-9	-0		1/1			
M2	-7			-1							
I1	-7			-1							
I2	-7			-1							
Surface Collection: Subadult G-1											
<i>Maxillary</i>											
I1	1/-	0/-	0/-		9/-	9/-	1-2/1		9		
I2	1/-	0/-	0/-		0/-	1/-	1-2/1		9		
M2, probably	1/-	0/-	0/-		0/-	9/-	1-2/1		9		

Table 7. continued.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm) L/R
							degree/form Left	degree/form Right	type/no. Left	type/no. Right	
Surface Collection: Subadult C, E, F, G-1, or G-2											
<i>Maxillary</i>											
M1 or M2	1+7/-										
Surface Collection: Subadult H											
<i>Maxillary</i>											
I1	1/5	0/-	0/-	-9	0/-	1/-	2/2		9		
I2	-2	-0	-0	-1	-0	-0	2/2			0	
C	-2	-0	-0	-1	-0	-0	1/1			9	
P1	-2	-0	-0	-1	-9	-0	1/1			9	
P2	-2	-0	-0	-1	-0	-0	1/1			9	
<i>Mandibular</i>											
C	1/-	0/-	0/-		1/-	1/-	2/1-2		4/4		9
M2	-1	-0	-0		-0	-0	1/1				
Surface Collection: Subadult G-1, G-2, or H											
<i>Maxillary</i>											
C	1/-	0/-	0/-		0/-	1/-	1/1		4/1		9
<i>Mandibular</i>											
C	-1	-0	-0		-9	-1	1/1				
M1 or M2	1/-	1, 1bu/-	0/-		0/-	0/-	2/1-2		0		
Surface Collection: Subadult I											
<i>Maxillary</i>											
I1	-5			-9							
I2	-5			-9							
C	-5			-1							
P1	-2	-0	-0	-1	-1	-1	1/1			0	
P2	-5			-1							
M1	-2	-0	-0	-1	-9	-1	1/1			9	
M2	-2	-0	-0	-1	-9	-1	1/1			9	
M3	-5+7			-1							

^a crown only due to postmortem damage

^b enamel broken off postmortem

^c roots broken postmortem

^d crown broken off postmortem

Key on following page.

Table 7. continued.

Key:

Status

- 1 = present, tooth only
- 2 = present, tooth in socket
- 3 = antemortem loss (socket resorbing)
- 4 = antemortem loss (socket resorbed)
- 5 = postmortem loss
- 6 = partial eruption
- 7 = unerupted
- 8 = congenital absence
- 9 = unknown

Caries

- 0 = absent
- 1 = pit or slight fissural beginning
- 2 = pit to 1/2 of surface destroyed
- 3 = destruction of 1/2 or more of surface
- 4 = complete destruction of crown
- 9 = unknown

oc = occlusal

bu = buccal

li = lingual

int = interproximal

Pulp exposure

- 0 = absent
- 2 = due to carious lesion

Alveolar abscess

- 1 = absent
- 2 = periodontal abscess with destruction of alveolar crest
- 3 = periapical abscess with perforation of cortex or bone destruction
- 4 = tooth abscessed out
- 5 = antemortem tooth loss with bone resorbed
- 9 = unknown

Hypercementosis

- 0 = absent
- 1 = present, slight
- 2 = present, moderate to severe
- 9 = unknown

Calculus

- 0 = absent
- 1 = slight or flex
- 2 = moderate, up to 1/2 crown covered
- 3 = heavy, over 1/2 crown covered
- 4 = 3-dimensional
- 9 = unknown

Attrition degree (Hinton 1981)

Incisors and canines

- 1 = unworn to polish or small facets (no dentin exposure)
- 2 = hairline of dentin exposure
- 3 = dentin line of distinct thickness
- 4 = moderate dentin exposure
- 5 = large dentin area with enamel rim complete
- 6 = large dentin area with enamel rim lost on one side
- 7 = enamel rim lost completely
- 8 = severe loss of crown height
- 9 = degree cannot be coded

Premolars

- 1 = unworn to polish or small facets (no dentin exposure)
- 2 = moderate cusp removal
- 3 = full cusp removal and/or moderate dentin patches
- 4 = at least one large dentin exposure on one cusp

- 5 = two large dentin exposures, may be slight coalescence
- 6 = dentinal exposures coalesced, enamel rim still complete
- 7 = full dentin exposure with loss of enamel rim on at least one side
- 8 = severe loss of crown height

Molars

- 1 = unworn to polish or small facets (no dentin exposure)
- 2 = moderate cusp removal
- 3 = full cusp removal and/or some dentin exposure, pinpoint-moderate
- 4 = several large dentin exposures, still discrete
- 5 = two dentinal areas coalesced
- 6 = three dentinal areas coalesced/four coalesced with enamel island
- 7 = dentin exposed on entire surface
- 8 = severe loss of crown height
- 9 = degree cannot be coded

Attrition form (Hinton 1981)

- 1 = natural face or slightly blunt
- 2 = flat
- 3 = cupped on half to 3/4 of surface
- 4 = entire surface cupped

Enamel defect type

- 0 = normal
- 2 = opacity (yellow/brown)
- 3 = hypoplasia (pits)
- 4 = hypoplasia (horizontal grooves)
- 7 = discolored enamel (not opacity)
- 8 = other defects
- 9 = unknown

Table 8. Dental Metrics (mm), 13PM248, Plymouth County, Iowa.

Tooth	Maxillary			Mandibular		
	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R
Feature 1: Adult 1-1						
C				6.7/-	8.4/-	4.7/-
P1				6.6/-	7.8/-	4.9/-
P2	6.4/-	9.0/-	4.2/-	7.5/-	8.8/-	5.8/-
M1	10.4/-	12.2/-	4.5/-	10.9/-	10.5/-	4.7/-
M2	10.3/-	12.2/-	5.6/-	-/10.8	-/11.0	-/4.7
M3				10.7/9.2	10.2/10.7	4.9/5.3
Feature 1: Adult 1-3						
I1	8.2/8.3	7.3/7.2	4.6/5.6	3.7/3.6	5.9/5.8	-/-
I2	6.2/7.3	6.7/6.7	5.8/7.7	4.3/4.3	6.0/6.1	-/-
C	7.6/7.8	8.0/8.3	6.8/8.8	6.8/6.8	8.1/8.3	5.8/5.9
P1	7.0/6.7	9.5/9.6	6.2/7.1	6.4/6.4	8.3/8.1	5.7/6.0
P2	6.7/6.5	9.6/9.9	6.4/6.9	7.1/7.0	9.0/9.0	6.2/5.9
M1	10.7/(10.0)	-/12.4	(6.1)/5.7	-/11.4	-/11.8	-/4.3
M2	10.6/10.4	11.7/11.4	6.0/6.7	11.5/11.4	11.3/11.2	5.7/5.4
M3	8.9/8.4	11.1/11.3	6.4/6.8	10.6/10.2	11.0/10.9	5.8/5.7
Feature 1: Subadult 1-1						
di1	6.6/6.6	5.0/5.0	5.5/5.5			
di2	-/4.2	-/4.2	-/5.6			
dc	6.9/7.3	5.7/5.9	6.0/6.0	6.0/5.9	5.4/5.5	6.7/6.7
dm1	6.6/6.6	8.3/8.6	4.6/4.8	8.0/8.0	6.8/6.9	5.9/5.6
dm2	8.9/8.9	10.1/10.1	5.8/5.9	10.4/10.5	8.7/9.0	5.8/5.9
Feature 2: Adult 2-1						
I1	8.1/7.8	6.7/6.8	9.9/10.3	5.0/5.1	5.3/5.3	7.4/7.9
I2	6.9/7.2	6.8/6.8	9.7/9.2	5.6/5.8	5.8/5.7	8.7/8.2
C	8.0/8.0	8.2/8.4	8.6/9.4	6.6/6.5	7.3/7.4	9.2/9.3
P1	7.3/7.2	9.4/9.3	7.4/7.2	7.0/7.1	8.2/7.9	7.4/7.3
P2	6.7/6.7	8.2/8.3	6.9/6.5	7.6/7.3	8.2/8.2	7.4/7.1
M1	10.8/10.7	11.6/11.5	6.9/7.0	12.3/12.1	11.1/11.4	6.6/6.4
M2	9.6/9.7	10.7/10.8	6.7/6.7	11.4/10.9	10.5/10.4	6.7/6.4
M3				-/7.8	-/8.1	-/6.0
Feature 2: Adult 2-2						
M3	-/9.8	-/10.9	-/5.9			
Feature 3: Miscellaneous Adult						
C				(7.0)/-	7.1/-	
P1				(6.4)/-	(8.0)/-	
P2				6.9/-	9.1/-	
Feature 4: Adult 4-2						
M3	10/-	11.2/-	(12.7)/-			
Feature 4: Subadult 4-5						
I1	-/7.2	-/6.5	-/(9.2)			
I				-/6.5	-/5.8	-/9.7
Feature 5: Subadult 5-2						
dc	6.7/-	5.5/-				
dm2	9.3/-	9.5/-	(6.1)/-			
I2	7.3/-	6.2/-	9.9/-			
C	7.7/-	7.8/-	10.2/-			
P1	7.1/-	8.8/-	8.2/-			
P2	7.7/-	9.3/-	7.1/-			
Possibly Feature 5: Possibly Adult						
I2	(6.7)/-	6.1/-				
M1 or M2				-/12.3	-/11.1	
Possibly Feature 5: Subadult 3						
dm1				8.3/-	6.8/-	7.1/-

Table 8. continued.

Tooth	Maxillary			Mandibular		
	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R
Feature 6: Subadult 6-2						
dc	6.6/(6.5)	5.3/5.1	7.1/7.0			
dm1	6.9/6.7	8.1/8.2	-/6.2			
dm2	8.7/-	9.3/-	6.9/-			
Feature 6: Subadult 6-5						
di1	(6.7)/-					
I1	8.6/8.6	6.7/6.7	9.8/10.8	5.7/5.4	5.3/5.3	9.4/9.4
I2	7.2/-	6.1/-	9.9/-	6.0/-	5.7/-	9.3/-
P1	6.9/-	9.5/-	7.5/-	6.9/-	7.4/-	8.5/-
P2	7.0/-	9.4/-	7.2/-			
M1	10.6/10.8	11.1/11.3	7.4/7.4	8.4/-	6.7/-	
M2	9.0/9.1	10.6/10.9				
Feature 6: Subadult 6-6						
di1	-(6.6)					
di2	4.8/4.6	4.1/3.8			4.7/-	
dc	6.3/6.2	5.8/5.1		7.1/-	6.1/-	
dm1	7.8/7.8	7.2/8.0				
dm2	10.7/10.7	9.3/9.1		-/9.3	-/10.5	
M1	11.8/12.3	11.1/11.2	7.0/7.4	-/10.6	-/12.2	-/6.9
Feature 6: Subadult 6-7						
P, unisided				7.4	9.2	7.3
Feature 6: Subadult 6-3 through 6-7						
M	-/9.1	-/10.9				
Feature 7: Adult 7-1						
M1				-/(10.8)	-/(11.1)	
M2		-/12.2		12.2/-	11.6/-	
M3	9.8/-	11.5/-		-/12.2	-/11.0	
Possibly Feature 7: Miscellaneous Adult						
M2	10.1/-	12.6/-				
M3	9.2/-	11.8/-	(7.6)/-			
P2	-/9.6	-/10.2				
M1	-/11.0	-/12.4				
M2	-/10.9	-/12.4				
M3	-/9.8	-/12.0	-/(6.5)			
Possibly Feature 10: Subadult 10-2						
di1	-/4.5	-/4.1				
Feature 11: Subadult 11-1						
di1	6.8/6.7	5.1/5.2		5.4/5.5	5.0/5.0	
dc	6.8/6.7	5.8/5.6		5.7/5.8	5.4/5.5	
dm1	7.2/7.2	9.0/9.2		7.5/7.7	7.6/7.3	
dm2	9.4/9.4	10.1/10.2		10.6/10.7	9.3/9.1	
I1	8.7/8.8	7.5/7.5	11.5/11.6	5.7/5.4	5.8/5.9	9.8/9.8
I2	-/7.8	-/7.1	-/10.0	6.0/-	6.4/-	9.3/-
C	-/8.0	-8.6	-/10.7	7.5/-	7.7/-	10.2/-
P1	-/7.6	-/9.9				
P2	7.5/7.7	9.8/10.0	8.4/-			
M1	11.5/-	11.5/-	7.8/-	12.0/-	10.9/-	8.2/-
M2	11.1/-	12.0/-				

Table 8. continued.

Tooth	Maxillary			Mandibular		
	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R
Feature 12: Max L1/R1						
I1	-(7.6)	-/7.3				
I2	-(6.0)	-/6.7				
C	(7.4)/(7.3)	8.4/8.1				
P1	6.5/7.2	9.3/9.3				
P2	6.5/6.7	9.1/9.2				
M1	10.2/10.0	11.5/11.3				
M2	-/9.9	-/12.1				
Feature 12: Max L2/R2						
P2	7.3/-	9.4/-				
M2	10.3/-	11.0/-	(6.7)/-			
Feature 12: Mand 1						
M3				-/11.7	-/10.7	
Feature 12: Mand 2						
I2				6.8/6.5	6.2/6.3	
C				7.5/-		(11.5)/-
P1				7.8/-	7.4/-	9.0/-
P2				8.1/-	8.5/-	8.7/-
M2					10.6/-	(7.5)/-
Feature 12: Mand 3						
M1				11.9/-	11.4/-	
Feature 12: Mand 4						
I1				-/4.9	-/5.9	
I2				-/5.4	-/6.1	
C				-/6.4	-/7.5	
P1				-/6.2	-/7.5	
P2				-/5.9	-/7.4	
M1				-/10.5	-/10.1	
M2				-/10.1	-/9.4	
Feature 12: Loose Teeth, Slight Wear						
I, unsided	6.7	6.2				
M2				10.8/-	10.0/-	(6.5)/-
M3	-/10.1	-/11.7				
Feature 12: Loose Teeth, Moderate to Severe Wear						
I1	(8.0)/-	7.2/-				
I, unsided, poss. max.		6.3				
C	8.3/-	8.6/-				
P	-/6.6	-/8.7				
P		-/9.3				
P, unsided	(5.9)	(8.9)				
M1 or M2				11.7/-	11.2/-	
M1 or M2				-/10.8	-/10.0	
M1 or M2				-/11.2	-/10.7	
Feature 12: Subadult 12-2						
dm1				-/7.4	-/7.3	-/6.6
Feature 12: Subadult 12-3						
dc				6.2/-	5.5/-	6.9/-
dm1				-/8.4	-/7.3	-/6.5
Feature 12: Subadult 12-2 or 12-3						
di2	6.4/-	4.5/-	6.1/-			
Feature 12: Subadult 12-5						
dm2	9.0/-	9.5/-	(6.3)/-			
M1 or M2				-/11.2	-/10.7	

Table 8. continued.

Tooth	Maxillary			Mandibular		
	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R
North Slope: Max L1&R1						
I1	-8.1	-7.5				
I2	-6.9	-6.5				
C	-7.9	-8.6				
P1	6.7/6.7	9.0/9.4				
P2	-6.4	-9.4				
M1	10.1/(9.8)	12.2/(12.1)				
M2	10.3/-	12.5/(11.8)				
North Slope: Max L2&R2						
I1	7.1/7.1					
I2	-6.2					
C	9.1/-					
M1	11.1/-	12.5/-				
North Slope: Max L3&R3						
I1	9.0/-	7.3/-				
I2	8.0/-	6.8/-				
P1	7.3/-	9.3/-				
M1	-10.9	-12.2				
M2	-10.3	-12.4				
North Slope: Max L4						
I2	(6.5)/-	6.1/-				
C	(7.5)/-	7.9/-				
P1	6.8/-	9.5/-				
P2	5.8/-					
M1	(9.1)/-	11.4/-				
North Slope: Max L5						
I1		6.7/-				
I2		6.3/-				
C	(6.6)/-	8.5/-				
P1	(6.4)/-	9.5/-				
P2		10.0/-				
North Slope: Max L7						
M1	(12.3)/-	10.7/-				
M2	(11.7)/-	10.9/-				
M3	11.9/-	10.5/-				
North Slope: Max R4						
I2		-7.7				
C		-6.2				
P1	-7.3	-9.3				
P2	-6.5	-8.8				
M1	-9.7	-11.5				
M2	-(9.8)	-10.6				
North Slope: Max R5						
I1	-9.5	-7.6				
P1	-7.9	-9.8				
P2	-7.3	-10.1				
M1	11.4/11.0	12.3/12.4				
M2	11.3/-	12.4/-				
North Slope: Max R6						
I2		6.9/-				
C	-8.2	-7.4				
P1	-6.8	-9.7				
P2	-6.9					
M1	-10.1	-11.7				

Table 8. continued .

Tooth	Maxillary			Mandibular		
	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R
North Slope: Max R7						
M2	-/11.4	-/12.6	-/7.5			
M3	-/9.1	-/12.4	-/7.1			
North Slope: Mand 1						
C				(6.1)/-	7.4/-	
P1				6.4/-	7.2/-	
P2				7.2/7.0	8.1/8.1	
M2				10.4/10.9	10.0/9.6	
M3				11.2/11.0	10.2/10.2	
North Slope: Mand 2						
P1				6.9/-	7.0/-	
P2				7.0/-	7.8/-	
M1				10.9/-	10.2/-	
M2				10.7/-	9.9/-	
M3				10.4/-	9.9/-	
North Slope: Mand 3						
I2				-/6.2	-/(6.2)	
C				7.0/7.2	-/(8.1)	
P2				7.1/7.6	9.0/9.0	
M1				-/11.1	-/11.6	
M2				10.9/10.8	(11.2)/11.0	
M3				12.1/11.4	(11.0)/11.0	
North Slope: Mand 4						
I1				5.9/(5.5)	5.6/5.5	
I2				-/6.7	-/6.5	
C				-/7.3	-/8.3	
P1				-/7.4	-/8.4	
P2				-/7.9	-/9.4	
North Slope: Mand 5						
I2					5.7/-	
C					-/(8.1)	
P1				-/6.7	-/7.5	
P2				-/7.2	-/8.5	
North Slope: Mand 6						
M1				11.6/11.5	10.4/10.9	
North Slope: Mand 7						
C				7.6/-	(8.8)/-	
P1				6.9/-	7.7/-	
P2				7.1/-	8.2/-	
M1				12.0/-	11.2/-	
M2				11.4/-	11.4/-	
North Slope: Mand 8						
P2				7.5/-	8.1/-	
M2				10.6/-	10.8/-	
M3				11.7/-	10.7/-	
North Slope: Adult Loose Teeth						
I1 (1)	(8.5)/-	7.1/-				
I2 (2)	-/8.1	-/6.8				
I2 (3)	-/(7.0)	-/6.5				
I2 (5)	6.7	(8.3)				
I2 (6)	(7.2)	6.6				
I2 (7)	(7.4)	6.7				
I (8)	(6.5)					
I (9)		7.1				
I (10)		6.0				

Table 8. continued.

Tooth	Maxillary			Mandibular		
	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R
North Slope: Adult Loose Teeth continued						
I (11)		5.9				
I (12)		7.7				
C (13)	(7.5)/-	7.7/-				
C (14)		8.1/-				
C (15)		8.0/-				
C (17)		8.2				
I or C (18)		8.2				
I or C (19)		6.9				
P (20)	7.2/-	10.6/-				
P (21)	-7.6	-10.1				
P (22)	6.4	9.2				
P (26)		(9.4)				
P (27)	7.6	9.9				
P (28)	7.0	9.7				
P (29)	6.4	9.1				
M1 or M2 (31)	9.0/-	11.3/-				
M1 or M2 (32)	9.2/-	11.3/-				
M1 or M2 (33)	10.0/-	11.2				
M1 or M2 (34)	-9.9	-12.5				
M3 (35)	10.0/-	11.6/-				
M3 (36)	9.1/-	10.2/-				
M3 (37)	-10.2	-11.4	-(7.5)			
I2 (38)				-6.2	-6.2	
I2 (39)				-6.7	-6.7	
C (41)				-7.4	-8.4	
C (42)				-7.5	-7.8	
C (43)				6.5	(7.2)	
P2 (45)				-8.0	-9.0	
P (46)				6.8	8.2	
P (47)				6.6	7.6	
P (48)				6.4	7.5	
P (49)				7.5	8.6	
M2 (52)				12.2/-	12.1/-	
M1 or M2 (53)				11.6/-	11.5/-	
M1 or M2 (54)				11.3/-	10.8/-	
M3 (55)				10.3/-	10.5/-	
I, unidentified (58)		(6.5)				
single-rooted, unidentified (69)		7.1				
North Slope: Subadult NS-6						
dc	7.0/-	5.8/-				
dm2	9.5/-	10.5/-	6.9/-			
North Slope: Subadult NS-7						
dc	6.8/-	10.0/-	6.2/-			
dm2	9.5/-	10.4/-				
North Slope Subadult NS-8						
dc	6.1/-	5.5/-	7.8/-			
dm2	9.9/-	10.0/-	6.3/-			
North Slope: Subadults 6-8 (Max1/Mand1)						
dm1	-6.8	-8.5	-5.8			
dm2				-10.4	-8.8	

Table 8. continued.

Tooth	Maxillary			Mandibular		
	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R
North Slope: Subadults 6-8 (young age estimate, MNI=2)						
di1	6.1/-	4.0/-	5.8/-			
di1	7.2/7.3	5.4/5.4	7.2/7.4			
di2	-/5.8	-/4.9	-/5.7			
dm1	7.0/7.1	8.3/8.5	6.2/-	8.2/-	6.6/-	(6.8)/-
dm1	-/7.0	-/8.6		8.3/-	5.7/-	
North Slope: Subadults 6-8 (slightly older child, MNI=2)						
dc				-/6.0	-/5.4	-/7.4
dm2				-/11.2	-/9.2	-/6.8
dm2				-/9.1	-/8.0	-/8.0
North Slope: Subadult NS-9						
di1	(6.4)/-	4.6/-				
North Slope: Subadult NS-10						
di1	6.8/-	4.8/-	(6.4)/-			
di2	5.8/-					
dc	-/6.3	-/5.2	-/6.4			
dm1	7.3/-	8.6/-	5.7/-			
dm2	9.4/-	10.0/-	6.6/-			
North Slope: Subadult NS-9 or NS-10						
di2				5.0/4.9	4.8/4.2	
North Slope: Subadult NS-11						
I1, unsided	9.0					
I				5.5/-	5.4/-	9.8/-
dm1				8.6/-	7.1/-	
dm2	9.6/-	10.7/-	7.0/-	10.1/-	8.5/-	
North Slope: Subadult NS-12						
I1	9.1/-	7.1/-	10.6/-			
C	7.3/-	8.7/-	11.1/-			
dm1				-/8.5	-/7.6	
dm2				-/11.1	-/9.4	
North Slope: Subadult NS-13						
dc	-/6.6	-/5.5				
dm1	-/7.5	-/9.0				
dm2	-/9.7	-/11.0	-/(6.3)			
North Slope: Subadult NS-14						
I1	8.6/-	7.1/-	11.9/-			
C	8.7/8.5	9.1/9.1	12.8/13.2			
P1	-/7.8	-/9.4	-/9.4	7.6/-	8.6/-	9.7/-
P2	8.0/-	9.8/-	8.0/-			
M1	11.5/11.8	12.4/12.3	8.3/8.3			
dm2	-/10.2	-/11.0		-/10.0	-/8.7	
North Slope: Subadult NS-15						
C	7.2/-	7.1/-	11.2/-			
P				7.3/-	8.2/-	9.7/-
P1 or P2	-/7.9	-/9.7	-/7.2			
P1 or P2	-/7.3	-/9.4	-/8.4			
M2				11.5/-	10.1/-	(8.7)/-
North Slope: Subadult NS-16						
C	7.3/-	7.9/-	13.3			
North Slope: Subadult NS-17						
P1	6.9/-	9.8/-	9.1			
P2	6.5/-	8.5/-	8.4/-			
M1	10.3/-	11.8/-				

Table 8. continued.

Tooth	Maxillary			Mandibular		
	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R
North Slope: Subadult NS-17 or NS-18						
P2	-7.0	-9.1	-8.7			
North Slope: Subadults NS-14 through NS-18						
dm2	10.3/-	11.0/-	(7.1)/-			
dm2		-10.8				
dm2	-7.6	-9.3				
M1 or M2	11.6/-	12.1/-	7.7/-	10.3/-	10.2/-	7.1/-
M1 or M2	-10.8	-11.2	-(6.0)			
North Slope: Subadult NS-19 or NS-20						
I1 or I2				5.7/-	5.8/-	
I2	-7.7	-6.9	-(9.1)			
P	-7.5	-9.3	-8.1			
M1				-11.5	-10.9	
M2				-12.0	-11.7	-6.6
North Slope: Subadult NS-21						
C	-8.5	-8.7				
North Slope: Subadult NS-22						
C	-8.5	-9.1				
North Slope: Subadult NS-21 or NS-22						
C	8.5/-	9.0/-				
M1	10.6/-	11.8/-	(7.6)/-	11.0/-	10.8/-	
M2	9.9/-	10.7/-	(7.7)/-	12.9/-	11.3/-	
M2	10.5/-	11.6/-	(6.5)/-	-11.9	-10.8	
M3				-8.9	-10.2	-5.7
North Slope: Subadult NS-23						
C				-6.4	-6.6	
P1				-5.9	-7.1	
P2				-6.3	-7.5	
P	-6.8	-9.6				
North Slope: Misc. Subadult Newborn to Older Child						
M				-10.7	-9.3	
North Slope: Misc. Subadult Young Child						
dm1	6.8/-	7.9/-				
North Slope: Misc. Subadult Child						
I1	-9.0	-7.2				
M1 or M2				-11.3	-10.0	-(7.7)
North Slope: Misc. Subadult Child to Juvenile						
C	8.6/-	8.7/-				
P				-8.9	-9.0	
M	10.7/-	11.9/-	8.0/-			
M1 or M2	-10.4	-11.9		11.0/-	10.3/10.2	
No Feature 102N86E						
<i>Adult incomplete mandible</i>						
C				-7.6	-7.9	(9.4)
<i>Adult mandible fragment</i>						
P				7.2/-	8.3/-	7.6/-
No Feature 114N94E						
<i>Adult</i>						
P1				6.6/-	8.0/-	
P2				6.4/6.7	8.0/7.9	
M1				11.6/11.7	10.9/10.9	
M2				11.6/11.3	10.6/10.5	(7.2)/-
M3				11.0/10.7	10.7/10.0	(6.5)/7.5
<i>Subadult 3</i>						
I2	-8.5	-6.9	-10.8			

Table 8. continued.

Tooth	Maxillary			Mandibular		
	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R
Surface: Max L1						
P1	7.1/-	10.0/-				
P2	6.9/-	9.9/-				
M1	11.2/-	12.7/-				
Surface: Mand 1						
P2				6.9/6.8	8.5/8.2	
M1				12.2/11.0	11.0/10.9	
M2				11.6/10.3	11.0/10.0	
M3				13.3/11.7	11.2/10.0	(7.6)/7.8
Surface: Mand 3						
M1				-(10.5)	-(10.4)	
M2				-(10.7)	-(10.0)	
M3				-(9.9)	-(9.2)	
Surface: Mand 4						
M1				-/10.1		
M2				-(11.3)	-(10.5)	
M3				-(11.1)		
Surface Loose Teeth: Dentition A						
M1 or M2	(10.1)/-	12.3/-				
Surface Loose Teeth: Dentition B						
M1	-(9.9)	-(11.4)				
M2		(10.9)				
Surface: Subadult A						
<i>Maxillary or Mandibular</i>						
di, unsided	5.3	5.2	9.0			
Surface: Subadult B-1						
dm1	-/7.7	-/10.0	-/6.5	8.9/-	7.6/-	6.4/-
Surface: Subadult B-2						
dm1				8.0/-	6.9/-	7.0/-
Surface: Subadult C						
dm1	-/10.9	-/11.2	-/6.9	9.0/-	6.9/-	6.8/-
dm2				10.4/10.6	9.0/8.8	6.6/6.5
Surface: Subadult D						
di1	-/7.5	-/5.4	-(6.4)			
di2	5.4/5.5	5.2/5.1	5.9/6.0			
dc				6.3/-	6.1/-	7.8/-
dm1	7.5/7.5	9.3/9.6	6.6/(6.9)	8.5/-	7.9/-	6.4/-
dm2	10.1/10.3	10.6/10.7	7.4/(6.9)	11.2/-	9.7/-	7.0/-
Surface: Subadult F						
dc	-/7.2	-/6.0				
dm1	-/7.4	-/8.6				
dm2	-/9.6	-/10.7				
M1	-/11.5	-/12.2	-/7.7			
Surface: Subadult G-1						
I1	9.2/-	7.2/-	(10.7)/-			
I2	7.6/-	7.0/-	(8.0)/-			
M2	10.3/-	10.7/-	(7.0)/-			
Surface: Subadult H						
I1	8.5/-	(7.1)/-				
I2	-/6.8	-/6.5	-(8.3)			
C	-/8.4	-/8.8	-(10.6)	8.2/-	8.5/-	
P1	-/6.5	-/9.2	-(8.3)			
P2	-/6.8	-/8.9	-(7.4)			

Table 8. continued.

Tooth	Maxillary			Mandibular		
	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R
Surface: Subadult G-1, G-2, or H						
C	8.3/-	9.0/-	10.8/-	-/8.5	-/8.3	-/(10.5)
M1 or M2				-/12.5	-/11.2	-/(6.1)
Surface: Subadult I						
P1	-/7.9	-/10.1				
M1	-/11.3	-/11.8				
M2	-/11.1	-/12.0				

Note: () indicates approximated measurements

Table 9. Enamel Hypoplastic Defects Measurements (mm), 13PM248, Plymouth County, Iowa.

	Maxilla				Mandible			
	Quad 1	Quad 2	Quad 3	Quad 4	Quad 1	Quad 2	Quad 3	Quad 4
Feature 1: Adult 1-1								
C, left						2.4, 3.9		
Feature 1: Adult 1-3								
I2, right				5.9				
C, left		3.9-5.3						
C, right		4.3	6.2					
P1, left	1.6	3.2						
M2, left		2.9						
M2, right		2.6						
Feature 2: Adult 2-1								
I1, right		3.3	6.7			4.0	5.3	
P1, left		3.3				4.1		
P1, right		3.1						
P2, left						3.1		
M1, right		3.4						
M2, left						3.2		
M2, right		4.1						
Feature 5: Subadult 5-2								
I2, left	1.7	2.5						
C, left		2.5, 3.3						
P1, left		2.2-3.0						
P2, left		2.0						
Feature 6: Subadult 6-5								
I1, left		3.4	4.1					
I1, right		3.4	4.0					
I2, left		3.0	5.5					
P1, left		2.4						
P2, left		2.8						
M1, left		3.1						
Feature 6: Subadult 6-6								
M1, right	1.7							
Feature 11: Subadult 11-1								
C, left					1.8			
Feature 12: Mand 2								
C, left					1.5	2.8, 4.0		
Feature 12: Adult Loose Tooth								
P, right						2.6		
North Slope: Max L1&R1								
I1, right		3.7	5.4					
I2, right	2.3	4.2						
North Slope: Max L6								
I2, left			6.0					
North Slope: Max R5								
I1, right				7.9				
North Slope: Mand 4								
I2, right							5.3	
C, right						2.7, 4.0		
North Slope: Adult Loose Teeth								
I2, right (3)		4.4						
I2, right (38)							5.4, 6.0	
C, unsided (16)		4.2						

Table 9. continued.

	Maxilla				Mandible			
	Quad 1	Quad 2	Quad 3	Quad 4	Quad 1	Quad 2	Quad 3	Quad 4
North Slope: Subadult NS-11								
I, left					1.9		3.8	
North Slope: Subadult NS-12								
I1, left	1.5	3.0						
C, left			6.7					
North Slope: Subadult NS-14								
I1, left		3.8	6.7					
C, left			5.2, 5.7-6.4					
C, right			5.2, 5.7-7.2					
North Slope: Subadult NS-15								
P, left							3.7	6.1
P, right	1.5							
North Slope: Subadult NS-16								
C, left		3.8	5.4					
North Slope: Subadults 14-18								
M1 or M2, left		2.9						
North Slope: Subadult NS-18, NS-19, or NS-20								
P, right	1.1							
North Slope: Subadult NS-21 or 22								
C, left			4.8					
North Slope: Subadult NS-23								
P2, right					1.6	2.5		
North Slope: Miscellaneous Subadult Child-Juvenile								
M, left	1.1	2.6						
No Feature 114N94E, Subadult 3								
I2, right						2.6-3.3	6.3	
Surface: Dentition C								
I1, left		4.1	6.3	7.1				
Surface: Subadult H								
C, left						2.5	3.7	4.5, 5.3
Surface: Subadult G-1, G-2, or H								
C, left		3.9						

Quads:

- 1 = crown $\frac{3}{4}$ to crown complete
- 2 = crown $\frac{1}{2}$ to crown $\frac{3}{4}$
- 3 = crown $\frac{1}{4}$ to crown $\frac{1}{2}$
- 4 = crown initial to crown $\frac{1}{4}$

Human Skeletal Remains from 13WD402, Siouxland Sand and Gravel Site, Woodbury County, Iowa

Brianna V. Hoffmann

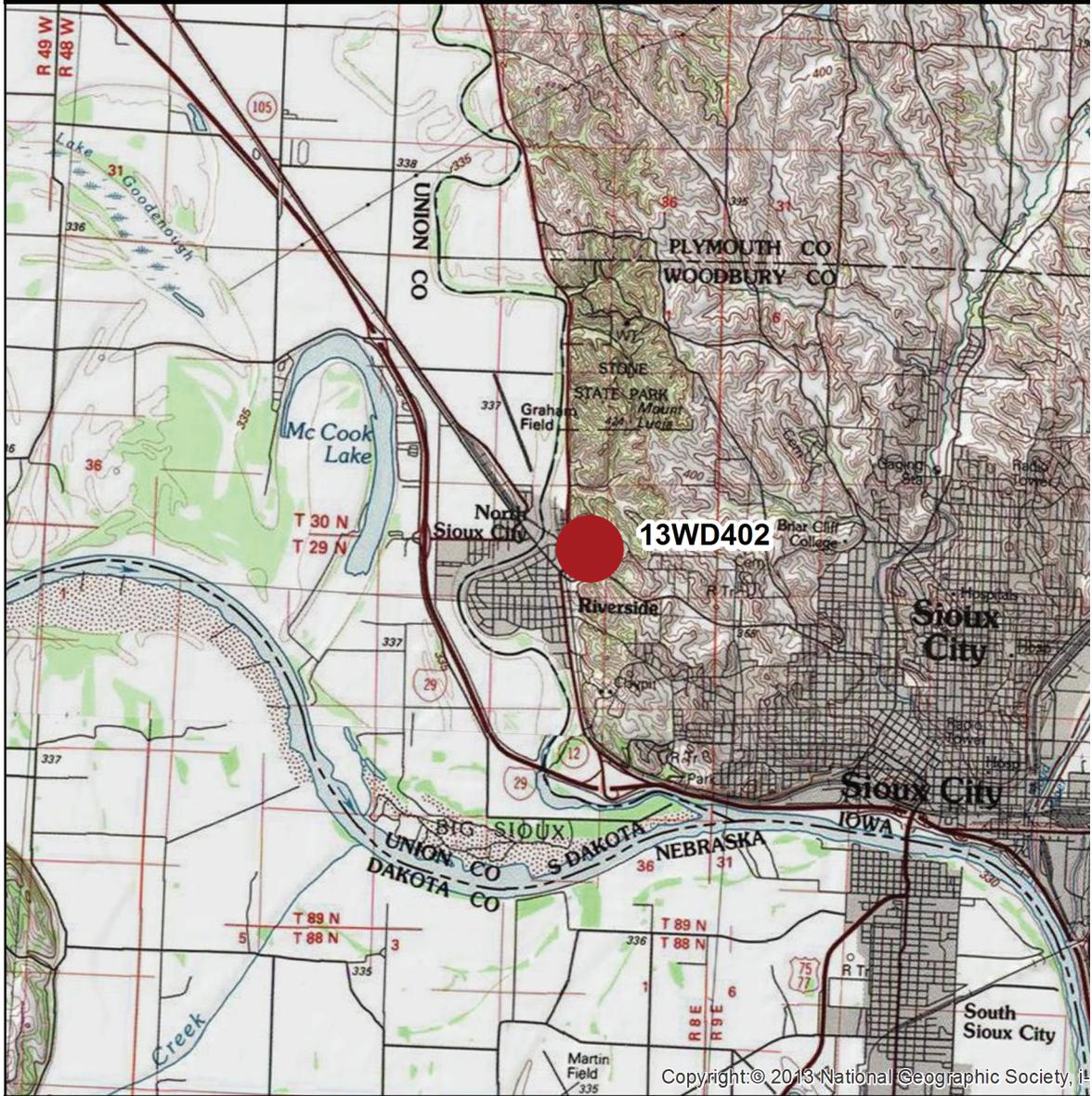
Human skeletal remains from 13WD402 in Woodbury County, Iowa, represent a minimum of 20 individuals. Remains from Burial Project 57 represent two individuals (an older adult and a middle-aged to older adult) previously reported by Duane Anderson and colleagues (1979); however, these individuals do not change their MNI estimate. Remains from Burial Project 2378 in Woodbury County, Iowa, represent a minimum of 20 individuals: 10 adults, and 10 subadults. The 10 adults are one young to middle aged male; one young to middle aged female; three young to middle aged possible females; one possible male of indeterminate age; two possible females of indeterminate age; one older individual of indeterminate sex; and one individual of indeterminate age and sex. The subadults include one infant, four children, and five adolescents. A number of postcranial elements, mostly vertebrae, exhibit varying levels of degenerative joint disease. Notable pathologies include lesions on a clavicle and a femur, possible DISH in three consecutive thoracic vertebrae, healed periostitis in an adult right tibia, and possible rickets in an adult left tibia. 13WD402 is a known Mill Creek cemetery site.

The Siouxland Sand and Gravel site, 13WD402, is located in Section 14, T89N, R48W, Woodbury County, Iowa (Figure 1). Human remains from the site have been disinterred under a variety of circumstances since the 1970s. Other human skeletal remains from 13WD402 have been analyzed and reported on previously by personnel of the University of Iowa Office of the State Archaeologist (OSA) Bioarchaeology Program (Anderson et al. 1979; Fisher 1978, 1980; Lillie 2004, this volume; Lillie and Schermer 1990). A brief history of the site, originally compiled in a previous report (Lillie and Schermer 1990), has been updated and can be found in Appendix A.

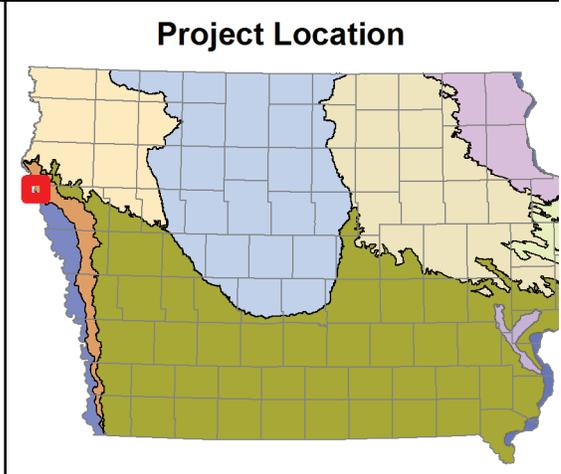
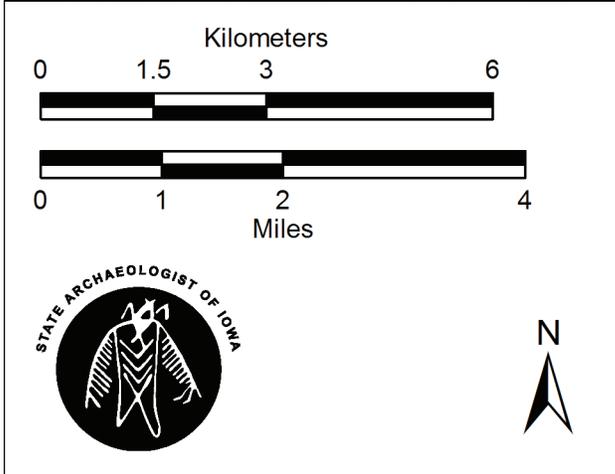
Methods

The osteological analyses follow the guidelines developed by the Paleopathology Association (PA) (Bui-kstra and Ubelaker 1994). Osteological inventories are compiled. Cranial metrics are taken utilizing methods in Moore-Jansen et al. (1994). Cranial nonmetric observations are based on definitions in Finnegan (1972), El-Najjar and McWilliams (1978), Hauser and De Stefano (1989), and Turner et al. (1991). Postcranial metrics are taken following Moore-Jansen et al. (1994) for adults, and Fazekas and Kósa (1978) for subadults. Postcranial nonmetric traits are scored using the definitions in Finnegan (1978) and Saunders (1978). Dental inventories and dental pathologies are presented. Dental attrition is scored using the coding method developed by Scott (1979) and Smith (1984). Dental metrics are taken using the guidelines and landmarks defined by Hillson et al. (2005), Mayhall (1992), and Moorees (1957). Dental morphology is scored using the Arizona State University Dental Anthropology System (Turner et al. 1991). Enamel hypoplastic defects are measured using the procedures outlined by Goodman and Rose. (1990). Descriptions and interpretations of pathological conditions utilize Ortner and Putschar (1985), Ortner (2003), and Mann and

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Murphy (1990), as well as other sources. Age estimates are based on one or more of the following methods: relative dental attrition (for broad age ranges); dental development (AlQahtani et al. 2010); palatal suture closure (Mann et al. 1991); cranial suture closure (Buikstra and Ubelaker 1994; Meindl and Lovejoy 1985); changes in sternal rib ends (Işcan and Loth 1986); changes in the face of the pubic symphysis (Suchey and Katz 1986; Brooks and Suchey 1990); changes in the auricular surface of the innominate (Lovejoy et al. 1985; Meindl and Lovejoy 1989); skeletal maturation (Scheuer and Black 2000; White et al. 2012); skeletal epiphyseal closure (Scheuer and Black 2000); subadult diaphyseal length and ilium breadth (Scheuer and Black 2000; Ubelaker 1989); the presence or absence of age-related osteological changes (White et al. 2012); and comparison with confidently-aged subadult remains in the OSA comparative collection. Sex is estimated based on sexually dimorphic postcranial metrics defined in Bass (1995), and femoral circumference (Black, 1978), as well as morphological characteristics of the cranium (Acsadi and Nemeskeri 1970) and the innominate (Buikstra and Ubelaker 1994; Milner 1992; Phenice 1969). Some descriptions of cranial deformation utilize categories defined by Neumann (1942). Observations regarding the location and function of muscles are based on Netter (2006), and Warwick and Williams (1973). The commingled remains were sorted by element and side and assigned labels to distinguish them. For instance, the humeri were designated Humerus Left 1, Humerus Left 2, etc. and abbreviated HL1, HL2, etc.

Osteological Analysis – Burial Project 57

The remains were found in the OSA Bioarchaeology Laboratory in 2014 following reorganization of the collections. The box was labelled “13WD402 Fisher Material” along with the burial project number 57, which had been assigned in 1978 (University of Iowa, Office of the State Archaeologist [UI, OSA] 1978). The remains had been culled from those reported on previously by Anderson et al. (1979). Dr. Alton K. Fisher was associated with the OSA as a physical anthropologist, although his profession was as a professor of dentistry at the University of Iowa. He had a keen interest in both dental and osseous pathologies. It is likely he retained these particular elements for further study. A skeletal inventory and the ossuary designations of the material are outlined in Table 1. Dental inventories and metrics can be found in Tables 2 and 3. The remains from Burial Project 57 have been previously reported on by Anderson et al. (1979).

ADULT 1

Adult 1 is represented by an incomplete fifth lumbar vertebra (L5Vert1 vertebra) and a complete sacrum. The L5 vertebra is missing the left transverse process and exhibits some postmortem damage to the right transverse process, the articular facets, and the vertebral body. Severe osteophytic lipping is present on the anterior and lateral portions of both the superior and inferior aspects of the vertebral body. This lipping increases the transverse diameter of the vertebral body by 4 to 11 mm superiorly, and 3 to 13 mm inferiorly. Pronounced porosity is present on the superior and inferior surfaces of the vertebral body, with some areas of macroporosity on the inferior surface. The L5 vertebra also exhibits marked osteophytic lipping on the superior articular facets and on the left inferior articular facet. Lipping is also present on the right inferior articular facet, but is less severe than the lipping on the other three facets. The sacrum exhibits some postmortem damage to the distal tip and along the left side of the bone in the region of the third and fourth bodies. Severe osteophytic growth matching that of the L5 vertebra is present around the anterior and lateral portions of the sacral base, with both micro- and macroporosity occurring on the sacral base. The growth around the sacral base increases the transverse diameter by between 10 and 13 mm. Lipping is also present around the superior articular facets and the border around the auricular surface. The auricular surface itself is irregular and uneven. The marked osteophytic development on the L5 vertebra and the sacrum suggests that the two elements were in the process of ankylosing. One small area on the left side of the vertebral and sacral bodies may have been ankylosed at some point, but has broken apart postmortem. Based on the

extent of osteoarthritis and remodeling, Individual 1 was likely a middle-aged to older adult. Both the sacral index and the base-wing index were calculated for the determination of sex, and yielded conflicting results. The sex of the individual is, therefore, indeterminate.

ADULT 2

Adult 2 is represented by a fifth lumbar vertebra (L5Vert2). The bone is darker in color than other elements in the collection with some postmortem damage to the cortex. Most erosion appears to be degenerative, not taphonomic. Moderate porosity is present on the superior and inferior surfaces of the vertebral body with some bony spicules near the posterior margin of the superior surface. Larger, more pronounced spicules are present on the posterior half of the inferior surface of the vertebral body. The annular ring on the superior surface is still intact. The vertebra exhibits marked osteophytic lipping on the anterior margins of the superior and inferior surfaces of the vertebral body. Pronounced lipping is also present on the superior articular facets, particularly the left superior facet. The inferior articular facets have less pronounced lipping. The superior articular processes and the inferior surface of the vertebral body exhibit areas of macroporosity. Based on the level of degenerative changes, Adult 2 is estimated to be a middle-aged adult to older adult. Sex is indeterminate.

MISCELLANEOUS REMAINS

Mandible 1

Mandible 1 is an adult mandible consisting only of the left mandibular body and a portion of the mental eminence, with no teeth in situ. The bone is light in weight, but the cortex itself is in good condition. The sockets for the left canine and the left first premolar are present. While these teeth were likely lost postmortem, there appears to be some active resorption occurring in the two sockets. A partial socket for the left second premolar is present, with the distal aspect of the socket obliterated by active resorption. Due to the active resorption of the socket, the tooth may have been lost either antemortem or postmortem. The socket for the left first molar was mostly resorbed at the time of death, with the tooth lost antemortem. There is evidence of a possible abscess associated with the left first molar that has healed, but it still resulted in the resorption of the bone down to the base of the roots. The region of the left second molar has been completely resorbed, indicating the tooth was lost antemortem. The socket for the left third molar is present. The condition of the socket suggests the tooth was likely present at the time of death and lost postmortem. Because multiple teeth have been lost postmortem, there is no eruption or dental wear data available; therefore, a specific age estimation cannot be made. However, based on the level of antemortem tooth loss and alveolar resorption, the individual is estimated to be a middle to older adult. The sex of the individual is indeterminate.

Mandible 2

Mandible 2 is an adult mandible consisting only of the left mandibular body, with the left canine and left first molar preserved in situ. The sockets for the left central and lateral incisors, and the left first and second premolars are preserved, though the teeth have been lost postmortem. The medial portion of the left second molar socket is preserved, and some of the distal portion has been broken postmortem. The preserved portion of the socket for the left second molar is completely resorbed to below the root level, indicating the tooth was lost antemortem. The canine and first molar exhibit only slight occlusal wear. A small pinprick of dentin exposure is present on the canine. The buccal cusps of the first molar have large wear facets, but are not yet worn flat, while the lingual cusps have very small, if any, wear facets. Based on the minimal dental attrition, the individual is estimated to be a young adult. The mental eminence of Mandible 2 is very gracile, suggesting the individual was possibly a female

Miscellaneous Lumbar Vertebra

Miscellaneous lumbar vertebrae 1 and 2 (MLV1 and MLV2) are two sequential vertebrae from the same individual. Miscellaneous lumbar vertebra 1 (MLV1) is complete. MLV1 exhibits some slight postmortem damage to the transverse and spinous processes but is otherwise in relatively good condition. There is slight osteophytic lipping on the anterior margin of the superior portion of the vertebral body, and a small bony growth (possibly ankylosing) on the left, posterior margin of the inferior portion of the body. Very slight lipping is present around the superior articular facets and the left inferior articular facet. MLV1 also exhibits a bony ridge, approximately 12 mm in length, running just behind the posterior margin of the right inferior articular facet. The right inferior articular facet itself exhibits a small exostosis, approximately 2 to 3 mm in diameter, near the center of the articular surface. Miscellaneous lumbar vertebra 2 (MLV2) is incomplete, missing the left transverse process. Despite some slight postmortem damage to the right transverse process, the spinous process, and articular facets, the bone is in relatively good condition with only slight postmortem erosion. Lipping and osteophytic growth is present on the anterior margin of the superior portion of the vertebral body. Slight lipping is also present on the anterior margin of the inferior portion of the vertebral body. MLV2 also exhibits some degenerative erosion on both the superior and inferior surfaces of the vertebral body. Slight spicule development is present within the annular margins of both the superior and inferior surfaces of the body but is more pronounced on the inferior surface. While osteophytic lipping is present on all four articular facets, it is much more pronounced on the inferior articular facets. The posterior aspect of the left inferior articular process also exhibits a small tuberosity-like exostosis. Based on the degenerative joint changes, MLV1 and MLV2 are estimated to belong to a middle-aged individual.

Right Ulna

The partial right ulna consists of the proximal end and approximately half of the shaft. The cortex is in relatively good condition, with little taphonomic damage other than a postmortem break resulting in the loss of the distal half. The element is very large and robust. Pronounced osteophytic lipping is present around the margins of the trochlear and radial notches but is most pronounced on the superior margin and at the coronoid process. The trochlear notch exhibits microporosity, as well as three areas of pronounced pitting and macroporosity on the inferior portion. Slight porosity is also present in the radial notch. The proximal portion of the shaft, near the area of the ulnar tuberosity, appears to be slightly bowed medially. The ulna also exhibits a very pronounced and robust attachment site for the flexor digitorum superficialis muscle (flexion of digits 2-5, flexion of wrist). The flexor digitorum superficialis muscle flexes both the wrist and the second through the fifth digits of the hand. This enthesis development and osteoarthritis evident on the articular surfaces indicated suggests bony changes due to engagement in regular manual labor that involved grip strength, flexion of the wrist, flexion and extension of the elbow, and pronation and supination of the forearm.

Right Tibia

A right tibia consists of the proximal end and approximately one-fourth of the diaphysis. The cortical bone itself is in good condition, with the exception of some postmortem damage around the condylar margins and the break of the diaphysis. A large abscess, approximately 10 by 12 mm in size, is present on the anterior surface, superior to the tibial tuberosity. The lesion perforates the cortex and continues at least 18 mm into the bone. Porosity is present immediately inferior to the tibial plateau on the posterior aspect of the bone, along with areas of bone deposition that are spicule-like in appearance. A similar combination of porosity and bone deposition is also present on the anterior surface of the bone below the tibial plateau, with more pronounced bone development laterally. This combination of porosity and increased bone development is indicative of active periostitis, possibly caused by the large lesion at the proximal end of the tibia. Because few measurements of the tibia could be taken due to postmortem damage, a sex estimate based on metric traits could not be provided.

Osteological Analysis – Burial Project 2378

On April 2, 2009, the Sioux City Police Department responded to a complaint regarding human skeletal remains inside of a garage. The owner of the building was amateur archaeologist Tom Fugle, who had collected the remains when they were disturbed and exposed on the surface during quarry operations at 13WD402 in the 1970s. Fugle had turned over some of the remains in the past, possibly to the Northwest Chapter of the Iowa Archaeological Society and then to the collections of various museums in Iowa. However, he retained some of the remains on his personal property. Once recovered by the Sioux City police, the remains were transferred to the OSA Bioarchaeology Program in 2009 (UI, OSA 2009).

The minimum number of individuals from the remains transferred to the Bioarchaeological Program in 2009 is derived from adult cranial remains and subadult postcranial elements. A skeletal inventory and the lab designations for the remains are outlined in Table 41. Cranial and mandibular metrics can be found in Table 5. Tables 6 and 7 present adult and subadult dental inventories, respectively. Dental metrics for adults and subadults can be found in Tables 8 and 9. Adult postcranial metrics are summarized in Table 10, while Table 11 includes subadult postcranial metrics.

ADULT CRANIAL REMAINS

The minimum number of adult individuals are based on the duplication of the frontal bone. Distinct adult crania may be associated with miscellaneous elements, but associations cannot be definitively made. Approximate age ranges for each individual were estimated based on cranial suture closure only.

Cranium 1

Cranium 1 is a nearly complete cranium, but missing both maxillae and zygomas. The cortical bone has been bleached and moderately eroded postmortem. The cranium also exhibits some cracking and warping along the frontal bone. There is evidence of a possible healed fracture running transversely along the posterior aspect of the right parietal; the fracture line is approximately 22 mm in length. Slight porosity is present along the posterior aspect of both parietals and the occipital bone in the region of lambda, which may be evidence of healing porotic hyperostosis.

Suture closure ranges from minimum closure to complete obliteration both endocranially and ectocranially. The lateral-anterior systems for cranial suture closure provided a composite score of four, providing an age range of 41.1 ± 10.0 years. Based on suture closure, age was estimated to be a middle adult. Though the glabellar region is intermediate in size, the nuchal crest, mastoid processes, and supraorbital margins of Cranium 1 are relatively large, suggesting the individual was male.

Cranium 2

Cranium 2 is a partial cranial vault that includes the frontal, the right parietal and temporal, the superior portion of the left parietal, and the right superior portion of the occipital. The cortical bone is moderately eroded postmortem with root damage on the ectocranial surface. The posterior surface of the occipital is somewhat flattened, which could be indicative of cradle-boarding or some other form of unintentional modification.

While the cranial sutures are open in two locations, most exhibit minimal closure. The lateral-anterior sutures yielded a composite score of two, providing an age range of 36.2 ± 6.2 years. The individual is estimated to be a middle-aged adult. The relatively gracile morphology of Cranium 2 suggests the individual was possibly female.

Cranium 3

Cranium 3 is a partial cranial vault that includes portions of the frontal, the left and right parietals, the occipital, the left and right nasal bones, and the frontal process of the right maxilla. The cranium is reconstructed from two portions. The cortical bone of Cranium 3 exhibits moderate postmortem erosion, with

the most severe weathering occurring on the left side. The endocranial surface is much less weathered. Extending superiorly from the right supraorbital foramen is a large groove, approximately 25 mm in length, running parallel to the temporal line. The groove is likely an accessory frontal sulcus.

The vault cranial suture closure score of Cranium 3 provided an age range of 39.4 ± 9.1 years. Most lateral-anterior sutures are unobservable. The individual is estimated to be a middle adult. The gracile features of the cranium suggest the individual was likely female.

Cranium 4

Cranium 4 is a partial cranial vault that includes the left portion of the frontal, most of the left and right parietals, and the superior portion of the occipital. The cranium is reconstructed from two portions. The cortical bone is moderately eroded postmortem, with dark staining on the left parietal and some green algae staining (Dupras and Schultz 2012) on the left portion of the frontal bone. An accessory frontal sulcus, approximately 25 mm in length, is present above the left orbit. Cranium 4 also exhibits porosity on both parietals along the sagittal suture and on the occipital in the region of lambda, possibly indicative of healing porotic hyperostosis.

Of the observable sutures for Cranium 4, most exhibit either significant closure or complete obliteration. The vault composite score is eight, providing an age range of 39.4 ± 9.1 years. Most of lateral-anterior sutures are unobservable. Age is estimated to be a middle adult. The glabellar region and the nuchal crest are both relatively gracile, while the left supraorbital margin is intermediate in morphology. The sex of the individual is possibly female.

Cranium 5

Cranium 5 is a partial cranial vault including the posterior portions of the left and right parietals, the left temporal and posterior portion of the right temporal, and the occipital bone. The cortex is very well preserved with some dark grey staining on the anterior portion of the left parietal. There is also green algae staining (Dupras and Schultz 2012) along the right parietal and some red staining surrounding the region of lambda. The posterior aspect of the cranium is relatively flattened, indicating the practice of cradle-boarding or some other unintentional modification. A small linear depression approximately 7 mm in length is present on the right parietal near obelion; the depression runs transverse to the sagittal suture. The origin of the depression is unknown; it could be the result of vascularization, or possibly the result of a healed sharp force trauma. A very small indentation is present near the middle of the left parietal, as is a shallow sulcus-shaped depression near the middle of the right parietal. Neither depression appears to be pathological, but are likely the result of vascularization.

The composite cranial suture closure vault score for Cranium 5 is three, yielding an age range of 34.7 ± 7.8 years. No lateral-anterior sutures were observable. Age is estimated to be a young to middle adult. The nuchal crest and the left mastoid process are relatively gracile, suggesting the sex of the individual was possibly female.

Cranium 6

Cranium 6 is represented by partial left and right parietals and the superior portion of the frontal. The partial cranium exhibits slight porosity, possibly indicative of healing porotic hyperostosis, along the sagittal suture from the region of bregma extending posteriorly to lambda. An arachnoid depression is present on the endocranial surface of the left parietal near the sagittal suture. Cranium 6 exhibits moderate postmortem erosion with marked cracking and warping both anteriorly and posteriorly.

Although few sutures have been preserved, all observable sutures had been completely obliterated, suggesting the individual was possibly an older adult. No sexually dimorphic characteristics were present. Sex was indeterminate.

Cranium 7

Cranium 7 is represented by a nearly complete frontal bone and a right parietal. The cortical bone is moderately eroded postmortem with some dark staining on the right portion of the frontal bone and on the right parietal. Root damage is concentrated near the glabellar region. A healed depressed fracture, approximately 10 mm in diameter and round, is present on the frontal bone above the left orbit. Remodeling and pitting is present within the fracture, and opposite the depression on the endocranial surface is a large round exostosis approximately 13 mm in diameter. The exostosis slopes gradually and extends approximately 1 to 2 mm above the normal bone surface. A separate depression is exhibited on the endocranial surface above the right eye orbit. Moderate porosity is present on the superior portion of the frontal and along the right parietal near the sagittal suture. The eye orbits also exhibit slight cribra orbitalia. Both the porosity and the cribra orbitalia may be indicative of porotic hyperostosis.

There is insufficient evidence to estimate the age of the individual based on cranial suture closure. The gracile nature of the frontal bone suggests the individual was possibly female.

Cranium 8

Cranium 8 is represented by a frontal bone, with the glabella lost postmortem. The cortical bone is moderately eroded postmortem with slight cracking interspersed with dark staining and concentrated just superior to the glabellar region. An arachnoid depression, approximately 12 mm in diameter, is present just to the left of the frontal crest on the endocranial surface of the frontal bone. There is possible cribra orbitalia present in the orbits. No sutures are observable, and no age estimate is possible. Based on the blunt supra-orbital margins, the sex of the individual is tentatively male.

Cranium 9

Cranium 9 is represented by a frontal bone and a right parietal. The cortical bone is relatively well preserved, with some cracking running superoinferiorly along the frontal bone. The cranium exhibits slight cribra orbitalia, as well as slight porosity on the right parietal near the sagittal suture. An accessory frontal sulcus, approximately 14 mm in length, is present above the right orbit. No sutures are observable, and no age range could be estimated. The glabellar region and supraorbital margins are relatively gracile, suggesting the individual was possibly female.

Cranium 10

Cranium 10 is represented by a partial frontal bone missing a portion of the right side. The frontal exhibits marked postmortem erosion, bleaching, and excessive root-etching damage. No sutures are observable, and no age estimate could be determined. Cranium 10 is missing the right supraorbital margin, and the shape of the left supraorbital margin is ambiguous for estimation of sex. The glabellar region is relatively gracile. Sex is possibly female.

Miscellaneous Crania

Crania 11, 15, and 16 are associated with the subadult remains, and are described later in the report. Crania 12 through 14 are not considered distinct crania, and cannot be definitively attributed to a specific individual. Therefore, these crania do not contribute to the minimum number of individuals represented.

Cranium 12 consists of the posterior portion of the left and right parietals and the superior portion of the occipital. The cortical bone is moderately eroded postmortem with some flaking both ecto- and endocranially. Slight porosity is exhibited on both the left and right parietal, as well as the occipital. Only the left lambdoid suture and the posterior aspect of the sagittal suture are observable. The two sutures exhibit only minimal closure both endocranially and ectocranially, suggesting the individual is possibly a young to middle-aged adult. No sex traits are present.

Cranium 13 is represented by partial left and right parietals and the superior portion of the occipital.

Cranium 13 exhibits slight postmortem erosion with root etching occurring posteriorly. The superior half of the left parietal and the posterior portion of the right parietal are preserved. Slight porosity is present on the squama of the parietals and concentrated posteriorly. The cranial vault is very thick, ranging from approximately 8 to 12 mm. Of the four observable sutures, one exhibits minimal closure while the others exhibit significant closure; this suggests the individual is possibly a young to middle-adult. No sex traits are present.

Cranium 14 is represented by the posterior half of the right parietal and the right half of the occipital bone. The basilar portion of the occipital is missing. Cranium 14 exhibits moderate postmortem erosion, and the cortex is light in color. Porosity is exhibited along the right lambdoidal suture and on the occipital bone near lambda. A vascular groove, approximately 10 mm in length, runs perpendicular to the right lambdoidal suture. Only two cranial sutures were observable, and both were completely obliterated. This suggests a tentative age range of 23 to 45 years old. Sex is indeterminate.

Miscellaneous Cranial Fragments

Various cranial fragments are present in addition to distinct crania. Three left and seven right temporals are present and have been designated LTemp1-LTemp3 and RTemp1-RTemp7. Of the left temporals, one is complete and two are incomplete. Of the right temporals, four are complete and three are incomplete. An ear ossicle, a right stapes, was discovered in RTemp6.

Three left, one right, and one unisided parietal are also present, and have been designated LP1-3, RP1, and MP1. One left parietal is complete while all other parietals are incomplete. Three parietals, LP2, LP3, and MP1, exhibit evidence of healed porotic hyperostosis. A number of unidentifiable cranial fragments are also present, including eight that display cut marks on the ectocranial surface. The miscellaneous fragments described in this section may be associated with distinct crania; however, none can be definitively assigned to a specific cranium.

ADULT DENTAL REMAINS

A minimum number of 10 individuals are represented by adult dental remains. It is possible that the dental remains are associated with the adult cranial remains; however, none can be definitively matched to any crania.

Mandible 1

Mandible 1 is a complete adult mandible with postmortem damage to the coronoid processes. No teeth are present in situ. The following teeth have been lost antemortem with their sockets resorbed: the left lateral incisor, the right canine, the left and right second premolars, and the left and right first through third molars. The sockets for the left and right first premolars and the left canine are present with minimal resorption, indicating these teeth were lost postmortem. The incisor region of the mandible is too damaged postmortem to determine if the left and right central incisors and the right lateral incisor were present antemortem. A periapical abscess is present in the socket of the left canine, and is associated with microporosity on the cortical bone surrounding the abscess. The right condyle is somewhat flattened anteroposteriorly with a small hook-like exostosis extending inferiorly from the medial edge. Mandible 1 is robust with a prominent mental eminence, suggesting the individual was male. Based on the level of antemortem tooth loss and alveolar resorption, the individual is estimated to have been an older adult.

Mandible 2

Mandible 2 is a complete adult mandible with postmortem damage to the lateral portion of the left mandibular body. The cortex is bleached and eroded. The only tooth in situ is the right first premolar, which has been worn flat with no dentin exposure. The following teeth were lost antemortem with their sockets resorbed: the left and right central incisors, the left and right lateral incisors, the right canine, the left first premolar, the left second premolar, and the left and right first and second molars. The sockets for the right

canine, right first premolar, and the left and right third molars are present, indicating the teeth were lost postmortem. Although the right canine was present at the time of death, the alveolar bone surrounding the socket exhibits slight resorption. Mandible 2 exhibits too much antemortem tooth loss to obtain an accurate gonial angle; the sex of Mandible 2 is therefore indeterminate. Based on the level of tooth wear and alveolar resorption, the individual is estimated to have been a middle aged to older adult.

Mandible 3

Mandible 3 is an incomplete mandible which has been broken into two halves postmortem and is missing the mental eminence. The two halves of the mandible were determined to be from the same individual based on similarities in the morphology of the teeth and mandibular body. Both the cortical bone and the enamel exhibit only slight taphonomic erosion. The right second premolar and the left and right first through third molars are in situ. Partial sockets for the right first premolar and the left second premolar are also present. The sockets for the left first premolar, the left and right canines, and the left and right lateral and central incisors are all absent, having been lost postmortem with the mental eminence of Mandible 3. All three left molars exhibit carious lesions. A large lesion on the occlusal surface of first molar affects cusps one and four, exposing the pulp cavity. The second molar displays only a small lesion in the buccal groove. The third molar exhibits a small lesion in the buccal groove as well as a small lesion near the center of the occlusal surface. One small carious lesion is present in the buccal groove of the right second molar. No other carious lesions are present on the right teeth. All teeth are worn flat, with small patches of dentin exposed on three teeth; the right second premolar, and the left and right first molars. Based on the tooth wear, the individual is estimated to be a middle-aged adult. Overall, Mandible 3 is relatively robust and the gonial angle appears to be nearly vertical, suggesting the individual is possibly male.

Left Mandible 1

Left Mandible 1 is incomplete, consisting of the left coronoid process, condyle, ramus, mandibular body, and partial mental eminence. Both the cortical bone and enamel are moderately eroded and partially bleached. The empty sockets for the following teeth are present: the left central and lateral incisors, the left canine, the left first and second premolars, and the second molar. The left first and third molars are in situ. The third molar was likely impacted as it is leaning mesially and probably contacted the distal crown of the left second molar near the cemento-enamel junction (CEJ). The buccal cusps of the first molar are worn flat with two small areas of dentin exposure, while the lingual cusps are worn but still slightly rounded. The third molar exhibits no occlusal wear. Based on the level of tooth wear, the individual is estimated to be a young adult. The gonial angle of Left Mandible 1 appears to be relatively vertical; the individual was possibly male.

Left Mandible 2

Left Mandible 2 is incomplete, consisting of the left coronoid process, condyle, ramus, and mandibular body. The sockets for the left central incisor through left second molar are present, with only the first molar in situ. There is no socket for the left third molar. It is unknown if this is due to congenital absence or antemortem loss with complete alveolar resorption. The cusps of the first molar are completely worn with dentin exposure on nearly the entire occlusal surface. The tooth is also missing some enamel from the lingual surface due to postmortem damage. Overall, the mandible is relatively gracile with an obtuse gonial angle, suggesting the individual was possibly female. Based on the level of wear of the first molar, Left Mandible 2 is estimated to represent a middle-aged to older adult.

Left Mandible 3

Left Mandible 3 is an incomplete adult mandible missing the anterior half of the mandibular body, the superior third of the ramus, and the posterior-most border of the ramus. Both the cortical bone and the tooth enamel are greatly taphonomically eroded with marked root damage. The left first, second, and third molars

are present, though a portion of the left first molar socket has been lost postmortem. The buccal cusps of the second molar are worn flat with no dentin exposure, while the lingual cusps are still slightly rounded. The third molar exhibits only small wear facets on all cusps. The third molar is impacted, with the tooth's mesial-occlusal edge in contact with the distal surface of the second molar. Based on the level of tooth wear, the individual is estimated to be a young adult. Sex is indeterminate.

Right Mandible 1

Right Mandible 1 is incomplete, consisting of the right condyle, coronoid process, ramus, right mandibular body, and partial mental eminence. The superior surface of the condyle is somewhat flattened. The right first and third molars are in situ. In addition to the first and third molars, the sockets for the left and right central and lateral incisors, the right canine, the right first and second premolars, and the right second molar are present, with the teeth lost postmortem. The cusps of the first molar are nearly worn flat with two small patches of dentin exposure, and the third molar exhibits, at most, only small wear facets. Based on the slight tooth wear, the individual is estimated to be a young adult. Overall, the mandible is gracile, indicating the individual was possibly female.

Right Mandible 2

Right Mandible 2 is incomplete, broken at midline, and consists of the right mandibular body, ramus, and a portion of the coronoid process. The cortical bone is bleached over most of the surface. Although no teeth are in situ, the sockets for the right lateral incisor through third molar are present. Right Mandible 2 is robust with a strongly male gonial angle and pronounced mental eminence, indicating that the individual was probably a male. No specific age estimate is possible.

Right Mandible 3

Right Mandible 3 is incomplete, consisting of the right ramus and a portion of the right mandibular body. The cortical bone is very bleached and taphonomically eroded, and most of the sockets are damaged postmortem. A partial socket is preserved for the right canine, and complete sockets are preserved for the right first premolar to the third molar. No teeth are in situ. No age or sex estimates could be determined.

Right Mandible 4

Right Mandible 4 is incomplete, consisting of the partial right mandibular body, the coronoid process, and most of the ramus. The right second and third molars are in situ; a partial socket for the right first molar is also present. The third molar is not fully erupted and impacted, with its mesial surface in contact with the distal surface of the second molar. The cusps of the first molar are worn nearly flat with two small dentin exposures on the buccal aspect of the occlusal surface. The mesial cusps of the third molar are also worn flat, while the distal cusps only exhibit small facets and somewhat diminished surface features. The level of tooth wear suggests the individual is a young to middle-aged adult. Left Mandible 4 is robust with well-developed muscle markings and a strongly male gonial angle, indicating the individual was possibly male.

Right Mandible 5

Right Mandible 5 is incomplete and consists of the right coronoid process, ramus, mandibular body, and the mental eminence. No teeth are in situ; however, the sockets for the left lateral incisor, the left central incisor, and the right central incisor through the right second premolar are present. All three molars on the right side had been lost antemortem and their sockets completely resorbed. The second premolar socket also exhibits slight alveolar resorption. Left Mandible 5 displays a prominent mental eminence and a relatively vertical gonial angle, suggesting the individual was possibly male. Based on the level of antemortem tooth loss and alveolar resorption, the individual is estimated to have been a middle-aged to older adult.

Right Mandible 6

Right Mandible 6 is incomplete, consisting of the mental eminence, a portion of the right mandibular

body, and the inferior portion of the left mandibular body. Although a portion of the left mandibular body is present, only the inferior portion has been preserved and no left teeth or sockets are present. The right second and third molars are in situ. Additionally, the sockets for the right central incisor through second premolar are present. The right first molar has been lost antemortem, and the socket has been completely resorbed. Although the right second molar is worn flat buccally and mesially, the distolingual cusp is still somewhat rounded. The tooth also exhibits one large and two moderate-sized areas of dentin exposure. The right second molar exhibits almost no occlusal wear, although the mesiobuccal cusp is slightly blunted. The tooth root also displays moderate hypercementosis. This level of tooth wear suggests the individual was possibly a middle-aged adult. Right Mandible 6 shows possible evidence of periodontal disease in the form of billowing in the region of the right third molar and a large rounded exostosis behind the premolars. The mental eminence of Right Mandible 6 is neither gracile nor robust. Lacking gonial angle data, the sex of the individual is indeterminate.

Left Maxilla 1

Left Maxilla 1, abbreviated to LMax1, is an incomplete left maxilla which consists of the palate, the alveolar process, and the inferior border of the nasal aperture. The cortex of LMax1 is bleached and taphonomically eroded. The sockets for the left central incisor through the first molar and a partial socket for the second molar are present. There is no evidence of alveolar resorption, indicating the teeth were all lost postmortem. The palatal portion exhibits some pronounced bony spicules just adjacent to the socket for the left molar. Due to the lack of teeth in situ, no age was estimated for the individual. Based on the level of bleaching and postmortem erosion of the cortex, it is possible that LMax1 is part of Cranium 1.

Miscellaneous Adult Teeth

In addition to the mandibular remains, three loose adult teeth are present. The mandibular teeth are a left second premolar and a left second molar. The one maxillary loose tooth is a left first or second molar. The maxillary first or second molar is very worn, with three areas of dentin exposure that have coalesced. The tooth also exhibits a small linear carious lesion on the mesial aspect at the CEJ. The left mandibular premolar exhibits only slight blunting of the mesial cusp. Approximately two-thirds of the crown of the left mandibular second molar has been destroyed by a carious lesion with pulp exposure. No occlusal wear is present on the occlusal portion that is preserved. Sex and age are indeterminate.

ADULT POSTCRANIAL REMAINS

Cervical Vertebrae

A minimum of three individuals are represented by nearly complete atlas vertebrae, designated CV1-1 through CV1--3. A substantial amount of osteophytic lipping is present on CV1-1 around the margins of the facet for the dens, and is concentrated on the lateral and superior margins. Superiorly, osteophytic development seems to have extended superiorly but was broken off postmortem. The remodeling on CV1-1 has increased the articular surface for the dens to approximately 19 mm in height and 22 mm in width.

CV1-2 exhibits some osteophytic lipping on the inferior margin of the facet for the dens. CV1-3 displays slight osteophytic lipping around the margins of the inferior articular facets that is most pronounced on the lateral margins of the facets.

Three unidentified cervical vertebrae, designated UCV1 through UCV3, are nearly complete. UCV1 exhibits osteophytic lipping on the anterior margins of both the inferior and superior aspects of the vertebral body. UCV2 has osteophytic lipping on the anterior and posterior margins of both the superior and inferior vertebral bodies. Osteophytic growth is also present on the right inferior and left superior articular facets, although osteophyte development is only slight on the left superior facet. UCV3 exhibits marked osteophytic growth around the superior and inferior portions of the vertebral body and around the margins of all articular facets. There is also a large bony extension that projects anteriorly from the superior margin of the

right superior articular facet, and ligamentous ossification evident on the spinous process.

Thoracic Vertebrae

Seventeen unidentified thoracic vertebrae are present, designated UTV1 through UTV17. Nine of the vertebrae are either complete or nearly complete, while eight are incomplete. Ten of the vertebrae exhibit varying degrees of degenerative joint disease in the form of remodeling and porosity on articular surfaces. One of these vertebra, UTV13, has a Schmorl's node on the superior aspect of the vertebral body.

Three of these vertebra, UTV15 to UTV17, are consecutive vertebrae from one individual. All three vertebrae are incomplete: UTV15 and 16 are both missing the right transverse processes, while UTV17 is missing the left transverse process. All three vertebral bodies had, at one point, been fused together, although UTV17 broke apart from UTV16 postmortem. The three vertebrae were fused by two large areas of osteophytic development along the right side of the vertebral bodies. Some fusion had also started between the inferior articular facets of UTV15 and the superior articular facets of UTV16. Although broken postmortem, there is no evidence to suggest that fusion was occurring between the articular facets of UTV16 and 17. The fusion of the three vertebrae was likely caused by either advanced degenerative joint disease or diffuse idiopathic skeletal hyperostosis. Bony spicules are present on the inferior surface of UTV16's vertebral body, and on the superior surface of UTV17's vertebral body. UTV17 also exhibits a foramen inferior to the right superior articular facet. All three vertebrae exhibit degenerative changes on the left costal demifacets, with severity in porosity increasing inferiorly. Porosity is also present on the inferior articular facets of UTV17. The inferior portion of the vertebral body of UTV16 and both the inferior and superior portions of the vertebral body of UTV17 exhibit marked porosity, mostly concentrated around the margin of the annular ring. Some macroporosity is present on the fused regions of the right costal demifacets of UTV15-17. UTV17 exhibits severe osteophytic lipping on the inferior margin of the vertebral body; this remodeling is concentrated on the right side. There is also moderate osteophytic lipping around the margins of the inferior articular facets of UTV17.

Lumbar Vertebrae

Two fifth lumbar vertebrae are present, designated LV5-1 and LV5-2. LV5-1 is incomplete, missing a portion of the right transverse process. A small amount of osteophytic growth is present on the anterior right aspect of the superior margin of the vertebral body, as well as some small osteophytic projections on the posterior aspect of the inferior margin of the vertebral body. LV5-1 is a lumbosacral transitional vertebra, and exhibits an enlarged left transverse process with a pseudarthrosis for articulation with the sacrum. Despite postmortem damage, a small articular portion on the right transverse process of LV5-1 is preserved, indicating that an enlarged transverse process and a pseudarthrosis were likely present on the right side as well. LV5-1 also exhibits moderate osteophytic lipping around the right inferior articular facet. Based on the localized formation of bone growth on the vertebral body, it is possible that LV5-1 belongs to the same individual as vertebrae TV15-17.

LV5-2 is incomplete, missing the left and right transverse processes. LV5-2 exhibits moderate postmortem erosion with damage to the spinous process and the right articular processes. The center of the vertebral body is slightly depressed with development of small spicules within the annular margins. A small bony exostosis is present on the posterior surface of the right lamina below the right superior articular facet. Although the margins of the vertebral body have been damaged postmortem, slight lipping around the superior and inferior margins is present. The vertebra is relatively small in size, suggesting it may belong to a female. Age is indeterminate.

Ten unidentified lumbar vertebrae are present, designated ULV1 through ULV10. Three of the lumbar vertebrae are complete, while seven are incomplete. Of these vertebrae, nine exhibit some degree of osteophytic lipping on the articular surfaces, though some are markedly less severe than others. Marked remodeling is present on one of these vertebra: ULV6. It is possible that ULV6 may have been in the process of ankylosing to the adjacent vertebra during life; however, it is unlikely that it was already fused to the next

vertebra as the margins of the extension are intact and do not exhibit taphonomic damage. A separate vertebra, ULV1, has a Schmorl's node on the superior aspect of the vertebral body.

Ribs

A total of 30 unidentified ribs are present (15 left, 15 right), which have been designated URibL1 through URibL15 and URibR1 through URibR15. URibL10 is complete, while all other ribs are incomplete.

URibL1, URibL2, URibL3, URibL4, URibR3, and URibR4 are likely from the same individual, based on the similarity in morphology of the rib head, neck, and tubercle, as well as articular surface degeneration. The non-articular portion of the tubercle is exaggerated on all six ribs, and all ribs display similar osteophytic lipping on the rib head. Osteophyte development is most pronounced on URibL4.

The sternal ends are preserved on three ribs, URibR10, URibR12, URibL10, allowing for an approximate age estimation. The sternal end of URibR10 is classified as a stage two or three, and the individual is estimated to have been between 20 and 28 years old. URibR12 is classified as a stage four or five, and the individual is estimated to have been between 25.7 and 42.3 years old. URibL10 is classified as stage five or six, and the individual is estimated to have been between 34.4 and 55.7 years old.

Scapulae

A minimum of two individuals are represented by scapulae. Portions of one left and two right scapulae are present and have been designated SL1, SR1, and SR2. SL1 consists of the acromion, coracoid process, and glenoid fossa. SR1 consists of the coracoid process and the glenoid fossa with a portion of the lateral border preserved. SR2 consists of a partial acromion and a portion of the scapular spine. No pathologies are present on any of the scapulae, and the extent of postmortem erosion ranges from slight to severe.

Clavicles

Two left clavicles and three right clavicles are present and have been designated CL1, CL2, and CR1 through CR3. Three are complete, two are incomplete. CL1 and CR2 exhibit slight osteophytic lipping on their sternal articular surfaces. A lesion, approximately 9 by 7 millimeters in size, is present on the sternal articular surface of CR1. The bone within the lesion is porous with a bony projection in the center, approximately 1 by 2 mm in size, while the outer margins are smooth and remodeled. CR1 also exhibits a small enthesophyte on the superior surface at the site of the sternocleidomastoid muscle attachment. None of the right clavicles paired with the left clavicles.

Humeri

Seven left and two right humeri are present and have been designated HL1 through HL7 and HR1 and HR2. Overall, the humeri exhibit moderate postmortem erosion with root etching and, in some cases, rodent gnawing. Of the left humeri, three are complete, three consist of a partial diaphysis and the distal end, and one consists of the proximal end and a portion of the diaphysis. Of the right humeri, one is complete and one consists of the diaphysis and the distal end. Only one humerus, HL6, exhibits osteophytic lipping around the distal articular surface. Most elements have pronounced muscle attachments. Of the humeri present, vertical head diameter could only be collected for five elements, HL1-HL3, HL5, and HR2. Based on the vertical head diameter, all five individuals are estimated to have been female. Some of the left and right humeri may be associated with one another, but postmortem erosion makes it difficult to definitively pair elements.

Radii

Three right radii are present and have been designated RR1 through RR3. RR1 is complete, while both RR2 and RR3 are incomplete. All three radii exhibit moderate postmortem erosion while one radius, RR2, has dispersed areas of dark staining. RR2 consists of a partial diaphysis and the distal end, while RR3 consists of the proximal end and a portion of the diaphysis. None of the radii exhibit age related osteophytic

remodeling around the margins of their articular surfaces. Some of the left and right radii may be associated with one another, but taphonomic changes make it impossible to definitively pair elements.

Ulnae

Three left and two right ulnae are present and have been designated UL1-UL3 and UR1 and UR2. All five ulnae exhibit slight to moderate postmortem erosion. UL2, UL3, and UR1 are all complete, while UL1 and UR2 both consist of the proximal end and a portion of the diaphysis. Three of the ulnae, UR1, UL1, and UL2, exhibit slight osteophytic lipping around the articular surfaces. UL2 also has a large enthesopathy at the attachment site for the pronator quadratus muscle. The enthesopathy has a bark-like appearance; a small groove is also present on the lateral portion of the enthesopathy, indicative of vascularization. Some of the left and right ulnae may be associated with one another, but taphonomic changes make it impossible to definitively pair elements.

Innomimates

Two innominates are from the same individual and were designated Inn Pair 1 (IP1); both are complete. IP1 exhibits a large bony lipped exostosis, probably age related, and indicative of separation of pubic tubercle on both the left and right; both are triangular in shape. The exostosis on the left innominate is approximately 15 mm in length and 12 mm in width, while the exostosis on the right innominate is approximately 11 mm in length and 15 mm in width. IP1 also exhibits a small number of enthesophytes along the pubic portion of both the left and right obturator foramina. The left and right auricular margins exhibit lipping, with marked osteophytic lipping on their posterosuperior margins. Both innominates also exhibit very large, rugged iliac tuberosities where the sacroiliac ligaments attach, with bony projections on the right innominate being less exaggerated. A few small enthesophytes are also present on the posterior inferior iliac spine of both the left and right innominates. Based on sexually dimorphic characteristics, IP1 represents a male individual.

The left auricular surface of IP1 exhibits some microporosity and moderate retroauricular activity. The anterior and superior portion of the auricular surface is still slightly billowed, usually indicative of a younger individual. However, the inferior and posterior portion is coarse and granular in texture with slight porosity. Moderate retroauricular activity is also present. Based on the observed changes of the auricular surfaces, IP1 is estimated to represent an individual between approximately 30 to 49 years of age.

The left pubic symphysis exhibits the beginnings of the formation of a border and separation of the pubic tubercle. The right pubic symphysis exhibits the slight formation of the dorsal border and the separation of the pubic tubercle. The age related changes observed in the left and right pubic symphyses suggest the individual was between 22 and 59 years old at death.

In addition to Innominate Pair 1, three left and six right miscellaneous innominates are also present and have been designated IL1-IL3 and IR1-IR6. One unsided acetabular fragment is also present. Of the miscellaneous innominates, one is complete (IL1), and the remainder are incomplete. Innominate IL1 has a large number of pronounced enthesophytes along many of the muscle attachments. Five innominates, IL1, IL2, IL3, IR1, and IR3, exhibit varying levels of osteophytic lipping. Sexually dimorphic characteristics indicate that IL2 and IR2 both likely represent female individuals; IL3 is indeterminate for sex; IL1 is likely a male individual; and IR1 is a possible male.

Femora

Nine left femora and six right femora are present, and have been designated FL1 – FL9, and FR1 – FR6. Of the left femora, three are complete, four consist of the proximal end and a portion of the diaphysis, one consists of a portion of the diaphysis and the distal end, and one consists of just the diaphysis. Of the right femora, one is complete, three consist of the proximal end and a portion of the diaphysis, one consists of a portion of the diaphysis and the distal end, and one consists of just the diaphysis.

Four femora, FL1, FL3, FR2, and FR6, exhibit varying degrees of osteophytic lipping. Two of these

femora, FL1 and FR2, exhibit osteophytic lipping around their femoral heads. FL3 displays moderate lipping around both the proximal and distal articular surfaces, while FR6 exhibits lipping on only the distal surface. FL3 also displays a large number of enthesophytes along the gluteal muscle attachments and within the trochanteric fossa. FL1 has a lesion, approximately 21 mm in length and 14 mm wide, just superior to the medial condyle on the posterior surface of the diaphysis. One element, FR3, exhibits two small perimortem cut marks: one on the posteroinferior surface of the femoral neck (approximately 7 mm long), and one on the medial surface of the shaft at the level of the lesser trochanter (approximately 2 mm long). FL1, FL2, FL3, and FR1 all display large, rugose gluteal muscle attachments. Five femora, FL2, FL5, FL6, FR1, and FR4, exhibit slight to prominent third trochanters.

One right femoral fragment is present. Some of the left and right femora may be associated with one another, but taphonomic changes make it impossible to definitively pair elements.

Tibiae

Five left tibiae and seven right tibiae are present, and have been designated TL1 – TL5, and TR1 – TR7. Two unisided tibial fragments, an articular portion of a proximal condyle and a portion of a diaphysis, are also present. Of the left tibiae, three are complete and two consist of the proximal end and a portion of the diaphysis. Of the right tibiae, two are complete; one consists of the proximal end and a portion of the diaphysis; and four consist of a partial diaphysis and the distal end.

Three tibial elements display osteophytic lipping; TL4 and TR3 exhibit osteophyte development on the intercondylar tubercles, while TR1 exhibits lipping on both the intercondylar tubercles and the articular surface for the fibula. TL3 is bowed laterally with the proximal end rotated medially; this abnormal shape is possible evidence of rickets. One tibia, TR7, displays healed periostitis on the proximal half of the anterior surface of the shaft, resulting in rounding out of the anterior border.

Two unisided tibial fragments are present. Some of the left and right tibiae may be associated with one another, but taphonomic changes make it impossible to definitively pair elements.

Fibulae

Only one fibula, FibL1, is present and complete with moderate postmortem erosion of the cortex. FibL1 exhibits a very distinct, sharply defined anterior border and a rugged attachment for the soleus muscle. No pathologies were observed.

Hand and Foot Bones

A minimum of one individual is represented by metacarpals. The two elements: a left second and a left fourth metacarpal, are both complete and in relatively good condition. A minimum of one individual is represented by foot bones, a left first metatarsal and a left talus. Both foot elements are complete and in relatively good condition.

SUBADULT REMAINS

A minimum number of ten subadults are represented by postcranial remains. The minimum number of individuals was determined based on age estimates and duplication of elements. Age estimates were determined using epiphyseal fusion, diaphyseal metrics, and relative size in comparison to confidently aged subadult skeletal material.

Subadult 1

Subadult 1 is represented by a right tibial diaphysis. Both the proximal and distal ends of the tibia have been broken off postmortem and an accurate length measurement is not possible. However, the diaphysis was compared to that of a confidently aged 2.5 to 3.5 year old, and the tibia appears to be slightly smaller. The age estimate for Subadult 1 is approximately 1 to 3 years old. The cortex is only slightly eroded postmortem.

Subadult 2

Subadult 2 is represented by partial left and right femora. Both the left and right femur exhibit moderate postmortem erosion with some damage to the ends. The right femur consists of the complete unfused diaphysis, but both the proximal and distal epiphyses are missing. The left femur consists of the distal half of the diaphysis, but the distal epiphysis is missing. Based on the diaphyseal length of the right femora, Subadult 2 is estimated to have been approximately 3.5 to 5.0 years of age.

Subadult 3

Subadult 3 is represented by a partial left femur diaphysis. The diaphysis is nearly complete, but the distal end has been broken off postmortem. The femur exhibits moderate levels of postmortem erosion with root damage. Both the proximal and distal epiphyses are also missing postmortem. Although an exact diaphyseal measurement could be collected, the femur was compared to a confidently aged 2.5 to 3.5 year old. Subadult 3 is estimated to have been approximately 5 to 7 years of age.

Subadult 4

Subadult 4 is represented by a partial right humerus diaphysis. The cortical bone exhibits moderate postmortem erosion. Both the proximal and distal epiphyses are damaged postmortem, but portions of the unfused epiphyseal surfaces are preserved. Based on the overall length of the diaphysis, Subadult 4 is estimated to have been between 8 and 11 years of age.

Subadult 5

Subadult 5 is represented by a partial left humerus. The distal aspect of the humerus exhibits only slight postmortem erosion, while the proximal end has more pronounced erosion. There is also a hole in the proximal portion of the diaphysis, which is recent damage. The diaphysis is complete with some slight postmortem damage to the unfused epiphyseal surface of the proximal end. The distal epiphysis is present and in the process of fusing to the diaphysis. Based on the length of the diaphysis and the partial fusion of the distal epiphysis, Subadult 5 is estimated to have been between 13.0 and 18.0 years of age.

Subadults 6, 7, and 8

Three subadults (Subadults 6, 7, and 8) are represented by duplicated right humeri. Subadult 6 is represented by a right humerus diaphysis. The cortex exhibits moderate postmortem erosion. The diaphysis is complete with some postmortem damage to the distal end. Both the proximal and distal ends are unfused, and the epiphyses are missing. Based on the size of the diaphysis and the lack of fusion, Subadult 6 is estimated to have been between 13.0 and 18.0 years of age.

Subadult 7 is represented by a partial right humerus consisting of the diaphysis and the distal epiphysis. The distal aspect of the humerus exhibits only slight postmortem erosion, while the erosion to the proximal aspect is more pronounced. The diaphysis is essentially complete with slight damage to both the proximal and distal ends. The distal epiphysis is fused to the diaphysis, but the proximal epiphysis and the medial epicondyle remain unfused. The humerus is adult in size. Based on the overall size and the level of fusion, Subadult 7 was between 13.0 and 18.0 years of age.

Subadult 8 is represented by a nearly complete right humerus, consisting of the diaphysis and the distal epiphysis. The cortical bone is moderately eroded postmortem, with damage to both the distal and proximal ends. The distal epiphysis is fused to the diaphysis. A small portion of the proximal epiphyseal surface is preserved despite postmortem damage to the proximal end, indicating that the proximal end is unfused. Based on size and the level of fusion, Subadult 8 was between 13.0 and 18.0 years of age.

None of these humeri match in size with Subadult 5 and therefore represent three additional subadults.

Subadult 9

Subadult 9 is represented by the proximal epiphysis of a right humerus. The epiphysis does not refit with

any of the older subadult right humeral diaphyses, and was therefore determined to be a separate individual. The epiphysis is adult in size and unfused, and Subadult 9 was likely an older juvenile between the ages of 16.0 and 19.0.

Subadult 10

Subadult 10 is represented by a partial left humerus diaphysis. The humerus is much smaller than any of the other humeri present and could not be matched as an antimere. It was designated a separate individual. Both the proximal and distal aspects of the diaphysis have been broken off postmortem. Based on the size of the diaphysis, Subadult 10 is estimated to have been between 6.0 and 11.0 years of age.

Miscellaneous Subadult Remains

Three subadult crania, designated Cranium 11, 15, and 16, represent three juveniles. Subadult Cranium 11 is represented by a nearly complete frontal bone, partial left and right parietals, left and right nasal bones, and the frontal processes of the left and right maxillae. Slight porosity is exhibited on both the left and right parietals along the sagittal suture. The cranium is well preserved with some dark grey staining on the right side. The observable cranial sutures for Cranium 11 are open or exhibit minimal closure. The cranial bones of the individual are also relatively thin, suggesting the individual was an older juvenile or possibly a young adult. Based on thinness of the cranial remains, this cranium is more likely associated with one of the juveniles represented by postcranial remains.

Subadult Cranium 15 is represented by the superior-posterior portion of the left parietal and the left half of the occipital. The cortex exhibits moderate postmortem erosion. The basilar portion of the occipital is missing. Porosity is present on the left parietal and the occipital in the area of lambda. The bone itself is relatively thin, indicating the individual is likely an older juvenile or possibly a young adult. This cranium, based on thinness of the cranial remains, is most likely associated with one of the juveniles represented by postcranial remains.

Subadult Cranium 16 is nearly complete, missing the nasal process of the left maxilla, the right and left temporals, the left half of the sphenoid, and the basilar portion of the occipital. Cranium 16 exhibits only slight postmortem erosion of the facial region and on the right side of the cranium, while erosion on the left side is much more pronounced, resulting in the cracking and flaking of the cortical bone. The occipital and left parietal are highly taphonomically eroded. Striped dark staining is present across the frontal bone. On the medial aspect of the palatine groove of the right maxilla, there are two bony spicules that extend toward each other, forming a nearly complete bridge. On the left maxilla, a single bony projection extends medially and forms a complete bridge with the palate just anterior transverse palatine suture. The following maxillary teeth are present and in situ: the right lateral incisor, the right canine, the right first and second premolars, the left and right first and second molars, and the right third molar. The sockets for all other maxillary teeth, including the crypt for the left third molar, are all present and observable. The right third molar is unerupted; the crown is complete and at least a portion of the root is formed. The individual is estimated to be an older juvenile at least 14 to 15 years old based on the development and eruption stage of the third molars, and may be associated with one of the juvenile subadults represented by postcranial remains. The right lateral incisor, the right canine, and both right premolars exhibit enamel hypoplasias, the locations of which suggest the individual experienced various periods of growth disruption from approximately 0.9 to 4.2 years of age.

Miscellaneous Subadult Cranial Remains

Six miscellaneous subadult cranial elements or partial elements are present: two frontal bones, a right parietal, an occipital, a pars basilaris, and the petrous portion of a temporal. The size of one frontal bone, the parietal, and the occipital suggest a general age estimate of 3.0 to 8.0 years old. The pars basilaris is nearly adult in size and unfused, suggesting it the individual is younger than 16 years old. In addition to these bones are three subadult cranial fragments and one subadult facial fragment.

Miscellaneous Subadult Mandibles and Loose Dentition

Although age could be estimated for the subadult mandibles, none could be confidently assigned to a particular individual. Therefore, the five subadult mandibles do not contribute to the minimum number of individuals.

Subadult Mandible 1 is incomplete, consisting of the right ramus, coronoid process, condyle, and a small portion of the right mandibular body. The mandible is very small in size. No teeth are in situ; however, a partial socket for the permanent right first molar and crypt for the permanent right second molar are observable. Although the right first molar is not present, the outline of the tooth's roots and crown is preserved in the alveolar bone. The molar's roots are approximately one-fourth to one-half complete. Based on the estimated development of the first molar, the individual was between 4.5 and 6.5 years of age. The mandible could be associated with Subadult 2, 3, or 10.

Subadult Mandible 2 is incomplete, consisting of the left ramus, coronoid process, condyle, and a portion of the left mandibular body. No teeth are in situ, but a partial socket for the permanent left second molar and the crypt for the left third molar are preserved. Similar to Subadult Mandible 1, the development of the left second molar is visible in Subadult Mandible 2. The outline shows that the left second molar had a complete crown and with roots approximately one-fourth to one-half complete. Based on the development of the second molar, the individual is estimated to have been between 9.0 and 11.5 years of age. The mandible could be associated with Subadult 4 or 10.

Subadult Mandible 3 is incomplete and represented by the left ramus, coronoid process, condyle, left mandibular body, the mental eminence, and a portion of the right mandibular body. The following teeth are present in situ: the left permanent canine, the left first premolar, the left deciduous second molar, the left permanent first molar, and the left permanent second molar. The permanent canine, first premolar, and permanent second molar are all unerupted, but visible within their crypts. In addition to the teeth in situ, the sockets for the following teeth are present: the left and right permanent central and lateral incisors, the left deciduous canine, and the left deciduous first molar. Based on dental development, the individual is estimated to have been between 8.5 and 10.5 years of age. The mandible could be associated with Subadult 4 or 10.

Subadult Mandible 4 consists of the right ramus, coronoid process, condyle, and a portion of the right mandibular body. The right permanent third molar is present in situ, and partial sockets for the right permanent first and second molar are visible. The crown of the left third molar is complete and about one-fourth of the root is developed. Based on the tooth development, the individual is estimated to be between 13.5 and 15.5 years of age. This element could be associated with one of the four juveniles, Subadults 5-8, represented by postcranial remains, or possibly with Cranium 16.

Subadult Mandible 5 consists of the left ramus, coronoid, condyle, and a portion of the right mandibular body. The left permanent third molar is present and unerupted within the crypt. The sockets for the left permanent first and second molars, and the left permanent first and second premolars are also present, although the teeth have been lost postmortem. The crown of the left third molar is visible within the crypt. At a minimum, the cusp outline is complete; however, the precise level of development cannot be determined. The mandible is comparable in size to Subadult Mandible 4, if not slightly smaller. Based on the overall size of the mandible and the approximate level of development of the third molar, the individual is estimated to be between the ages of 10.5 and 15.5. This element could be associated with one of the juvenile subadults, Subadult 5-8.

In addition to the five subadult mandibles, three loose subadult teeth were also present: a permanent maxillary right lateral incisor, a permanent maxillary right canine, and a permanent maxillary right third molar. The maxillary incisor is completely developed, exhibits slight wear on the lingual surface of the cusp, and is shovel-shaped. Both the tooth enamel and root are eroded postmortem.

The maxillary canine is also completely developed and displays more advanced wear, with slight blunting of the cusp and a small pinpoint of dentin exposure. The tooth has at least one horizontal hypoplasia

line, approximately 3.2 mm from the CEJ, suggesting growth disruption around approximately 4.0 years of age. The root of the tooth exhibits moderate hypercementosis. The enamel and root are both eroded and cracked, and a small amount of enamel is missing from the labial surface of the canine near the CEJ. Based on level of development and wear of the maxillary incisor and canine, they may belong to an older juvenile or a young adult.

The permanent maxillary third molar is not completely developed, although the crown and approximately half of the tooth root are complete; the molar would have been unerupted. The tooth is well preserved with a small portion of enamel missing postmortem from both the lingual and buccal aspects near the CEJ. Based on the development of the root, the individual is estimated to be approximately 15.5 to 18.5 years old. None of the loose subadult teeth could be assigned to a particular individual or set of dentition.

Miscellaneous subadult postcranial remains

Thirteen miscellaneous subadult postcranial remains are present: a left rib, a cervical vertebra and thoracic vertebra (likely from the same individual), a fifth lumbar vertebra and a partial sacrum (likely from the same individual), a partial radius, a right clavicle, a right ilium, a right ischio-pubic ramus, a right femur, a left tibia, a right tibia, and a left calcaneus. Although approximate age estimates were made for most of the subadult postcranial remains, none could be definitively designated to a particular individual.

The cervical and thoracic vertebrae, right ilium, right radius, and right tibia fall within the approximate age range for children and may be associated with Subadults 1 through 4, or Subadult 10. The right ischio-pubic ramus is estimated to be an older child or young adolescent, and could be associated with Subadults 4 through 8 or Subadult 10. The remaining subadult elements fall within the age range for adolescents, and may be associated with Subadults 5 through 9.

13WD402 – Burial Projects 57 and 2378 Summary

The remains from Burial Projects 57 and 2378 represent a minimum of 20 individuals – 10 adults and 10 subadults. The minimum number of adults is based on crania, while the minimum number of subadults is based on postcranial elements. Remains from Burial Project 57 have been previously reported by Anderson et al. (1979). The two individuals documented in this report do not add to the MNI from 13WD402; they are most likely associated with previously documented individuals. Of the adults, there is one male, one female, five possible females, one possible male, and two individuals of indeterminate sex based on the cranial remains. A minimum of six individuals exhibit evidence of healed cribra orbitalia and/or porotic hyperostosis, suggesting the population may have undergone periods of nutritional stress and/or illness.

Most adult dental remains exhibit moderate levels of tooth wear, although two mandibles have more heavily worn teeth with large dentin exposures. A total of seven mandibles display varying stages of alveolar resorption resulting from antemortem tooth loss. Two mandibular portions exhibit periapical abscesses. Three teeth from Mandible 3 and two isolated teeth exhibit carious lesions.

A number of the adult postcranial elements, mostly vertebrae, display signs of degenerative joint disease in the form of osteophytic lipping and porosity. Schmorl's nodes are present on two vertebrae, UTV13 and ULV1. Three consecutive vertebrae, UTV15, UTV16, and UTV17 are fused together as the result of either advanced degenerative joint disease or DISH. The left transverse process of a fifth lumbar vertebrae, LV5-1, displays a pseudarthrosis. One clavicle, CR1, and one femur, FL1, exhibit evidence of lesions. An enthesopathy is present on one ulna, UL2, at the attachment site of the pronator quadratus muscle. Three tibial elements are pathological; two tibiae, TR7 and the right tibia from Burial Project 57, show evidence of periostitis. TL3 exhibits evidence of rickets. Only one postcranial element, FR3, exhibits cut marks.

The subadults consist of one infant, four children, and five adolescents. Hypercementosis is exhibited on one loose subadult tooth. Enamel hypoplasias are present on the dentition of Subadult Mandible 3, Cranium 16, and one loose subadult tooth.

Cultural affiliation of the remains is Mill Creek based on archaeological material associated with previously disturbed remains from the site, previously reported on by Anderson et al. 1979; Fisher 1978, 1980; Lillie 2004, this volume; Lillie and Schermer 1990.

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Table 1. Osteological Inventory, 13WD402, Burial Project 57, Woodbury County, Iowa.

	Lab Designation
Adult 1	
5 th lumbar vertebra	L5Vert1
sacrum – incomplete	Sacrum
Adult 2	
5 th lumbar vertebra	L5Vert 2
Miscellaneous Remains	
2 mandibles – incomplete	Mandible 1-2
2 lumbar vertebrae, unidentified – 1 complete, 1 incomplete	ULV1-2
ulna, right– incomplete	R. Ulna
tibia, right– incomplete	R. Tibia

Table 2. Adult Dental Inventory, 13WD402, Burial Project 57, Woodbury County, Iowa.

Tooth Dis-buc	Presence	Attrition:		Attrition – Molars:	
		I, C, PM	Mes-buc	Mes-ling	Dis-ling
Mandible 1					
LM3	5		0	0	0
LM2	4		0	0	0
LM1	4		0	0	0
LP2	4	9			
LP1	5	9			
LC	5	9			
LI2	4	9			
Mandible 2					
LM3	9		0	0	0
LM2	4		0	0	0
LM1	2		4	1	2
LP2	5	9			
LP1	5	9			
LC	2	2			
LI2	5	9			
LI1	9	9			

Dental Key:

Presence

- 2 Present, development completed, in occlusion
- 4 Missing, with alveolus resorbing or fully resorbed: antemortem loss
- 5 Missing, with no alveolar resorption: postmortem loss
- 9 Unobservable

Attrition (I, C, PM)

- 1 Unworn or small facets
- 2 Point or hairline of dentin
- 3 Dentin line of distinct thickness
- 9 Unobservable

Attrition (molars)

- 0 Unobservable

Table 3. Adult Dental Metrics, 13WD402, Burial Project 57, Woodbury County, Iowa

Tooth	Mesiodistal	Buccolingual	CEJ mesiodistal	CEJ buccolingual
Mandible 2				
LM1		6.8		9.05
LC	7.4	7.0	5.35	7.25

Table 4. Osteological Inventory, 13WD402, Burial Project 2378, Woodbury County, Iowa.

<u>Adult Remains</u>	<u>Lab Designation</u>
Cranium 1	CRN1
frontal	parietals, left and right
occipital	
maxilla, left and right – incomplete, frontal processes	
nasal bones, left and right – incomplete	
sphenoid – incomplete	
ethmoid – incomplete	
vomer – incomplete	
malleus, right – complete	
Cranium 2	CRN2
frontal	
parietals, left and right – incomplete and complete	
occipital – incomplete	
temporal, right	
sphenoid – incomplete	
ethmoid – incomplete	
malleus, right – complete	
incus, right – complete	
Cranium 3	CRN3
frontal – incomplete	
parietals, left and right – incomplete	
occipital – incomplete	
maxilla, right – incomplete, frontal process	
nasal bones, left and right – incomplete	
Cranium 4	CRN4
frontal – incomplete	
parietals, left and right – incomplete	
occipital – incomplete	
nasal bones, left and right – incomplete	
Cranium 5	CRN5
parietals, left and right – incomplete	
occipital – incomplete	
temporals, left and right – incomplete	
Cranium 6	CRN6
frontal – incomplete	
parietals, left and right – incomplete	
Cranium 7	CRN7
frontal – incomplete	
parietal, right – incomplete?	
Cranium 8	CRN8
frontal – incomplete?	
Cranium 9	CRN9
frontal – incomplete	
parietal, right – incomplete	
Cranium 10	CRN10
frontal – incomplete	
<u>Miscellaneous Adult Remains</u>	
3 crania – incomplete	CRN12-14
maxilla – left, incomplete	LMax1
3 mandibles – 1 complete, 2 incomplete	Mandible 1-3
9 mandibular bodies – 3 left (incomplete), 6 right (incomplete)	LM1-3, RM1-6
10 temporals – 3 left (1 complete, 2 incomplete), 7 right (4 complete, 3 incomplete)	LTemp1-3, RTemp1-7
stapes – right, complete	RTemp6
5 parietal fragments – 3 left (1 complete, 2 incomplete), 1 right (incomplete), 1 unisided (incomplete)	LP1-3, RP1, MP1
occipital fragment – squama, incomplete	

Table 4. continued.

Miscellaneous Adult Remains continued

3 scapula fragments – 1 left, 2 right	SL1, SR1-2
5 clavicles – 2 left (1 complete, 1 incomplete), 3 right (2 complete, 1 incomplete)	CL1-2, CR1-3
9 humeri – 7 left (3 complete, 4 incomplete), 2 right (1 complete, 1 incomplete)	HL1 – 7, HR1 – 2
3 radii – right (1 complete, 2 incomplete)	RR1-RR3
5 ulnae – 3 left (2 complete, 1 incomplete), 2 right (1 complete, 1 incomplete)	UL1-3, UR1-2
second metacarpal, left – complete	
fourth metacarpal, left – complete	
3 atlas vertebrae – complete	CV1-1 – CV1-3
3 cervical vertebrae – unidentified, complete	UCV1-3
17 thoracic vertebrae – 15 complete, 2 incomplete	TV1-17
fifth lumbar vertebra – incomplete, missing transverse processes	LV5-1
fifth lumbar vertebra – incomplete, missing right transverse process	LV5-2
11 lumbar vertebrae – 7 complete, 4 incomplete	LV1-11
30 ribs – 15 left (1 complete, 14 incomplete), 15 right (incomplete)	RL1-15, RR1-15
5 rib fragments – 1 left, 4 unsorted	
paired innominates – complete	Inn Pair 1
9 innominates – 3 left (1 complete, 2 incomplete), 6 right (incomplete)	IL1-3, IR1-6
innominate fragment – unsorted, partial acetabular fossa, burned	
15 femora – 9 left (3 complete, 6 incomplete), 6 right (1 complete, 5 incomplete)	FL1 - FL9, FR1 - FR6
femoral fragment, right, incomplete – diaphysis	
12 tibia – 5 left (3 complete, 2 incomplete), 7 right (2 complete, 5 incomplete)	TR1-7, TL1-5
2 tibial fragments – 1 diaphysis, 1 partial proximal	
fibula, left – complete	FibL1
calcaneus, left – lateral portion	
first metatarsal, left – complete	
talus, left – complete	
4 large cranial fragments – 2 parietal, 2 unidentified	
8 cranial vault fragments – cutmarks	
44 cranial vault fragments	
19 facial fragments	
32 rib fragments	
61 long bone fragments	
127 miscellaneous fragments	
<u>Subadult Remains</u>	
Subadult 1	
right tibia – incomplete	
Subadult 2	
2 femora – left (incomplete), right (incomplete)	
Subadult 3	
right femur – incomplete	
Subadult 4	
right humerus – incomplete	
Subadult 5	
left humerus – incomplete	
Subadult 6	
right humerus – incomplete	
Subadult 7	
right humerus – incomplete	
Subadult 8	
right humerus – incomplete	
Subadult 9	
right humerus	
Subadult 10	
left humerus – incomplete	
<u>Miscellaneous Subadult Remains</u>	
Cranium 11	CRN11
frontal – incomplete	
parietals, left and right – incomplete	

Table 4. continued.

Cranium 15	CRN15
parietal, left – incomplete	
occipital – incomplete	
Cranium 16	CRN16
frontal – incomplete	
parietals, left and right – incomplete and complete	
occipital – incomplete	
maxilla, left and right – incomplete and complete	
sphenoid - incomplete	
palatine, left – incomplete	
nasal concha, left – complete	
9 maxillary teeth	
5 mandibles – all incomplete	Misc. SA Mandible 1 – 5
2 frontal – both incomplete	
right parietal – incomplete, reconstructed	
occipital – incomplete	
pars basilaris – complete	
left (?) temporal – petrous portion (incomplete)	
left rib – incomplete	
cervical vertebra – incomplete	
thoracic vertebra – incomplete	
fifth lumbar vertebra – incomplete	
sacrum – incomplete	
right clavicle – incomplete	
right (?) radius – incomplete	
2 innominates – 1 right ilium (incomplete), 1 ischio-pubic ramus (incomplete)	
right femur – incomplete	
2 tibiae – left (incomplete), right (incomplete)	
left calcaneus – incomplete	

Table 5 Cranial Metrics (mm). 13WD402, Burial Project 2378, Woodbury County, Iowa.

Cranial Measurement	CRN1	CRN2	CRN3	CRN4	CRN5	CRN7	CRN8	CRN9	CRN11	
Maximum cranial length	(192)		(177)			(144)				
Maximum cranial breadth	(125)									
Basion-bregma height	144									
Cranial base length	110									
Biauricular breadth	125									
Minimum frontal breadth	(100)	93	88				93	(90)	87	
Upper facial breadth	(113)	102	95				103	(103)	(102)	
Biorbital breadth	(106)	96	(86)				95	(96)	(96)	
Frontal chord	113	(106)	104		117		(105)	(113)	(109)	
Parietal chord	112	102	(109)		116					
Occipital chord	106		96			(103)				
Foramen magnum length	42					102				
Foramen magnum breadth	32									
Mastoid length (L/R)	(26)/(33)	-(27)				(23)-				
Mandible 1 Mandible 2 Mandible 3										
Mandible Measurement	L/R	L/R	L/R	LM1	LM2	RM1	RM2	RM3	RM4	RM5
RM6										
Bicondylar breadth	(130)	(124)								
Bigonial breadth	98	(97)								
Length of ramus	68	65	(68)/(65)???	57	55	45				
Maximum breadth of ramus		46/44	46/43	(42)	40	35				
Minimum breadth of ramus	35/37	32/32	(34)/32	(33)	(30)	26	(36)	(32)	(41)	(31)
Height of mandibular body	(36)/(35)	24??/31		(32)	34	(27)	(35)			
(32)??										
Length of mandibular body	88	75				(74)	(78)			(82)
Breadth of mandibular body	13/14	10/10		(9)	11	8	9	10		(10)
Height of symphysis	(35)?	(35)		30						(33)
(34)										
Gonial angle	135	134	???	(140)-						
Condyle mesiolateral length	-/23	(19)/19	21/(21)	(17)	(15)	(15)				
Condyle anteroposterior length	(11)/11	9/9	10/9	(8)	10	(7)				

Note: () indicates approximated measurements

Table 6. Adult Dental Inventory, 13WD402, Burial Project 2378, Woodbury County, Iowa.

Tooth	Presence	Attrition:		Attrition – Molars:		
		I, C, PM	Mes-buc	Mes-ling	Dis-ling	Dis-buc
Mandible 1						
LM3	4		0	0	0	0
LM2	4		0	0	0	0
LM1	4		0	0	0	0
LP2	4	9				
LP1	5	9				
LC	5	9				
LI2	4	9				
LI1	9	9				
RM3	4		0	0	0	0
RM2	4		0	0	0	0
RM1	4		0	0	0	0
RP2	4	9				
RP1	5	9				
RC	4	9				
RI2	9	9				
RI1	9	9				
Mandible 2						
M3	5		0	0	0	0
LM2	4		0	0	0	0
LM1	4		0	0	0	0
LP2	4	9				
LP1	4	9				
LC	4	9				
LI2	4	9				
LI1	4	9				
RM3	5		0	0	0	0
RM2	4		0	0	0	0
RM1	4		0	0	0	0
RP2	2	3				
RP1	5	9				
RC	4	9				
RI2	4	9				
RI1	4	9				
Mandible 3						
LM3	2		4	3	4	4
LM2	2		4	4	4	4
LM1	2		6	5	5	5
LP2	5	9				
LP1	3	9				
RM3	2		4	2	4	4
RM2	2		4	3	3	4
RM1	2		5	3	3	5
LP2	2	3				
LP1	5	9				
LC	3	9				
R. Mandible 1						
LC	3	9				
LI2	5	9				
LI1	5	9				
RM3	2		1	1	1	1
RM2	5		0	0	0	0
RM1	2		5	3	3	5
RP2	5	9				

Table 6. continued.

Tooth	Presence	Attrition:		Attrition – Molars:		
		I, C, PM	Mes-buc	Mes-ling	Dis-ling	Dis-buc
R. Mandible 1 continued						
RP1	5	9				
RC	5	9				
RI2	5	9				
RI1	5	9				
R. Mandible 2						
RM3	5		0	0	0	0
RM2	5		0	0	0	0
RM1	5		0	0	0	0
RP2	5	9				
RP1	5	9				
RC	5	9				
RI2	5	9				
RI1	3	9				
R. Mandible 3						
RM3	5		0	0	0	0
RM2	5		0	0	0	0
RM1	5		0	0	0	0
RP2	5	9				
RP1	5	9				
RC	3	9				
R. Mandible 4						
RM3	2		3	1	4	4
RM2	2		5	2	3	5
RM1	9		0	0	0	0
R. Mandible 5						
LC	3	9				
LI2	5	9				
LI1	5	9				
RM3	4		0	0	0	0
RM2	4		0	0	0	0
RM1	4		0	0	0	0
RP2	5	9				
RP1	5	9				
RC	5	9				
RI2	5	9				
RI1	5	9				
R. Mandible 6						
LI1	3	9				
RM3	2		2	2	1	1
RM2	2		7	5	3	5
RM1	4		0	0	0	0
RP2	5	9				
RP1	5	9				
RC	5	9				
RI2	5	9				
RI1	9	9				

Table 6. continued.

Tooth	Presence	Attrition:		Attrition – Molars:		
		I, C, PM	Mes-buc	Mes-ling	Dis-ling	Dis-buc
L. Mandible 1						
LM3	2		1	1	1	1
LM2	5		0	0	0	0
LM1	2		5	3	3	5
LP2	5	9				
LP1	5	9				
LC	5	9				
LI2	5	9				
LI1	3	9				
L. Mandible 2						
LM3	9		0	0	0	0
LM2	4		0	0	0	0
LM1	2		7	7	7	7
LP2	5	9				
LP1	5	9				
LC	5	9				
LI2	5	9				
LI1	5	9				
RI1	3	9				
L. Mandible 3						
LM3	2		1	1	2	1
LM2	2		4	3	3	4
LM1	2		6	5	5	5
LP2	3	9				

Dental Key:

Presence

- 2 Present, development completed, in occlusion
- 3 Missing, with no associated alveolar bone
- 4 Missing, with alveolus resorbing or fully resorbed: antemortem loss
- 5 Missing, with no alveolar resorption: postmortem loss
- 9 Unobservable

Attrition (I, C, PM)

- 3 Dentin line of distinct thickness
- 9 Unobservable

Attrition (molars)

- 0 Unobservable
- 1 Wear facets invisible or very small
- 2 Wear facets large, but cusps and surface features still evident
- 3 Any cusp in quadrant is rounded, but not flat
- 4 Quadrant is worn flat, but no dentin is exposed (except pinprick-sized)
- 5 Quadrant is flat, dentin exposed on ¼ of quadrant
- 6 More than ¼ of dentin is exposed, with enamel ring still complete
- 7 Enamel is found on only two sides of quadrant
- 8 Enamel on only one side of quadrant, but enamel is still thick
- 9 Enamel on only one side of quadrant and it is very thin

Table 7. Subadult Dental Inventory, 13WD402, Burial Project 2378, Woodbury County, Iowa.

Tooth	Presence	Attrition:		Attrition – Molars:		
		I, C, PM	Mes-buc	Mes-ling	Dist-ling	Dist-buc
Cranium 16						
<i>Maxilla</i>						
LM3	5		0	0	0	0
LM2	2		1	2	1	1
LM1	2		3	5	4	1
LP2	5	9				
LP1	5	9				
LC	5	9				
LI2	5	9				
LI1	5	9				
RM3	8		0	0	0	0
RM2	2		1	2	1	1
RM1	2		3	4	4	1
RP2	2	1				
RP1	2	1				
RC	2	2				
RI2	2	2				
RI1	5	9				
SA Mandible 1						
RM2	5		0	0	0	0
RM1	5		0	0	0	0
rdm2	3		0	0	0	0
SA Mandible 2						
LM3	5		0	0	0	
LM2	5		0	0	0	0
LM1	3		0	0	0	0
SA Mandible 3						
LM3	5		0	0	0	0
LM2	8		0	0	0	0
LM1	2		2	2	2	2
LP2	9	9				
LP1	8	9				
ldm2	2		3	0	3	0
ldm1	5		0	0	0	0
LC	8	9				
lc	5	9				
LI2	5	9				
LI1	5	9				
RC	9	9				
RI2	5	9				
RI1	5	9				
SA Mandible 4						
RM3	1		1	1	1	1
RM2	5		0	0	0	0
RM1	5		0	0	0	0
dm2	3		0	0	0	0
SA Mandible 5						
LM3	8		0	0	0	0
LM2	5		0	0	0	0
LM1	5		0	0	0	0
LP2	5	9				
LP1	5	9				
LC	3	9				

Table 7. continued.

Dental Key:

Presence

- 1 Present but not in occlusion
- 2 Present, development completed, in occlusion
- 3 Missing, with no associated alveolar bone
- 5 Missing, with no alveolar resorption: postmortem loss
- 8 Present but unobservable (e.g. teeth in crypts)
- 9 Unobservable

Attrition (I, C, PM)

- 1 Unworn or small facets
- 2 Point or hairline of dentin
- 9 Unobservable

Attrition (molars)

- 0 Unobservable
- 1 Wear facets invisible or very small
- 2 Wear facets large, but cusps and surface features still evident
- 3 Any cusp in quadrant is rounded, but not flat
- 4 Quadrant is worn flat, but no dentin is exposed (except pinprick-sized)
- 5 Quadrant is flat, dentin exposed on ¼ of quadrant

Table 8. Adult Dental Metrics, 13WD402, Burial Project 2378, Woodbury County, Iowa.

Tooth	Mesiodistal	Buccolingual	CEJ mesiodistal	CEJ buccolingual
Mandible 2				
RP2	6.6	8.3	4.5	6.6
Mandible 3				
LM3	11.5	11.0	(9.5)	
LM2	10.6	10.9	9.5	
LM1	10.3	10.7	9.6	8.6
RM3	11.2	11.3		
RM2	11.0	10.6	4.3	
RM1	10.9	10.7	9.4	8.8
RP2	6.9	9.1	5.1	7.1
R. Mandible 1				
RM3	10.3	9.7	8.2	7.5
RM1	11.2	10.3	8.4	8.0
R. Mandible 4				
RM3	11.7	10.5	8.7	
RM2	12.5	11.6	8.9	9.4
R. Mandible 6				
RM2	(11.5)		8.7	8.5
L. Mandible 1				
LM3	12.4	11.3	9.5	8.5
LM1	12.0	11.2	9.2	8.5
L. Mandible 2				
LM1	10.5		8.5	8.5
L. Mandible 3				
LM3	9.8	8.9		
LM2	11.7	10.4	9.5	8.3

Table 9. Subadult Dental Metrics, 13WD402, Burial Project 2378, Woodbury County, Iowa.

Tooth	Mesiodistal	Buccolingual	CEJ mesiodistal	CEJ buccolingual
Cranium 16				
<i>Maxilla</i>				
LM2	9.4	11.7	7.0	10.6
LM1	11.4	11.9	7.8	10.3
RM2	9.4	11.7	7.6	10.4
RM1	11.0	12.1	7.2	10.3
RP2	7.1	9.1	4.4	8.0
RP1	7.2	9.2	4.7	8.0
RC	7.8	8.3	5.7	7.5
RI2	7.6	5.9	5.6	5.9
SA Mandible 3				
LM1	11.7	(10.6)	(9.9)	(9.4)
ldm2	(9.9)	(8.7)	8.1	6.9
SA Mandible 4				
RM3	12.4	11.4	10.3	9.9

Table 10. continued.

Innominate	IL2								
Maximum height	231/227	207							
Maximum breadth	162/169	153							
Pubis length	73/75	73							
Ischium length	96/-	89							
Femur (left)	FL1	FL2	FL3	FL4	FL5	FL6	FL7	FL8	FL9
Maximum length	480	467	468						
Bicondylar length	477	467	467						
Anteroposterior diameter at midshaft	29	31	34			(21)	(23)	(21)	(28)
Mediolateral diameter at midshaft	29	31	27			(22)	(24)	(19)	(23)
Vertical diameter of head	(51)	49	46	48	(41)	39			
Circumference at midshaft	94	97	95			(71)	(75)	(67)	(82)
Subtrochanteric anteroposterior diameter	29	27	25	28	23	20	22	20	(24)
Subtrochanteric mediolateral diameter	39	38	35	36	33	30	30	25	(32)
Bicondylar breadth	88		80						
Femur (right)	FR1	FR2	FR3	FR4	FR5	FR6			
Maximum length	(438)								
Bicondylar length	435								
Anteroposterior diameter at midshaft	28	(24)	(21)	(27)	(24)	(30)			
Mediolateral diameter at midshaft	26	(27)	(24)	(22)	(23)	(25)			
Vertical diameter of head	(44)	44	39	42					
Circumference at midshaft	88	(84)	(71)	(78)	(75)	(88)			
Subtrochanteric anteroposterior diameter	24	(23)	20	23	21				
Subtrochanteric mediolateral diameter	33	(33)	30	31	30	(72)			
Tibia (left)	TL1	TL2	TL3	TL4	TL5				
Maximum length	341	374	347						
Physiological length	330	(367)	(335)						
AP diameter at nutrient foramen	31	34	(33)	33	38				
SI diameter at nutrient foramen	30	22	(24)	20	20				
Circumference at nutrient foramen	84	93	(89)	85	77				
Proximal breadth	66	-	-	(70)					
Distal breadth	-	(50)	(48)-						
Tibia (right)	TR1	TR2	TR3	TR4	TR5	TR6	TR7		
Maximum length	395	370							
Physiological length	384	357							
AP diameter at nutrient foramen	37	35	38		(31)				
SI diameter at nutrient foramen	22	25	24		(18)				

Table 10. continued.

Tibia (left) continued					
Circumference at nutrient foramen	98	96	102	(78)	49
Proximal breadth	78	(75)	82	47	48
Distal breadth	54	52	(47)		
Fibula	FibL1				
Maximum length	401				
Maximum diameter	17				
Talus	TalL1				
Maximum talar length	61				
Talar width	45				
Maximum height	33				

Table 11. Subadult Postcranial Metrics (mm), 13WD402, Burial Project 2378, Woodbury County, Iowa.

	Subadult 4	Subadult 5	Subadult 6	Subadult 7	Subadult 8
Humerus	Right	Left	Right	Right	Right
Maximum length of diaphysis		(226)	(272)	(268)	(278)
Maximum width of distal extremity			(45)	(52)	(53)
Maximum diameter at midshaft	(18)	(22)	(19)	(23)	(20)
		Subadult 2		Subadult 3	
		Right		Left	
Femur					
Maximum length of diaphysis		(224)			
Maximum width of distal extremity		(41)			
Maximum diameter at midshaft		18		(18)	

Appendix A

Brief History of Siouxland Sand and Gravel Site, 13WD402

Compiled by Julie McCarty and Brianna Hoffmann

1972

- Letter to Richard Turner, Att. General from M. McKusick
 - Court orders about burial mounds, laws about burials and human bones
- Request for opinion
 - Marshall McKusick on Indian mound problems
- Newspaper article
 - Confrontation develops at Ancient Indian Burial Ground, *Sioux City Journal*, August 1972
- Archaeological survey sheet
 - Duane Anderson
 - Bones collected by Bill Diamond
- Letter to Adrian D. Anderson from Bill Diamond
 - August 18: Mrs. Kampen called about find of bones at gravel site, Bill Diamond gathered specimens
 - August 24: Siouxland Sand and Gravel called and said they had recovered additional skeletons
 - August 25: Native Americans found out and attacked Mr. Diamond
- Letter to Bill Diamond from M. McKusick
 - Police protection is necessary against AIM
- Letter to Clifford Peterson from M. McKusick
 - RE: Police protection

1975

- Article
 - A Long-Nosed God Mask from N.W. Iowa, *American Antiquity* 40(3), July 1975.
- Research Paper
 - Human Remains from the Sioux Land Sand and Gravel Co., by A. K. Fisher. Vol. 3, No.6.

1978

- Phone calls
 - Pat Williams called and said secondary burials were being removed
 - Called gravel company and they said they knew nothing of any finds
- Letter to Bailey from D. Anderson
 - States the legal action that will be taken against Mr. Bailey
- Phone calls
 - Called Betty Nolan and explained situation; she then suggested some procedures
- Field notes by Joe Tiffany, October 16
 - Destruction of site by vandals, ignorance of landowner, neglect by the state. The rest of the site must be preserved by close monitoring of quarry operations

1979

Article

The Siouxland Sand and Gravel Site 13WD402: New Data and the Application of Iowa's New State Law Protecting Ancient Cemeteries, by Anderson et al., *Journal of the Iowa Archeological Society*, vol. 26, 1979.

Letter to D. Anderson from Dan Zweiner

About an article in *Sioux City Journal* and children digging up Indian bones

Field notes Larry Abbott and John Kean, April 9

Mr. Bailey wanted to "skim" the top of the ridge to check for remaining burials. He was told only Duane Anderson could decide if further digging was to take place. Went back to site to collect artifacts and bones. Bailey still wants to move burials.

Letter to Police Chief from D. Anderson, April 10

Request assistance in protecting cemetery

Letter to D. Anderson from Frank O'Keefe, Chief of Police, April 20

Some cooperation by police, patrol cars, charges brought against anyone found digging

Note to Frank O'Keefe from Duane Anderson, April 23

Sent article about events that had taken place at the site

Paper

A Long-Nosed God Mask from Woodbury Co. Iowa, by Duane Anderson and Pat Williams

Research Paper

Human Skeletal Remains Collected on 10, April, 1979 from the Siouxland Sand and Gravel Co. Site, 13WD402, by Alton K. Fisher, Vol. 5, No.1 (1980).

1983

Letter to Duane Anderson from Patricia Williams, March 1983

Hesitation of taking action while driving by the site because of Bailey watching

1984

Site Record, October 11, 1984

200+ primary burials, collected by Bill Diamond, photos, map of site

1985

Letter to Bailey from Duane Anderson, June 10

Reminding Orville of the 1978 agreement

Letter to Bailey from Duane Anderson, June 28

Requesting information regarding protection of the cemetery

Letter to Bailey from Duane Anderson, December 31

Flew over site and confirmed the site had not been disturbed by Bailey

1986

Project 216

Letter to Larry Bradley from Elizabeth Stately (Sioux City Indian Center), September 15, 1986

Request that Bradley of USD survey Bailey's property

Phone call to Buckanaga from Steve Lensink, Sept, 22, 1986

Buckanaga agreed to send all bones to OSA

Phone call to Elizabeth Stately, October 6, 1986

Said Siouxland Sand and Gravel being used as a quarry again

Field notes October 7-8, 1986-Shirley Schermer

Bailey had widened the blufftop and he said he had found no bones

Schermer had found several bones and concluded Bailey had destroyed most of the site
Letter from Patricia Williams to Schermer, October 8, 1986
Visit to 13WD402; site had been altered much since her last visit in 1979. Suggested salvaging the site soon or it could be too late as Bailey's activities continue.
Letter to Bailey from J. Sarcone (Att. General), October 14, 1986
Informed Bailey he had broken the 1978 contract; if any further complaints about his activity surfaced, legal action would be taken.
Letter to Bailey from Joseph Tiffany, October 24, 1986
Bailey must not destroy the cemetery any further and must report any bones found outside the cemetery area to OSA.

Project 219

Field notes, December 11-12 Shirley Schermer
Went to Sioux City, met with surveyor Gregg Stroschien, many reporters; Mr. Bailey arrived. Schermer and Stroschien staked the boundaries of the cemetery.
Article
State orders quarrying halted at old Indian site, *Des Moines Register*, December 13, 1986
Article
Indian Center grants 60-day amnesty for return of remains, *Sioux City Journal*, December 14, 1986
Phone calls to Maria Pearson, Dec. 19
Buckanaga's plans about bones
Maria says this is breaking the law
OSA must go through Indian Advisory Committee
Gene Buckanaga called and said he will be holding a ceremony at the site
OSA Indian Advisory Committee
Bailey should not haul shale out, and should stop all activities and development in the area
Letter to Buckanaga from Stephen Lensink, Dec. 24
Encouraged Buckanaga to contact members of the Indian Advisory Board concerning a ceremony to be conducted during the reburial of the remains.
Phone call to Maria Pearson from Stephen Lensink, December 29
Buckanaga is cooperating and will send bones to OSA and contact OSA about reburial ceremony
Phone calls by Lensink to John Sarcone, Environmental Law Divisions
Could Bailey legally be restricted from quarrying activities in area
J. Sarcone believed that there is no legal basis
County Attorney for Woodbury, Pat McCormick, is ready to prosecute if Areas A and C are impacted without express approval of OSA.

1987

Phone call by John Sarcone
Told Stephen Lensink there is no legal way to keep Bailey out of Area B, but legal action is possible if Bailey disturbs Areas A or C.
Letter to Bailey from Lensink, Jan. 6
Enclosed map of the area clearly showing Areas A, B, C" and stated legal action could take place if Areas A or C are disturbed.
Phone calls by Gene Buckanaga

Told Stephen Lensink he had received bones from 13WD402 from two individuals. On Jan. 7, 1987, more remains brought from church across the street. Lensink told Buckanaga Shirley Schermer would pick up the bones later.

Phone call by Maria Pearson, Jan. 7
Told Steve Lensink she was concerned about Buckanaga's TV appearance in which he granted amnesty to people who bring in bones to the Sioux City Indian Center. Not legal. Lensink sent copies of the letter he sent Buckanaga to Rick Thomas, Ron Thomas, Indian Advisory Committee, etc.

Phone call to KTIV, Jan. 8
Confirmed they had done an article in which Buckanaga had been interviewed and had made the amnesty statement re: Siouxland Sand and Gravel.

Phone call by Stephen Lensink to Channel 4, Jan. 9
Reporter said Buckanaga claimed it was legal to declare amnesty because of Amendment Number? Lensink told reporter only the OSA has the authority to investigate. Buckanaga said he would go to jail if forced to reveal the identity of individuals turning in the remains.

Phone call to Lensink from Buckanaga, Jan. 9, 1987.
Lensink told Buckanaga that only the OSA has right to investigate the remains. Buckanaga said he had done what he had because he felt it was the right thing to do and it was getting results.

Letter to Buckanaga from Lensink, Jan. 12
Said public should not be involved; there is a professional way to do things. Restated reburial laws and told him his granting of amnesty is not proper. OSA takes care of examination of bones and through Indian Advisory Committee reburial is handled.

Phone call from Buckanaga to Lensink, Jan. 16 1987
He will bring remains to Iowa City on Tuesday, Jan. 20, 1987

Letter from Lensink to Buckanaga, Jan. 16, 1987
Suggested delivering remains to U of I hospitals by Woodbury Co. ambulance and marking them "Archaeological Specimens" to draw less attention to them. Told Buckanaga he should store them in Sioux City until someone from this office can come get them if the ambulance doesn't work out. .

Letter from Lensink to Loren Callender, Major, Jan. 26, 1987
Asks to be informed at all times of possibility of Bailey building on the site

Letter from Lensink to Pat McCormick, Jan. 26, 1987
States Bailey permitted to excavate in Area B but not A or C

Phone calls to Lensink from Bailey, Jan. 27, 1987
Is going to court to try to expand his operation in Area C. Said area A was disturbed

Letter from Lensink to Mose Yanney, court recorder, Jan. 29, 1987
States Area B is the only area Bailey is permitted to dig

Letter from Lensink to Bailey, March 18, 1987
Approval has been obtained to proceed with testing of areas so Bailey can expand his project

Proposal and budget for Siouxland Sand and Gravel by Hannus, April 29, 1987

Letter to Lensink from City Manager of Sioux City, April 29, 1987
They cannot keep Bailey from excavating. There are no markers to ensure the restricted areas.

Letter to Patricia Williams from Shirley Schermer asking her to survey the area and see what stakes are missing

Letter from Patricia Williams to Lensink, May 13, 1987
Some stakes are missing

Phone call from J. Sarcone to Lensink, May 20, 1987.
Cannot prosecute Bailey for activities in Area C unless human remains are disinterred;

cannot prosecute for past offenses

Letter from Patricia Williams to Lensink, June 5, 1987

Bailey has begun building his home. Williams surveyed and no human or cultural remains were found. The basement of the house is completed, and Bailey wants to bring dirt to fill in front of the basement. His long-term plans for the vicinity are rather extensive and much altering will take place.

Letter to Bailey from Lensink, August 19, 1987

Bailey was asked to replace the stakes to protect the cemetery area and to make sure no further disturbance of the cemetery took place.

Article

A Caddoan Trade Vessel From Northwestern Iowa, by Duane Anderson and Joseph A. Tiffany. *Plains Anthropologist* 32(115), 1987.

1988

Field Notes from Mark Anderson, April 14, 1988

No evidence of further work being done in the area. List of items collected.

1989

Notes from Bill Green and Shirley Schermer

Meeting with Orville Bailey at OSA, January 20

Bailey wants the state to either buy the land or let him develop it. Can't afford survey bid from A. Hannus. Possible to do a low-cost survey

Phone call from Schermer to Bailey, March 30

Discussed Area C, proposed possibility of low-cost survey by using field school

Letter to Bailey from Schermer, April 4 .

RE: low-cost survey proposal for Area C

Phone calls from Bailey, April 17 and 18

Wants phone number of the Appeals Board; said he would contact Appeals Board and his lawyer and get back to Schermer.

Copy of letter from city of Sioux City to Bailey, June 5

RE: Grading ordinance and grading permit application. Item 8 refers to GSA restrictions on Areas A and C.

Copy of letter from city of Sioux City to Bailey re: resubmittal of grading permit application, June 16 and June 19. Limited to Area B.

Letter to Bailey from Schermer re: grading permit and notification of upcoming field visit by S. Lensink, June 22.

Field visit by S. Lensink, June 27. No recent disturbance in Area A.

1990

Copy of letter from city of Sioux City to Bailey re: extension of grading permit, June 14. Limited to Area B.

Field visit, notes, by R Thompson, June 26. No recent disturbance in Area A.

2000

Phone call (Voicemail?) from Mark Sorenson to Schermer, August 2

Sorenson previously worked for Siouxland Sand and Gravel, Bailey had recently retired.

Sorenson was asked by Bailey to see if some restrictions on the property could be lifted, if he could pay to have burials excavated.

Phone call from Schermer to Sorenson, August 14

Schermer informed Sorenson that permission would not be given to remove burials from Area A. Sorenson asked if the University would buy the property, Schermer suggested he contact the DNR, County Conservation Board, or Iowa Natural Heritage Foundation if truly interested in selling the property.

E-mail to Schermer from Kevin Pape, September 8

Human remains brought to Pape's office on August 11, 2000 found by an anonymous citizen of Sioux City over 30 years ago, held onto them for many years before turning them in. Citizen found remains near Siouxland Sand and Gravel site.

Research Paper

Human Skeletal Remains Possibly From 13WD402, Woodbury County, Iowa, by Robin Lillie. Vol. 29, No. 2.

2007

E-mail from Dawn Snyder to Lensink, December 10

Informs Lensink that Bailey's Sand and Gravel property recently purchased by Rod Lieber who plans to excavate area for fill dirt, possibly turn into housing development. Lieber is not aware of archaeological sites on the property, and was not informed of any sites prior to purchase of the land. Correspondence between Lensink and Snyder forwarded to Schermer and John Doershuk, State Archaeologist.

E-mail from Schermer to Snyder, December 12

Informs Snyder she had contacted Lieber that morning. Provided with the 1989 engineering plot, Lieber believes site topography has changed since then and will have new map made by different firm. Schermer and Lieber plan to meet on-site in spring before beginning any excavation work.

2008

Phone call (?) between Schermer and Lieber, March 13

DGR engineering firm has prepared new topographic map showing some differences to late 1980s and early 1990s map. Plan site visit for April.

E-mail from Kyle Mullenix, of DGR firm, to Schermer, March 13

Sent new topographic map of the site with preliminary layout and grading plans.

Field notes from Schermer, April 16

Went to Siouxland (?) property with Lieber. Aside from erosion, Area A appeared undisturbed since most recent visits. Lieber will redraw property plans to preserve Area A and submit grading plan to city to eliminate erosional problem in Areas A and B. Will also talk with County Conservation Board about purchasing portion of property consisting of Area A and part of Area C.

Sale of property by Lieber to the Iowa National Heritage Foundation, September 11

2009

Sale of property by Iowa National Heritage Foundation to State of Iowa, February 10

Letter from Zachary Chwirka, of Sioux City Police Department, to Schermer, July 23

Package containing letter to Schermer from Zachary Chwirka of Sioux City PD, copy of JIAS article, and human skeletal remains. Letter explains that Sioux City PD responded to complaint on April 2 regarding human skeletal remains in a garage. The building belonged to Tom Fugle, who stated he found remains in the 1970s, turned them over to Archeological Society. Was told then he could keep those found in garage, remaining bones placed in museums. Human bones turned over to OSA.

Additional Human Skeletal Remains from 13WD402, Woodbury County, Iowa

Robin M. Lillie

Human skeletal remains collected by a hiker and other remains later surface-collected by professional archaeologists represent a minimum of two individuals, an adult, possibly male, and a subadult approximately 4 to 6 years of age. Cultural affiliation is probably Mill Creek.

In late May 2013, Human skeletal remains were collected by a local resident hiking in the area of 13WD402, the Siouxland Sand and Gravel site. The resident turned the remains over to Kevin Pape, Park Ranger at Stone State Park. Pape contacted Shirley J. Schermer, then Director of the Office of the State Archaeologist (OSA) Burials Program. Professional archaeologist Christy Rickers was sent to the site on June 3, 2013, to inspect the area where the remains had been found. Surface collections were made in four areas. All the remains were then sent to the OSA Burials Program for analysis and repatriation or reburial (University of Iowa, Office of the State Archaeologist 2013). A site visit was made by Schermer and Pape in July 2013, and a few additional bone fragments and a tooth were collected from the general area. Site 13WD402 is located in Section 14, T89N, R48W, Woodbury County, Iowa (for site location, see p. 181 this volume). Known as the Siouxland Sand and Gravel Site, it is a Mill Creek cemetery. For a brief history of this site, see Hoffman (this volume). Fragmentary human skeletal remains from the site, representing 38 individuals, have been analyzed previously (Anderson et al. 1979; Fisher 1978, 1980; Lillie and Schermer 1990). Twenty individuals were represented by remains analyzed by Hoffman (this volume). Cultural affiliation is Mill Creek.

Methodology

The osteological analysis follows the guidelines developed by the Paleopathology Association (Buikstra and Ubelaker 1994). Osteological inventories were compiled and are presented in Table 1. Although the remains are described below by when they were collected or from which area, they are combined in the inventory by adult and subadult remains. Cranial metrics (Table 2) were taken following the methods in Howells (1973), Bass (1995), and Moore-Jansen et al. (1994). Postcranial metrics were taken following Bass (1995) and Moore-Jansen et al. (1994). Dental inventories and dental pathologies were documented. Dental attrition was scored using the coding method developed by Hinton (1981). Dental metrics were taken using the guidelines and landmarks defined by Goose (1963). Age estimates were based on dental development (Moorrees et al. 1963a, 1963b). Sex was estimated based on sexually dimorphic metric and nonmetric characteristics defined in Bass (1995).

Osteological Analysis

COLLECTION FROM LOCAL RESIDENT, MAY 2013

The remains collected by a local resident in late May 2013 included adult-sized remains: a left mandible fragment, a left scapula fragment, two rib fragments, an incomplete right femur, an incomplete right tibia,

and three small unidentified fragments. The mandible portion consisted of the left side with the second and third molars in situ. All of the ramus was present except the condyle. Minimum breadth of the left ramus measured 33 mm. Both teeth displayed very little wear. The medial body surface was partially bleached from exposure on the ground surface. The left scapula fragment consisted of the coracoid process with the inferior surface bleached. One of the rib fragments was a body portion from a left rib. It was bleached on the superior and lateral surfaces. The superior margin was damaged with the exposed trabecular bone bleached. The second rib fragment was unisided and all surfaces were bleached. The right femur was missing the proximal fourth including the trochanters. Approximately 4 to 6 cm of the proximal end was bleached on all surfaces. The medial surface of the distal had been damaged recently. The right tibia was missing the proximal end superior to the tibial tuberosity, with approximately 4 cm more missing on the medial and posterior surfaces. The only bleached area was the distal articular surface and fibular notch area. The mandible, femur, and tibia were all robust in appearance. The gonial angle appeared close to a right angle on the mandible portion. Measurements from both the femur and tibia fell in the range for males. Sex was estimated to be male for these three elements.

A shell artifact was recovered along with the remains. It was rectangular in shape, measuring 4.25 cm long by 1.3 cm wide. A hole measuring 0.4 cm had been drilled slightly off center about 0.4 cm below one of the narrow ends. This end also had a slight notch in the middle of the edge. The shell was very white in appearance and may have been exposed on the ground surface.

GENERAL SURFACE COLLECTION – OSA

During the initial site inspection made by the OSA, bone fragments and a tooth were collected in and around the area where the remains had been found by the local resident. The fragments included one long bone shaft fragments and seven small unidentified fragments. All were bleached to some degree from exposure on the ground surface. The tooth was a mandibular right first or second molar. The crown was completely bleached, and the enamel slightly eroded. The roots were about half to three-fourths complete and were still actively forming at the time of the individual's death. If the tooth was a first molar, age estimation is 5 to 6 years, which is consistent with other subadult remains recovered. If the tooth was a second molar, it represents a unique subadult between the ages of 10 and 11 years.

FINDSPOT 1

Findspot 1 was in the same location where the remains were found by the local resident. A canine, possibly mandibular, was recovered. It was bleached on all surfaces and the crown was incomplete. The tooth was probably not very worn, but the occlusal surface was damaged postmortem and could not be assessed for the level of attrition. However, crown height appeared close to complete. In addition to the loose tooth, five small bone fragments were recovered, all but one with at least one surface bleached. One of the fragments was possibly from a rib.

DOWNSLOPE FROM FINDSPOT 1

The remains collected downslope from Findspot 1 included both adult-sized portions and remains from at least one subadult. The adult-sized remains included a small cranial vault fragment; two vertebral body fragments; a right humerus distal end fragment; an articular surface fragment; and two small long bone shaft fragments. All these remains displayed some bleaching. The subadult remains included an incomplete left temporal petrous portion and three loose teeth. The teeth were a completely developed maxillary right deciduous second molar; an unerupted mandibular right first or second molar; and an unerupted, possibly left, mandibular first premolar. Age estimates derived from development of the teeth suggest a subadult in the range of 4 to 6 years. Eighteen miscellaneous bone fragments were recovered along with the adult and subadult remains and may be associated with one or both of them.

One artifact was recovered with the remains. A small disk bead, commonly called a “Cheerio bead,” measured 0.8 cm in diameter and was 0.4 cm thick with a 0.4 cm hole drilled through it.

FINDSPOT 2

Findspot 2 was approximately 10 m northwest of Findspot 1. A long bone shaft fragment from a smaller adult long bone, such as the radius, was the only material recovered. It measured 3.9 cm long with a bleached area on one end measuring 1.3 cm long.

FINDSPOT 3

Findspot 3 was located at the west end of the quarry cut. A possible parietal fragment was found. One corner was bleached on the ectocranial surface. The fragment contained a small suture portion. It measured 3.8 by 3.8 cm and was 0.6 cm thick. It was probably from an adult-sized individual. The suture appeared unfused. Three small unidentified fragments were also collected. Two were bleached. One was possibly a rib fragment.

Conclusion

The remains collected from the surface or eroding out from site 13WD402 represented a minimum of two individuals, one adult and one subadult. Based on postcranial metrics of the femur and tibia, the adult was possibly male. The subadult was represented primarily by dental remains. On the assumption that one of the mandibular right first or second molars was a first molar and the other was a second molar, age is estimated to be between 4 and 6 years. Cultural affiliation of the remains is Mill Creek.

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University of Iowa, Office of the State Archaeologist

- 2013 Burial Project 2894. On file, Office of the State Archaeologist, University of Iowa, Iowa City.

Table 1. Osteological Inventory, 13WD402, Woodbury County, Iowa.

Adult Remains

possible parietal fragment
 cranial vault fragment
 mandible, incomplete – posterior left portion
 mandibular C, unisided
 scapula, left, incomplete – coracoid process
 2 rib fragments, 1 left, 1 unisided
 2 vertebra fragments – body
 humerus fragment, left – distal end fragment
 femur, right, incomplete – missing proximal ¼
 tibia, right, incomplete – missing proximal end
 long bone shaft fragment

Subadult Remains

temporal, left, incomplete – incomplete petrous portion
 maxillary right dm2
 mandibular P1, probably left, unerupted
 mandibular right M1 or M2, unerupted
 mandibular right M1 or M2

Adult or Subadult Remains

3 long bone shaft fragments
 concave articular surface fragment
 36 miscellaneous bone fragments

Table 2. Postcranial Metrics (mm), 13WD402, Woodbury County, Iowa.

Measurement	Left	Right
Femur		
Anteroposterior diameter at midshaft		(31)
Mediolateral diameter at midshaft		(31)
Circumference at midshaft		(95)
Subtrochanteric anteroposterior diameter		28
Bicondylar breadth		80
Tibia		
Anteroposterior diameter at nutrient foramen		36
Mediolateral diameter at nutrient foramen		22
Circumference at nutrient foramen		95

Note: () indicates approximated measurements

Table 3. Dental Inventory and Pathologies, I3WD402, Woodbury County, Iowa.

Tooth	Status L/R	Caries L/R	Pulp Exposure L/R	Alveolar Abscess L/R	Hyper- cementosis L/R	Calculus L/R	Attrition		Enamel Defects		Alveolar Resorption (mm)
							Left	Right	Left	Right	
Mandible											
<i>Mandibular</i>											
M2	2/-	0/-	0/-	9/-	9/-	0/-	2/1-2	0			
M3	2/-	0/-	0/-	1/-	9/-	0/-	1/1	0			
Subadult Teeth											
<i>Maxillary</i>											
dm2	-/1	-/0	-/0	-/0	-/0	-/0	1/1	1/1	9		
<i>Mandibular</i>											
P1	1+7/-							9	9		
M1 or M2	-/1+7								9		
M1 or M2	-/1	-/0	-/0	-/9	-/9	-/0	1/1	1/1	9		
Adult Loose Teeth											
<i>Mandibular</i>											
C, unside	1	9	9	0	0	9	9	9	9		

Key:

- Status*
- 1 = present, tooth only
- 2 = present, tooth in socket
- 7 = unerupted
- Caries*
- 0 = absent
- 9 = unknown
- Pulp exposure*
- 0 = absent
- 9 = unknown
- Alveolar abscess*
- 1 = absent
- 9 = unknown
- Hypercementosis*
- 0 = absent
- 9 = unknown

- Calculus*
- 0 = absent
- 9 = unknown
- Attrition degree (Hinton 1981)*
- Incisors and canines
- 9 = degree cannot be coded
- Premolars
- 9 = degree cannot be coded
- Molars
- 1 = unworn to polish or small facets, no dentin exposure
- 2 = moderate cusp removal
- Attrition form (Hinton 1981)*
- 1 = natural face or slightly blunt
- 2 = flat
- Enamel defect type*
- 0 = normal
- 9 = unknown

Table 4. Dental Metrics (mm), 13WD402, Woodbury County, Iowa.

Tooth	Maxillary			Mandibular		
	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R	Mesial-Distal L/R	Buccal-Lingual L/R	Crown Height L/R
Subadult Loose Teeth						
<i>Mandibular</i>						
dm2	-/9.0	-/10.2	-/6.3			
M1 or M2, unerupted				-/11.3		
M1 or M2				-/11.7	-/10.0	-/7.4
Mandible						
M2				11.5/-	11.0/-	7.3/-
M3				12.1/-	10.9/-	6.0/-