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THE WYOMING ARCHAEOLOGIST

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Table of Contents

1997 SPRING MEETING ANNOUNCEMENT

WYOMING ARCHAEOLOGICAL SOCIETY
WYOMING ASSOCIATION OF PROFESSIONAL ARCHAEOLOGISTS
WYOMING ARCHAEOLOGICAL FOUNDATION

WAPA
Friday, April 25, 1-5 p.m. - Physical Science Center, Casper College

WAS
Saturday, April 26 - Physical Science Center, Casper College

WAF
Sunday, April 27 - Holiday Inn Restaurant

Field Trip - Sunday, April 27
Butler/Rissler Site; Edness Kimball Wilkins Site (both ceramic sites)

Banquet Keynote Address - Adrien Hannus
"The Oldest That's New: A Potpourri of South Dakota Archaeology"
Holiday Inn

Costs
$30 postmarked by April 15;
$40 postmarked after April 15
($15 of the cost is banquet)

WEB SITE
http://www.coffey.com/~was

ATTENTION ATLATLISTS

The Annual Valley of Fire Atlatl Contest is Saturday April 19, 1997. This is a world class event and is sponsored by the World Atlatl Association and the Nevada Parks and Recreation. If you have ever considered competing with some of the best Atlatlists in the USA; this is the place to be.

Registration usually begins at 9:00 AM and the competition at 10:00 AM. The atlatl competition typically consists of 4 target rounds at 15, 40, 60 and 80 meters. This is played similar to golf with the purpose of attaining the lowest possible score. Competitors also throw 5 darts at a 15 meter target (one dart at a time) in the accuracy portion of the competition.

Classes are divided into men, women and children under 16 years old. Trophies are given for first, second and third place winners in those classifications.

Ten competitors (approx.) from all classes with the top scores will compete in a separate 15 and 20 meter accuracy throw using European rules. These results will be listed in the WAA newsletter and displayed in Europe and the USA to establish the top world Atlatlists.

If you are not an experienced Atlatlist, do not be concerned as many beginners are there as well as the experienced. This is a great place to learn how to make an atlatl and dart - primitive or modern. And if you wish to improve your throwing technique; why not learn from the masters.

The Valley of Fire State Park is located approximately 50 miles northeast of Las Vegas and is worth a trip on it's own merit. Allow an extra day to explore the many petroglyphs and unusual rock formations in the unique area.

If you have any questions please call Dean Pritchard at (208) 323-0293 (Boise, Idaho) from 7:00 AM to 7:00 PM any day (E-Mail: Atlatlist@aol.com) or Leni Clubb at (619) 358-7835 (Ocotillo, California).

Other WAA sanctioned events for 1997 include:

April 26*	Idaho State Open Atlatl Competition at Celebration Park - Melba, Idaho**
May 24*	Michigan Atlatl Association Contest - Marshall, Michigan
June 14,15*	Fremont Indian State Park Atlatl Contest - Sevier, Utah
June 21,22*	World Open Atlatl Competition - Fort Casper, Wyoming
July 4,5,6*	Colorado Archaeological Society Encampment - Radium, Colorado
July 12*	Aurora Atlatl Contest - Aurora, Colorado
July 19*	Annual Montana Mammoth Hunt - Blacktail Ranch, Montana
Sept 20	Chimney Point State Historical Site - Addison, Vermont
Sept 26,27,28*	Michigan Atlatl Association Atlatl Contest - Cheboygan, Michigan
Sept 27	West Virginia State Atlatl Championship - Elkins College, West Virginia
Sept 27*	N.E. Oregon Open Atlatl Challenge - Umatilla Indian Reservation - Umatilla, Oregon
October 4*	Dan O'Laurie Museum - Moab, Utah

Plus WAA Atlatl Events in Germany, France, Belgium and many additional non-sanctioned Atlatl Events in the USA.

* Approximate dates - to be verified later; **Non-sanctioned WAA Event at this time

EDITOR'S NOTE: *Wil Husted received the above announcement from the Idaho Archaeological Society, P. O. Box 1888, Boise, ID 83701 and thought the WAS membership would be interested in the information.*

STATE ARCHAEOLOGICAL SOCIETIES AND COMMUNICATION

by
Wil Husted

I have been knocking around the Northwestern Plains-Rocky Mountain archaeology scene for nearly 35 years. One thing that has impressed me mightily is a general lack of communication between archaeologists working in different states and regions. Over the years, I have found that one good way to keep an ear to the ground, so to speak, is membership in state archaeological societies, many of which publish excellent journals like Archaeology in Montana. I belong to the societies of Colorado, Idaho and Wyoming in addition to Montana. For the past few years I have been conducting a very informal survey of the membership of the Montana and Wyoming groups to get some idea of how many belong to the other's society. Not very many, unfortunately! It is my understanding that the Montana Archaeological Society membership has been declining the last few years. This is a most unhealthy situation for the organization. One way to increase our membership might be to join our neighboring states' archaeological societies and participate in their annual meetings and other events. Your appearance at annual meetings may stimulate greater and wider interest in the Montana Archaeological Society. At the least, you will become better informed of archaeological projects, events and trends in the surrounding area. I strongly urge each member to seriously consider joining the following societies:

Membership Chairperson
Colorado Archaeological Society
920 Balsam Street
Cortez, CO 81321-2608
Journal: Southwestern Lore
Annual membership: individual $12.50; family $15.00

Idaho Archaeologist
Department of Anthropology
Boise State University
1910 University Drive
Boise, ID 83727
Journal: Idaho Archaeologist
Annual membership: $12.00

Robert Christensen
Secretary/Treasurer
North Dakota Archaeological Association
203 8th Avenue N. W.
Mandan, ND 58554
Journal of North Dakota Archaeological Association
Annual membership: Individual $15.00

Kris Walther
South Dakota Archaeological Society
27944 443rd Avenue
Freeman, SD 57029
Journal: Journal of the South Dakota Archaeological Society
Annual membership: Individual $12.00; family $15.00

Carolyn Buff
Executive Secretary/Treasurer
Wyoming Archaeological Society
1617 Westridge Terrace
Casper, WY 82604
Journal: The Wyoming Archaeologist
Annual membership: Individual $10.00; Canada and foreign $19.00

PRELIMINARY ANNOUNCEMENT

THIRD BIENNIAL ROCKY MOUNTAIN ANTHROPOLOGICAL CONFERENCE

18-20 SEPTEMBER, 1997

HOLIDAY INN, BOZEMAN, MONTANA

The Third Annual Rocky Mountain Anthropological Conference will be held in Bozeman, Montana on September 18-20 of 1997. Now is the time to start planning to attend this important regional conference. Interested individuals are encouraged to organize forums as a possible alternative to symposia, to enable thoughtful, focused, and more open discussion of carefully delineated themes/topics. Please contact the conference organizers for information about organizing a forum. The organizers of the conference encourage the participation of individual researchers from all areas of anthropological study pertaining to the Rocky Mountains. Researchers in related fields addressing issues of past environmental conditions are also welcome.

Deadline for symposium or forum proposals is 15 March 1997. Other deadlines and information will be announced in future communications.

Organizers are:

Ken Cannon
National Park Service
Midwest Archeological Center
Federal Building, Room 474
100 Centennial Mall North
Lincoln, NE 68508-3873
Phone: 402/437-5392 x139
Fax: 402/437-5098
EMail: Ken_Cannon@nps.gov

Jack Fisher
Department of Sociology
Montana State University
Bozeman, MT 59717
Phone: 406/994-5250
Fax: 406/994-6879
Email: isijf@msu.oscs.montana.edu

PRELIMINARY ANNOUNCEMENT

1997 ANNUAL MEETING

MONTANA ARCHAEOLOGICAL SOCIETY

APRIL 11-13, 1997

HOLIDAY INN, BOZEMAN, MONTANA

The annual meeting of the Montana Archaeological Society will be held April 11-13 in Bozeman, MT. Registration and the fund raising auction will take place the evening of Friday the 11th at the Holiday Inn. Papers on the archaeology of Montana and surrounding areas will be presented all day Saturday the 12th at the Museum of the Rockies. The banquet will be Satureday evening at the Holiday Inn.

Following the banquet, the keynote address, Ethnoarchaeological Research Among Present-Day Forager Peoples of Namibia, will be presented by Dr. John Fisher of Montana State University. The keynote address is open to the public at no charge.

On Sunday morning Dr. Ken Karsmizki will speak at the Museum of the Rockies on A Multi-Pronged Attack on Lewis and Clark: Expanding the Archaeological Effort to Four Site Locations.

The MAS publishes two issues of the journal Archaeology in Montana and usually one newsletter every year. Regular membership is $18, student membership is $10, and family membership is $25.

For additional information on the annual meeting or membership, write to MAS, P.O. Box 2123, Billings, MT 59103.

A REQUEST FROM THE STATE ARCHAEOLOGIST FOR RESEARCH ASSISTANCE

Dear Wyoming Archaeological Society Members

Avocational archaeologists in Wyoming, especially members of the Wyoming Archaeological Society (WAS), always have been tremendous sources of information on important archaeological discoveries. Similar voluntary support is available to researchers elsewhere on the Plains, and Dr. Jack Hofman has been able to utilize such help to develop a fluted point survey in states like Oklahoma and Kansas. He and I would like to initiate a similar project for Wyoming, using the attached reporting form.

If you know of a fluted point (Folsom, Clovis) locality, or have a collection from one, please fill this form out and return it to one of the addresses listed at the bottom. You do not have to worry about completing every entry, and you only need to be as specific as you can. If you know a site location is in a particular county our township, but do not know the section, then just list the county or township. We are interested in descriptions and measurements of whole or fragmentary projectile points, and all the information you provide will be kept confidential.

We hope to compile information on as many discoveries as possible over the next year or so. Folsom and Clovis weapon technologies are relatively easy to identify compared to other Paleoindian assemblages, so we are confident the geographic distribution of known localities may help us understand certain aspects of prehistoric human behavior. From the forms you return, we can begin to get a picture of this distribution. We also can begin to see if certain raw materials show up more in one area than another, and whether or not different production technologies (flaking patterns) occur throughout the entire region. Many other lines of research may develop from this project.

Your participation will be a big help in our effort to document fluted point localities in Wyoming, and any information you provide will be greatly appreciated. Please call the Wyoming State Archaeologist's office at the number provided if you would like to visit about filling out a form, discuss a site or artifact you would like us to see, or if you just want to talk about archaeology.

Thank you in advance for any assistance you can provide. We will try to keep the WAS membership up-to-date through *The Wyoming Archaeologist* as we interpret any findings.

Dr. Mark E. Miller
State Archaeologist
Wyoming State Archaeologist's Office
Wyoming Department of Commerce
Department of Anthropology
University of Wyoming
Laramie, WY 82071-3431

GREAT PLAINS FLUTED POINT SURVEY

specimen data sheet 5/1/92 JLH

Date:_______ Recorder:_________ Spec. Number:______ Type:_______
Collection of:____
Specimen found by:____
Find Spot--State:_______ County:___________ River System:________
Site:__________________ Legal:_________ 1/4S:____ T:____ R:______
Context:(field,pasture,road,streambed,terrace,upland,slope,excav.)
____
Type of Specimen: point--fluted/unfluted preform--fluted/unfluted
____
Portion present: (complete, base, blade, tip, edge, channel flake)
____
Lithic Material: (include translucence, color, texture)
____
Ultraviolet response: LW/SW______________________________________
Thermal alteration:____
Abrasion/Patina:____

Measurements (cm/in):
Length:______Width:_______Basal Width:_______Thickness:_______
Fluted Thickness:______Basal Depth:________ Weight:______(gm/oz)
Flute A: length___width_____; Flute B: length_____width_______
Flake Scars (per/cm):face_____edge_____; Stem Length:__________

Reworking: (tip/base/edge)_______________________________________
Flaking Pattern A:_______________B:_________________
Flake Blank: (Y/N)____
Distal end of flute A: (extended to tip y/n)
removed by flaking:____hinged:____feathered:_____missing:_______
Nipple: (present/absent/remnant)_________________________________
Base outline:____________Edge outlines:__________________________
Edge Grinding A:_____Edge Grinding B:_____ Basal Grinding: _______

Photos: y/n, b&w, slides, color/ Draw specimen below or on back

Notes:

Return form to:

Jack L. Hofman
Anthropology Dept.
622 Fraser Hall
University of Kansas
Lawrence, KS. 66045
913/864-4103

or

Mark E. Miller
Anthropology Dept.
Univ. Station Box 3431
University of Wyoming
Laramie, WY 82071
307/766-5301

BIOARCHAEOLOGICAL RESOURCES ON THE NORTHWESTERN PLAINS: A BIBLIOGRAPHY

by
Laura L. Scheiber

The study of human skeletal remains from sites on the Northwestern Plains has been seriously pursued for at least sixty years. Despite continuing research efforts, bioanthropology has changed nationally and regionally during the last decade or so and certainly during the last few years. With the passing of the Native American Graves Protection and Repatriation Act (NAGPRA) in 1990 and the ensuring years of draft regulations, physical anthropologists and archaeologists and the museums, universities, and companies that employ them have been forced at times to reconsider their positions and goals. Increased focus on American Indian concerns in the process of reconstructing the past has contributed to changing opinions about how and why anthropologists use mortuary evidence in their analyses.

Given this context and the efforts to improve communication on all sides, now seems like a good time to summarize the published sources which are available for students and researchers in pursuit of bioarchaeological study of the Northwestern Plains, of using human bones and burial sites as one line of evidence in the process of understanding the events of the past. As specialists, we often become extremely familiar with the results of historical investigations within our own areas without understanding the relationships between adjacent areas or various data sets. Many researchers would like to use bioarchaeological information for strengthening their interpretations. Increasing numbers of college students are interested in the study of physical anthropology and are writing class papers as well as graduate theses. A published summary of past investigations can be helpful in this regard.

This bibliography is a selected list of publications and manuscripts pertaining to sites with known mortuary contexts on the Northwestern Plains. It is not a commentary on the political and ethical concerns surrounding the studying of human skeletal remains or mortuary sites but on the results of past research. A few of the sources which have been included focus on osteological data rather than reference to particular archaeological sites. Others are outside the scope of the geographic area but are important starting points for current issues such as repatriation. Additional information can be found by reviewing the National Park Service's *Federal Archaeology*, now reorganized and renamed *Common Ground*.

Considering published versus unpublished works is necessary when compiling a list of sources. This bibliography includes only unpublished manuscripts which are in the process of publication, are part of current graduate student research, or may be appropriate for more widespread distribution. Many manuscripts were not included in this list in an attempt to encourage people to publish their findings and to contribute their research to a community larger than their academic department or friends. This process is part of the ethical treatment of the past. Additionally, some of the information contained in such unpublished sources was preliminary and/or incorrect when written and has subsequently been updated. Caution should be used in utilizing this data unless the inconsistencies are made clear.

Students likewise have an obligation to provide laboratories with copies of their reports. These class papers should be systematically collected and put together as special contributions to anthropology or their conclusions are too often lost. The same studies are then re-conducted, the same data retabulated.

The mortuary sites presented in the references below are usually reported in one of two ways. In the most common, the site is classified as a "burial" and, as recorded, is limited primarily to the few meters surrounding a human skeleton and associated funerary objects. Other components such as structures, features, or additional artifacts are rarely present. How the burial relates to the surrounding landscape is sometimes addressed. In the second type of report, the site is classified as a camp or a habitation or an activity area with a few human bones. The significance of the skeletal remains is often lessened, and subsequent articles about these sites often fail to mention the skeletal material. The mortuary context is thus disassociated from later interpretations.

Most of the osteological work cited here has been conducted by or with George Gill at the Department of Anthropology, University of Wyoming. This catalog deals specifically with Wyoming, and to a lesser extent with Montana, northern Colorado, and western Nebraska. Work on two historic populations in Utah and Texas is also cited. Osteological information has been used to construct historical narratives for various groups including Native American families, White and Black frontierspeople, and Chinese railroad workers.

The references below focus, for the most part, on bioarchaeology or osteology and on sites with reported skeletal remains. The analyses often focus on an individual's basic age, sex, race, pathologies, and the biological and sometimes cultural meaning of various physical traits. Most also attempt to place the biological information within the larger Plains cultural context; some provide synthetic information. With burials occurring in groups of ones and twos, it is often difficult to generalize about populations because of the unknown relationships between individuals. Contributions to larger anthropological questions often go unstated but remain implicit nonetheless. It is important to ask what kind of research is being conducted, what questions are being asked, and how many are answered. Post-contact period mortuary behavior has been documented and can more regularly be used as the ending point of prehistoric occupation in an area, if not as out and out analogs.

The following sources can also be examined to observe how the information has been disseminated (Table 1). The results of osteological analyses have been consistently published, with most articles avail able to a regional audience. *The Wyoming Archaeologist* has been an especially valuable outlet, producing at least 27 bioarchaeological articles during the last 30 years. Considerable amateur involvement and a strong commitment to public archaeology have contributed to the success of many research goals.

The conclusions gathered from osteology, archaeology, ethnohistory, and other fields can greatly enhance our concepts of past lifeways on the Plains. These sources need not always agree. To truly appreciate the complex and interwoven lives of those who came before us, multiple interpretations should not just be possible, but expected.

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1966 The Gordon Creek Burial. *Southwestern Lore* 32(1):1-9.

Anonymous

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Table 1: Publication sources, Bioarchaeology of the Northwestern Plains.

State Journals (i.e. The Wyoming Archaeologist, Archaeology in Montana)	55 (46%)
Regional Journals (i.e. Plains Anthropologist)	21 (18%)
National Journals (i.e. American Antiquity)	12 (10%)
Book Articles and Theses	18 (15%)
Manuscripts	13 (11%)
Total	118 (100%)

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Laura L. Scheiber
Department of Anthropology
University of California
Berkeley, California

INMAN BUFFALO SITE [1]

by
William R. Latady, Jr., Lucy Hinze, and
Robert F. Scott, IV

INTRODUCTION

The Inman Buffalo site, 48SW3604, was exposed during trenching operations for a 12" Cities Services pipeline (Latady 1984). The site is located on the eastern side of a stabilized barchan dune. It was initially covered by sand, as much as two m thick on the southwestern side of the excavated area. Archeological excavations revealed 18 sq m of burned rock, bison bone fragments, one hearth and lithic artifacts (Figure 1). Approximately eight m^2 of the main bone and fire-cracked rock scatter were removed by the trencher. Unfortunately, limits imposed by the right-of-way prevented more extensive excavation. Radiocarbon analysis of two charcoal samples provided dates of 1080$\pm$100 years; A.D. 890$\pm$120, and 1080$\pm$110; A.D. 900$\pm$120 (all dates uncalibrated). Excavations were carried out sporadically during July and August, 1981. These revealed portions of a bison processing site within the existing right-of-way, which extends into the undisturbed dune. Due to the presence of buried intact deposits, this site holds the potential to contribute additional scientific data to several research questions.

REGIONAL SETTING

GEOMORPHOLOGY

The Washakie Basin is part of the Wyoming Basin province (Fenneman 1928). This province is an extension of Great Plains topography and geology and separates the Southern and Middle Rocky Mountain provinces (Thornbury 1965). Common topographic features of the Wyoming Basin province are also found in the Washakie Basin. Cuestas and dip slopes are the most common features; dunes, badlands, playas and alkali flats are also found. A physiographic diagram of the Washakie Basin by Roehler (1972) shows six outward facing nearly concentric rims, separated by broad, relatively flat areas. The bald outward-facing escarpments that encircle the basin are made up of the resistant rocks of the Laney Member of the Green River Formation (Roehler 1972:7). Laney Rim (Figure 2), in the northern end of the basin extends 183-213 m (600-700 ft) above the area to the north and northeast. This escarpment rises 366 m (1200 ft) on the southwestern side of the basin and is known as Kinney Rim (Figure 2). The rim has been reduced in the northwest due to local stream dissection by Bitter Creek and its tributaries (Thornbury 1965). Less prominent escarpments rise 30-90 m (100-300 ft) above surrounding areas within the basin and have been named the Lower Brown Sandstone Rim, Adobe Town Rim and the rim below Adobe Town Rim (Figure 2).

> The dominant feature of the landscape in the north-central part of the basin is Haystack Mountain, a large arcuate ridge that trends eastward for almost 16 km (10 mi). Relief on Haystack Mountain is greatest on its east end where . . . badland slopes rise precipitously for more than 167 m (500 ft) above adjacent plains. The relief decreases westward along the mountain, and badlands are present on more gentle slopes (Roehler 1972:17-18).

The relatively flat areas between the rims are generally covered with a thin layer of alluvium or dunes (Roehler 1973). Isolated playas are also interspersed across the flats where runoff accumulates. Subsequent evaporation of the playas results in the localized precipitation of salts that were dissolved

[1] EDITOR NOTE: This report was first prepared over 15 years ago. It has been cited extensively in the gray literature since that time. It is presented here in its original context, with no update on new literature or methodologies established since its original preparation. It is hoped the publication of this original version of the Inman Buffalo site report will make it more readily available to other scholars.

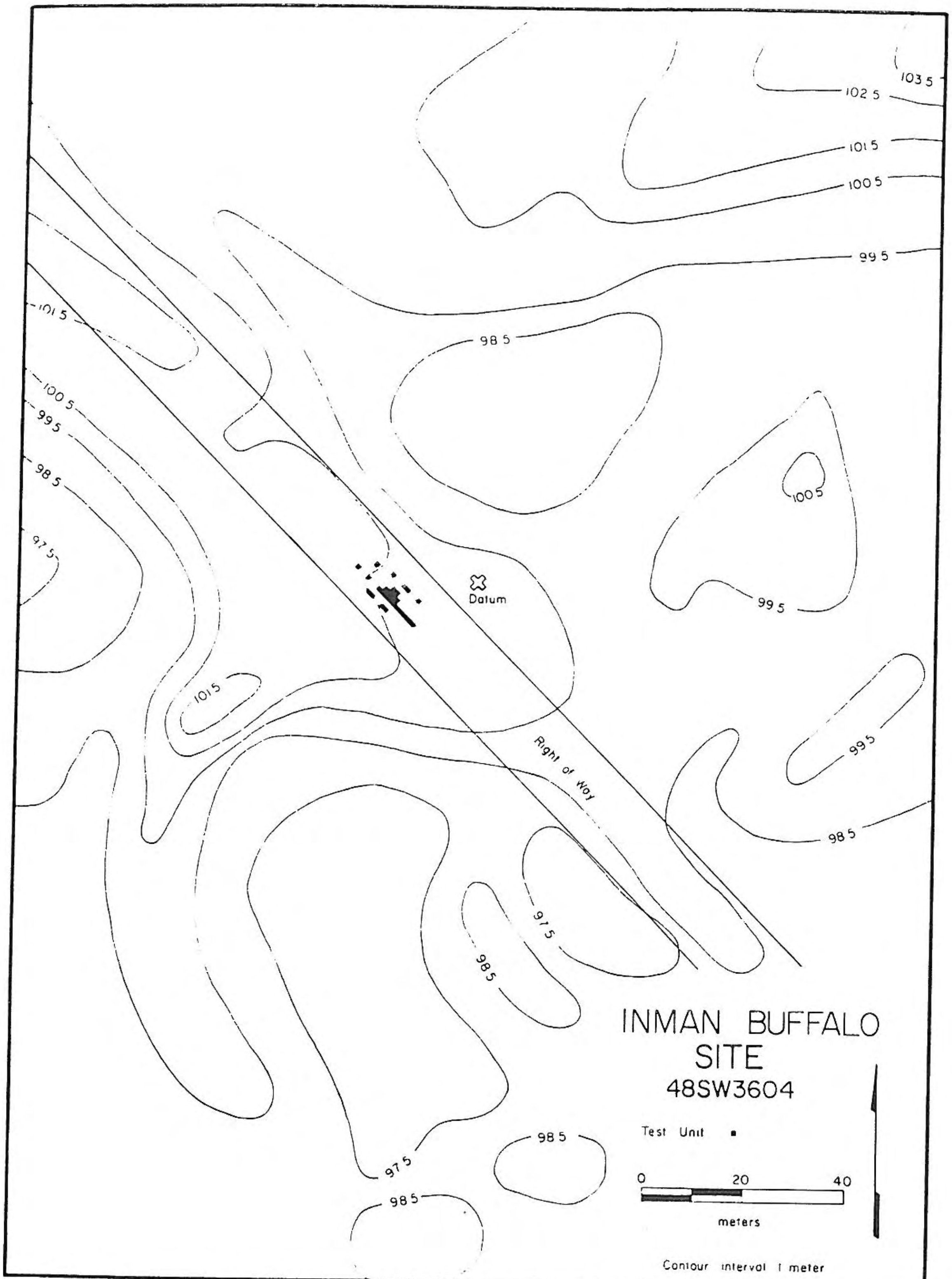

Figure 1: Map showing location of excavation units at 48SW3604, Inman Buffalo site.

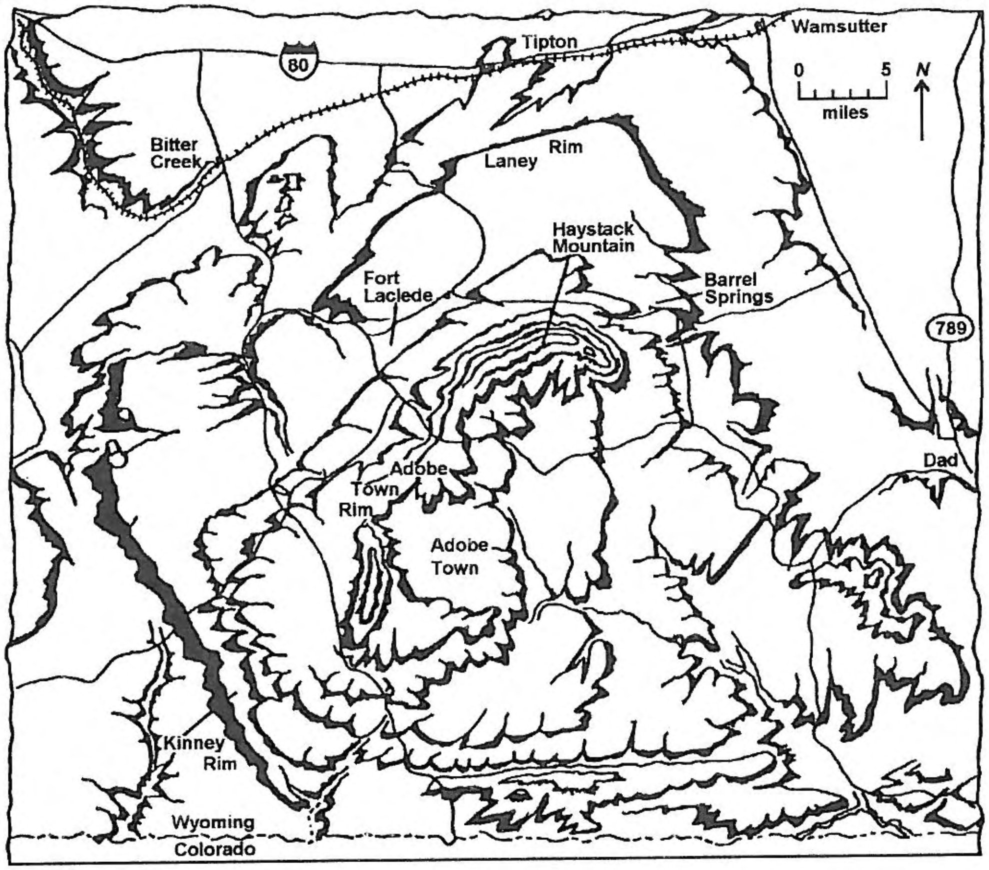

Figure 2: Physiographic diagram of Washakie Basin, showing landforms and location of Adobe Town (adapted from Roehler 1972).

and transported by water. Only the hardiest vegetation can tolerate this extremely harsh environment, leaving the area open to eolian activity. Also found across the flats are stretches of desert pavement, where eolian activity has removed the fine materials leaving behind a lag of pebbles and cobbles (Roehler 1973).

Another area of geomorphic interest is Adobe Town (Figure 2), a 104-130 km^2 (40-50 sq mi) area in the center of the basin that lies subjacent to Adobe Town Rim. A strip of badlands from 90 m to 1.6 km (300 ft to 1 mi) wide has been eroded in the rocks just below the rim. This badland area grades to a low plain covered with dunes and small haystack shaped outliers. The outliers are remnants of a former badland area that has migrated eastward to its present position (Roehler 1973).

Dunes are common features throughout the basin, and an extensive dune field is found in the western portion. The dunes in the Washakie Basin are mostly parabolic, but some barchan dunes are present. All the dunes are stabilized or semi-stabilized by vegetation, and though eolian activity is still an important factor in the removal and redeposition of material, dunes do not have active slip faces and are therefore not migrating at an appreciable rate. The general wind direction in the Washakie Basin, though not measured to our knowledge, is probably southwesterly. The source for the sand is probably local, with the Adobe Town and Kinney Rim Members of the Washakie Formation being the most likely sources. The dunes in the basin are not large features, and ". . . were difficult to locate using ERTS imagery due to a similarity between coloration of dune fields, alkali flats, and exposed sandstone units" (Kolm 1974:36).

HYDROLOGY

The regional drainage pattern for the Washakie Basin is annular. Most of the individual drainages display subdendritic to dendritic patterns, especially in the relatively flat-lying areas of the basin. Other drainages on the steeper dipping strata near the basin margins have subparallel patterns.

The major drainages are: Sand Creek, Shell Creek, Alkaline Creek, Laney Wash, Bitter Creek, and North and Middle Barrel Springs Draws. Sand Creek, which drains the Adobe Town area southeasterly out of the basin, has dissected the rim below Adobe Town Rim and the lower brown sandstone rim more than any other drainage in the basin. Shell Creek drains the southern reaches of the plain west of Adobe Town to the southwest. Dissection here is minimal, and dunes are prominent on this plain. The northern reaches of the plain are drained by Alkaline Creek which flows north into Laney Wash. The headwaters of Laney Wash drain southwest from the slopes of Laney Rim. Laney Wash and Alkaline Creek drain into Bitter Creek, which flows to the northwest. Laney Rim is quite heavily dissected by Bitter Creek where it exits the basin. North and Middle Barrel Springs Draws drain east-southeast from north of Haystack Mountain. The drainages are all ephemeral, steep-walled, flat-floored features that only receive occasional runoff after precipitation occurs. A few small springs are also present in the basin. The fact that tributaries from the different drainages have established themselves throughout the basin may indicate a former greater runoff (Bloom 1978).

PALEOCLIMATE

Climate has a major effect on weathering rates and processes. In arid areas such as the Washakie Basin, resistant rocks are well exposed and weathering rates are very slow. Paleoclimatic data suggest that many climatic fluctuations occurred throughout the Rocky Mountain region during the Quaternary. Since the Quaternary history of the Washakie Basin has yet to be worked out, only assumptions can be made as to the effects of the climate during this time. These assumptions are:

1) During glacial episodes, basin temperatures decreased while effective precipitation probably increased.
2) During interglacial periods, basin temperatures remained cooler and effective precipitation remained relatively high.
3) Periods of maximum erosion occurred during the interglacial episodes.

If the above assumptions are true, the Quaternary appears to have been a period of sporadic intense landform development during interglacial episodes, and less intense but substantial landform development during the glacial episodes. Therefore, most of the present landscape of the Washakie Basin probably formed in the Pleistocene or before, with minor changes occurring in the Holocene.

CLIMATE

The site is located within an intermontane desert steppe region with annual precipitation ranging between 17.5 and 30 cm (7 to 12 in) (Department of Interior 1979). Most of the precipitation occurs between April and September. Winters are dry and when precipitation does occur, it is usually as snow. Seasonal variation is high. Summers are short and cool with temperatures rarely exceeding 38° C (100° F). Winters are long and cold with temperatures that fall well below -18° C (O° F).

VEGETATION

Portions of the basin support sagebrush dominated grasslands in coarse upland soils. Meadows and small riparian broadleaf communities are found on the fine textured alluvial soils along rivers and streams. Fine textured alkaline soils in poorly drained depressions support greasewood and saltbush. Semi-stable and stable dunes support varieties of grass species, shrubs and forbs. Interaction of flora with the local environment has produced three vegetation zones (Kuchler 1966). These are: 1) sagebrush-steppe; 2) saltbush-greasewood; and, 3) wheatgrass-needlegrass shrub steppe. Within these three vegetation zones, at least seven plant associations have been noted (Marlow 1983). These include: 1) a big sagebrush-spiny hopsage association; 2) a big sagebrush-mountain shrub association; 3) a mat saltbush-wheatgrass-bottlebrush squirreltail association, 5) mat saltbush-sagebrush association; 6) Indian ricegrass-big sagebrush association; and, 7) wheatgrass-big sagebrush association. Plant species observed during the cultural resource survey can be found in Latady (1984:Appendix A).

FAUNA

The mammalian fauna of Washakie Basin has been described by Long (1965) and represent species of the Upper Green River division of the Rocky Mountain faunal area. A variety of animals adapted to the shortgrass plains can be found within the basin.

Pronghorn antelope (*Antilocapra americana*) was probably the species of greatest economic importance to the residents of the Washakie Basin. Several sites containing butchered pronghorn bone have been reported (Frison 1971, 1978; Fisher 1981; Metcalf and Treat 1979; Zier 1982; Reiss and Walker 1982; among others).

Other animals that were used prehistorically include deer (*Odocoileus hemionus*) and bison (*Bison bison*). Although scattered faunal evidence of *Bison* has been noted throughout the basin, little archeological evidence of *Bison* procurement has been found. One exception comes from investigations at the Wardell site along the Green River. This site is a Late Prehistoric period *Bison* trap and campsite (Frison 1973). Two other sites containing butchered bison bone are known from this area. The Inman Buffalo site, discussed here, is a small bison processing site containing at least five animals (Latady and Scott 1981; Chronic and Latady 1983). The other site, 48CR3961, is a multicomponent site containing the fragmentary remains of bison and pronghorn (O'Brian et al. 1983).

Ethnographic evidence indicates a wide variety of small animals were used as economic resources (Reher et al. 1977:59-60). Species noted in the area that were probably used include cottontail rabbit (*Sylvilagus* spp.), white-tailed jackrabbit (*Lepus townsendii*), ground squirrel (*Spermophilus* spp.), prairie dog (*Cynomys leucurus*), bushy-tailed packrat (*Neotoma cinerea*) and deer mouse (*Peromyscus* spp.). Carnivores used, although not necessarily as food, include badger (*Taxidea taxus*), coyote (*Canis latrans*), and red fox (*Vulpes vulpes*).

Many species of birds and insects, and some reptilian taxa also occur in the area. Although ethnographic evidence exists for the use of certain of these species, they were probably not of great economic importance prehistorically.

48SW3604

As noted in the introduction, the Inman Buffalo site is a buried lithic and *Bison* bone scatter located on the eastern side of a stabilized dune. Faunal remains, and lithics materials from the Inman Buffalo site, and postulated vegetational changes influencing human subsistence and *Bison* distribution are examined. In general, the site is analyzed in the context of Steward's (1938) model for the Great Basin Shoshone. This model of broad spectrum plant gathering supplemented by hunting is thought to be most applicable to the arid Washakie Basin. Problems associated with depositional and post depositional processes that altered the bone and bonebed are also examined.

SITE SETTING

Sand dunes, low ridges and gently rolling uplands characterize the area surrounding the site. During historic times, the climate has been classified as semi-arid. The physical environment is characterized by three vegetation zones and at least seven plant associations. These associations contain plants that could provide forage for deer, pronghorn, and bison, and other potentially edible species for humans. Smaller animals such as rabbits, ground squirrels gophers also can be found close to the site.

The Inman Buffalo site is on a stabilized sand dune north of a small playa. During the 1981 investigations, the playa contained water and supported plants often found only in riparian communities. Away from the immediate site area, the vegetation is best described as patchy. Within a two km radius, dunes, ephemeral and seasonal drainages, playas, and interdunal desert pavement are found.

LATE PREHISTORIC ADAPTATION

Late Prehistoric Period residents of the Washakie Basin apparently used a mobile broad spectrum foraging strategy (Steward 1938) reflecting seasonal scheduling of both wild game and plant resources. Exploitation of certain seeds, roots and greens was probably concentrated upon when they become available, as specialization was not feasible. Many resources were used during any given season. Knowledge of secondary, and tertiary, resources was necessary for times when primary resources failed or were not sufficiently productive.

Ethnographic studies dealing with subsistence strategies of hunter-gatherers in arid ecosystems have emphasized their dependence on edible plants. Lee (1968, 1969), Gould (1969) and Silberbaur (1972), among others, have noted that, in many environments, most of the diet is composed of edible plant foods. Small animals also contribute, but medium to large game make up only a small portion of the food. Studies in the Great Basin by Steward (1938) indicate the prehistoric adaptation there followed the same general patterns as described above. In a discussion of Shoshone subsistence patterns, Steward noted that game was not as important as plant foods, although small game often made up an important part of the total diet. These animals were easily caught and could be found in relatively large numbers. The arid nature of the region restricted the number of large game and the limited amount of grassland limited the populations of herd animals (Steward 1938:33).

POTENTIAL RESOURCES

Potentially edible plant resources can be found in all seven plant associations. These resources are available from May through November. Edible roots are most easily found during late May and early June, and include wild onion (*Allium textile*), biscuitroot (*Lomatium foeniculum*) and spring parsley (*Cymopterus bulbosus*). Seeds from junegrass (*Koelaria macrantha*), saltbush (*Atriplex* spp.) and Indian ricegrass (*Oryzopsis hymenoides*) are available during July. Seeds from wheatgrasses (*Agropyron* spp.) and wildrye (*Elymus* sp.) become ripe during August. The fruits from prickly pear (*Opuntia polyacantha*) are also available in late summer. Finally, seeds from sagebrush (*Artemisia* spp.) are available in November.

It is assumed the vegetation that comprises the modern plant associations and communities is similar to prehistoric vegetation, although percent composition of species might vary. This may be due to overgrazing by livestock, as well as minor climatic episodes.

Peden et al. (1973) have shown that *Bison* are adapted to the shortgrass plains (see Table 1 for a listing of plants used in a given season by *Bison*). Most of these plants can be found in the Wyoming Basin today. However, climatic conditions such as those that existed during the "Little Ice Age" could have increased shortgrass productivity, which might have lead to an increase in resident *Bison* population in the Washakie Basin.

The modern vegetation supports two other large game species that were used during the Late Prehistoric Period, deer and pronghorn. Important plant species eaten by these animals include sagebrush, antelope bitterbrush, wheatgrass, needleandthread, and sandberg bluegrass.

***BISON* DISTRIBUTION**

Present day vegetation in the Washakie Basin supports small herds of domestic cattle and sheep, although considerable aid in terms of accessibility to water and winter survival (i.e., artificial feeding) is necessary. Wild horses and pronghorn benefit from the cattle management, but these latter species were established before modern range programs. Recent studies of Holocene climatic episodes indicate there was one post-glacial episode that is of interest in reconstructing the environment when the site was occupied. During the Neoatlantic period, A.D. 800-1300, increased precipitation and slightly warmer temperatures occurred (Wendland 1978:281). Glaciers receded in the Rocky Mountains and prairie grasslands expanded westward replacing the shrub steppe vegetation (Bryson and Wendland 1967:294). According to Roe (1951:69-93), *Bison* could be found in habitats as diverse as the shortgrass plains of central Alberta and the arid portions of Texas and New Mexico. Yet, Seton (1937:647) reports *Bison* ranged, sporadically, into Utah and Nevada before the time of horse mounted hunters. Patches of optimum forage rather than the immense shortgrass plains probably contributed to a much lower overall density. In contrast, Marlow (1982:349) proposes that *Bison* grazing in the basin may have been limited to spring or early fall. Marlow bases this suggestion on the presence of only one warm season grass, sand dropseed (*Sporobolus cryptandrus*). According to Marlow, this grass has limited distribution and has low animal palatability.

Problems of optimizing hunting efficiency are here encountered. Frison (1973:6; 1978:229-230) has argued that a minimum number of *Bison* need to be present before communal hunting returns an adequate amount of meat to make up for the calories expended during the hunt. Such considerations were probably crucial in the Washakie Basin where small foraging units (families or bands) preyed opportunistically on the larger game animals.

The lack of *Bison* remains in an archeological context from the Washakie Basin indicates hunting these animals was probably rare in this area. Tools and features examined during the Cities Service Gas pipeline project (Latady et al. 1984) indicate that Late Prehistoric subsistence in the Washakie Basin was oriented toward small game and plant processing. Remains of large game animals rarely occurred in sites examined during the project. This phenomenon may be related to environmental factors affecting preservation, such as attrition from carnivore behavior.

Table I: Bison food sources as indicated by rumen sample analysis (adapted from Meagher 1973:92-93).

SPECIES	WINTER 11 samples Freq%	Comp%	SPRING 4 samples Freq%	Comp%	SUMMER 4 samples Freq%	Comp%	FALL 3 samples Freq%	Comp%	TOTAL 22 samples Freq%	Comp%
Grasses and grass-like plants	100	99	100	96	100	91	100	99	100	96
Sedge	100	56	100	49	100	50	100	37	100	51
Grasses	100	34	100	46	100	32	100	30	100	35
Wire rush	100	9	50	1	100	8	100	32	91	10
Spike-sedge	--	--	--	--	50	1	--	--	9	trace
Forbs	45	trace	100	3	100	6	67	trace	68	2
Phlox	18	trace	75	2	25	trace	--	--	27	1
Northwest cinquefoil	--	--	25	trace	100	6	--	--	23	1
Sulfur eriogonum	9	trace	100	trace	75	trace	33	trace	36	trace
Dandelion	73	trace	--	--	75	trace	33	trace	32	trace
Pussytoes	--	--	75	trace	--	--	--	--	14	trace
Groundsel	--	--	--	--	75	trace	--	--	14	trace
Shrubby cinquefoil	18	trace	--	--	--	--	--	--	9	trace
Clover	--	--	--	--	50	trace	--	--	9	trace
Onion	--	--	--	--	25	trace	--	--	5	trace
Blue-eyed Mary	--	--	--	--	--	--	33	trace	5	trace
Unidentified	--	--	25	trace	75	trace	33	trace	23	trace
Browse	82	1	75	trace	50	2	67	trace	73	1
Big sagebrush	36	1	50	trace	--	--	--	--	27	1
Red dogwood	45	trace	--	--	--	--	--	--	23	trace
Raspberry	9	trace	--	--	25	trace	--	--	9	trace
Dwarf huckleberry	--	--	--	--	25	2	--	--	5	trace
Serviceberry	--	--	--	--	--	--	25	trace	5	trace
Fringed sagebrush	9	trace	--	--	--	--	--	--	36	trace
Unidentified	45	trace	25	trace	--	--	67	trace	36	trace
Lodgepole pine	18	trace	75	trace	50	trace	33	trace	36	trace
Horsetail	18	trace	25	trace	25	trace	--	--	18	trace
Moss	9	trace	--	--	25	trace	33	trace	14	trace
Lichen	--	--	25	trace	--	--	--	--	5	trace
Unidentified	36	trace	75	trace	50	trace	33	trace	46	trace

Trace indicates less than 1% composition. Material is ranked according to composition by volume, in the total diet. Composition totals of less than 100% are the result of rounding to the nearest percent.

SITE DESCRIPTION

Because the Inman Buffalo site was first recorded during monitoring of a pipeline right-of-way, excavation units were placed parallel to the pipeline trench. A judgmental sampling program was employed to expose as much of the site as possible within the right-of-way. Seventeen units (primarily 1 x 2 m) were excavated before construction crews reburied the site. A schematic diagram of the position and size of the units is provided (Figure 3).

Sediments encountered at 48SW3604 may generally be described as a tan, loosely compacted, sand. Below the cultural level, this sand became more compact. Although neither the excavation units nor the pipeline trench reached below the dune, on either side of the trench, sediments consist of elastic ephemeral stream deposits. Cultural deposits appear to be confined to one level (Figure 4). This level was apparent in the pipeline trench profile and the hand excavation units did not reveal any additional levels. Only one probable hearth feature was found. Although partially destroyed by the trencher, it mea-

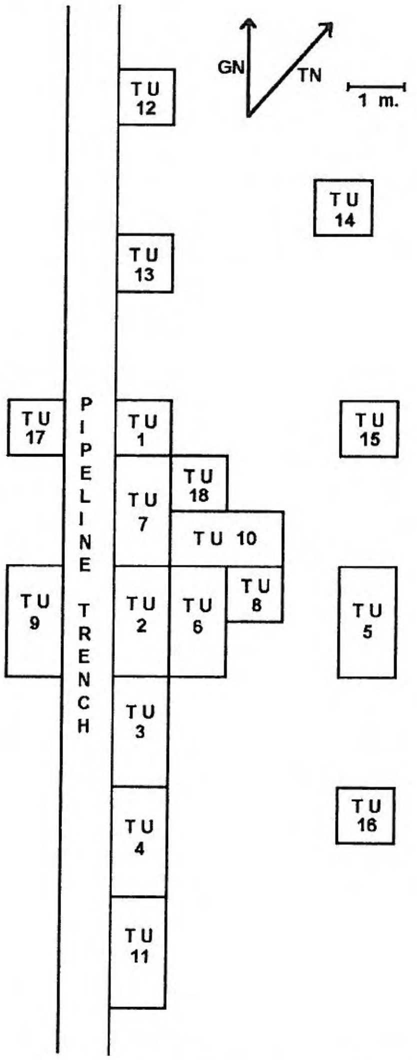

Figure 3: Schematic diagram of excavation units, 48SW3604, Inman Buffalo site.

sured at least 65 cm in diameter by 57 cm in depth (Figure 5). This feature contained large amounts of charcoal, quartzite fire-cracked rock and a small amount of fragmented bone.

LITHICS ARTIFACTS

Excavations yielded 1707 chipped stone artifacts (see Latady 1984; Lithic Analysis). The presence or absence of any edge modification was noted with the aid of a 10x hand lens. Provenience by test unit and artifact frequencies can be found in Latady (1984:Appendix C).

Only 14 formal tools were recovered. These are two corner-notched points, two preforms (Figure 6), nine bifaces (Figure 7), and two pieces of a production-failure biface. Both pieces were found in situ but were separated from one another by almost two m. Tools recovered are expedient and most appear to have been manufactured from chert and quartzite cobbles that occur on the desert pavement next to the dune. Other lithic artifacts recovered include hammerstones, cores, and tool sharpening, biface and core reduction flakes. In addition, seven retouched flakes, three utilized flakes and one retouched blade were found. All edge angles indicate use for cutting purposes.

Cherts and quartzites, locally occurring as lag deposits, make up 87.4% of the raw material recovered from the excavations. The next largest category is composed of artifacts manufactured from algalitic chert. These comprise 9.9% of the assemblage. Oolitic and bioclastic chert make up 2.6% of the raw material sample, and sandstone comprises 0.2% of the collection. Except for siltstone, the closest known source for these materials is located in the Haystacks about 19.2 km (12 mi) northeast of the site.

Based on their provenience, it seems probable that most of the artifacts described above were used during the processing activities. Apparently, several activities occurred here, including tool manufacturing and sharpening and *Bison* meat and bone processing. The presence of three exhausted cores, all of local chert, and the hundreds of percussion and pressure flakes indicate intense chipped stone artifact manufacturing or maintenance.

FAUNAL MATERIAL

One hundred and nine (109) identifiable bones and 486 unidentifiable bone fragments attributed to the modern *Bison bison* were recovered. Relative frequency of total NISP (number of identified specimens) of the various elements collected from the site were calculated (Figure 8). Four left femur heads and one fetal radius indicate that at least five animals, four adults and one fetus, were processed (Latady and Scott 1981:11). Age determination of the specimens for the purposes of suggesting seasonality of site occupation was limited to two elements. These are a fetal radius and a right maxilla with all teeth erupted. Both specimens were compared to elements in the faunal collections at the Department of Anthropology, University of Wyoming. As a result, the

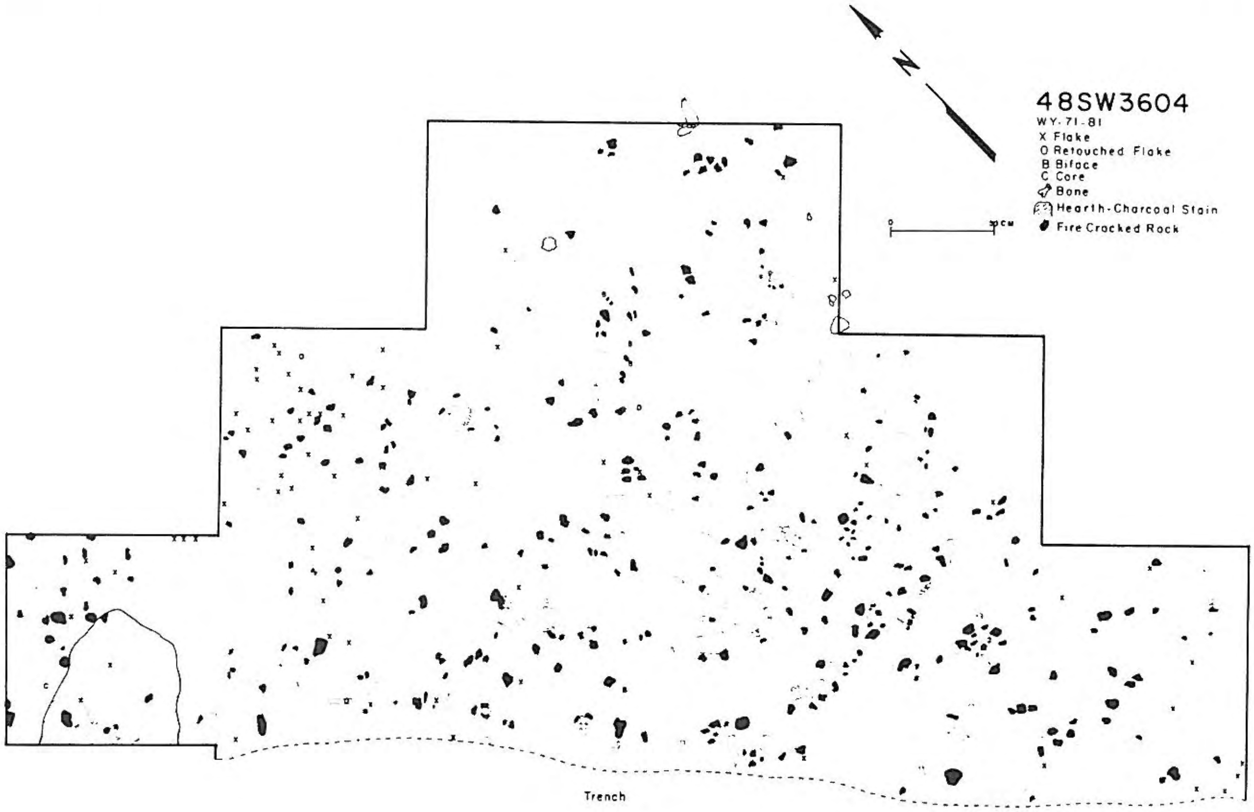

Figure 4: Main bone and fire-cracked rock concentration, 48SW3604, Inman Buffalo site.

maxilla was determined to be between 4.6 and 5.0 years in age. The fetal radius appeared to be near term. Since *Bison* have a birthing season confined to a six week period during the spring (Frison 1978:290), this information suggests a late winter-early spring occupation of the site.

Additional laboratory analysis included observations of cultural, biological and geological modifiers of the bone. These were approached spatially, that is, through horizontal distribution by test unit. Only agents directly observable on the preserved bone were recorded, and percentages of these were mapped by each unit.

Cultural modifications examined include cutmarks, burned bone, and green bone fracture. Of these, green bone fracture and burned bone were quite frequent and cutmarks were rare. Burned bones were designated calcined or carbonized depending on the degree of burning to see if they indicated any patterning of heat intensity, with higher heat causing calcination. The calcined bone fragments were grey in color and brittle, those identified as carbonized were black. Green bone fracture was defined by bone having a smooth fracture, often spiral, with none of the characteristic stepping of dry bone fracture. Impact features were included in this category.

Noncultural modifications noted include animal, root and a general designation of bone deterioration. Animal, which included both rodent and canid, was present on 5 to 10% of the bones. Most of the activity was by rodents and restricted to very small areas on the bones. Root action was the most predominant of the modifications, often totally breaking down the hard outer surface of the bone. Over half the bones were affected by root growth. Bone deterioration was based on a scale of one to four: one had none to slight surface deterioration or checking; two had slight checking or surface cracks; three had extensive surface checking and deep cracking; and four was crumbly bone.

Besides these modifications on the bone, fragments were conjoined or mechanically refitted and mapped. These were bones that were found broken and separated within the bonebed. A map of the spatial distribution by test unit was produced for each modification. Patterns in and between the various modifying agents were then observed.

Cultural modifications, cutmarks, burning, and green breakage, show some indistinct trends. The frequency of cutmarks in the main bonebed area was one aspect of bone modification examined (Figure 9). Apart from the hearth and charcoal stains, the hatching represents frequency of cutmarks. Denser hatching indicates higher frequency. The presence of cutmarks is limited to four m^2 within the main bonebed area, and in these only about 5% of all bone was modified. An interesting note is that these test units were also the densest in terms of bone found. This could certainly have affected the relative frequencies of cutmarks.

The angled lines in Figure 10 represent calcined bone while the vertical hatches represent carbonized bone. Calcined bone is most frequent in the southernmost unit, and appears to grade down in all directions excavated. Carbonized bone frequency is high in the test unit with the hearth and low otherwise. Altogether, the test units most affected by burning appear to be the ones closest to the trench. This suggests the site extends to the west. Calcined and carbonized bones together comprise over half the bones present, but of those, none were larger than five cm in length. The greatest frequencies of green bone fracture are in the southern and northern units with an otherwise fairly even distribution over the whole excavated area (Figure 11). Of all the fragments, about 60% had green breaks.

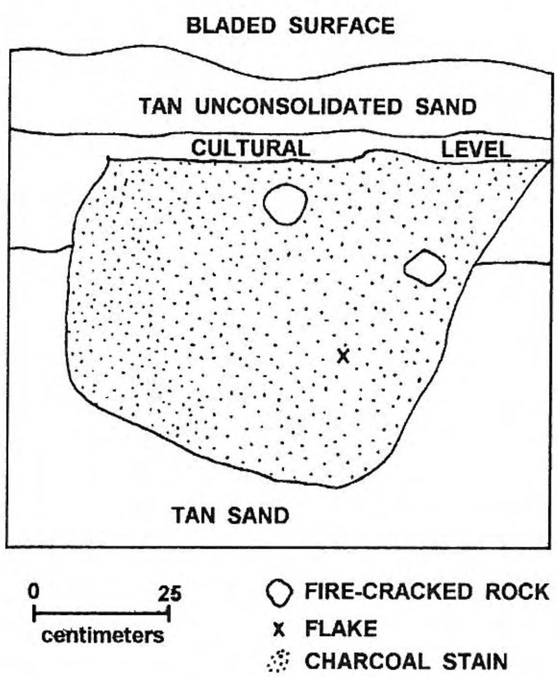

Figure 5: Basin-shaped hearth profile from 48SW-3604, Inman Buffalo site.

Patterns within each of these categories are fairly clear, but there seem to be fewer relationships between cultural modifications. Both burned bones and cutmarks appear to be slightly more common on the south side of the excavated site. This is not true of green bone fracture.

The non-cultural modifying agents, however, show a distinct patterning. Animal modifications show an increase of rodent gnawing, represented by angled hatchlines, to the northeast. Canid activity, shown by vertical hatching, was present in only one test unit (Figure 12). The latter may once more be due to the presence of more bone fragments per test unit. Both canid and rodent activity were fairly limited over the whole site, with the largest percentage in Test Unit 8 at a little less than 50% of the bones affected.

The next modifying agent, root activity, is more common with over 50% of all bones affected and often covered with roots (Figure 13). Again, root activity appears frequently in the northeast portion of the excavated area. This is also true of general bone deterioration (Figure 14). This map shows average bone deterioration and ranges from slight surface cracking to deep cracking.

Conjoinment, shown by connecting lines, is present in the area represented by the most bones found per test unit (Figure 15). No bones could be mechanically refitted over about 60 cm in horizontal direction.

The maps presented above show that non-cultural modifications acting to deteriorate the bone are more common on the northeastern part of the excavated site. Undoubtedly, animal activity and root action increase overall bone weathering, so an interrelationship is clear. In addition, the presence of the dune to the southwest suggests both that the bones in the northeast may have been exposed longer before burial, and that they were closer to the surface after

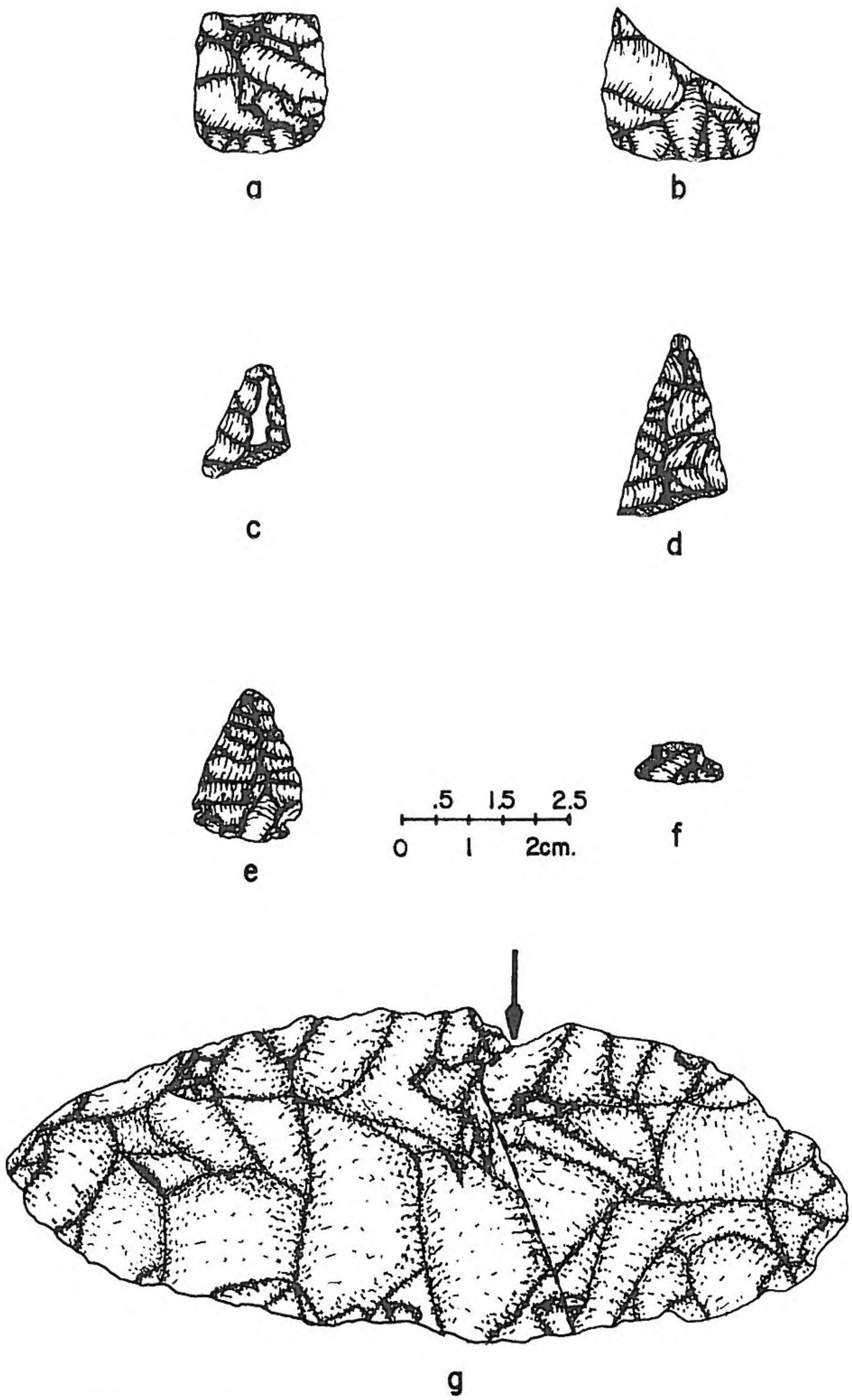

Figure 6: Formal tools recovered from Inman Buffalo site. a-b: preforms; c-d: biface tips; e-f: broken corner notched projectile points; g: production failure biface.

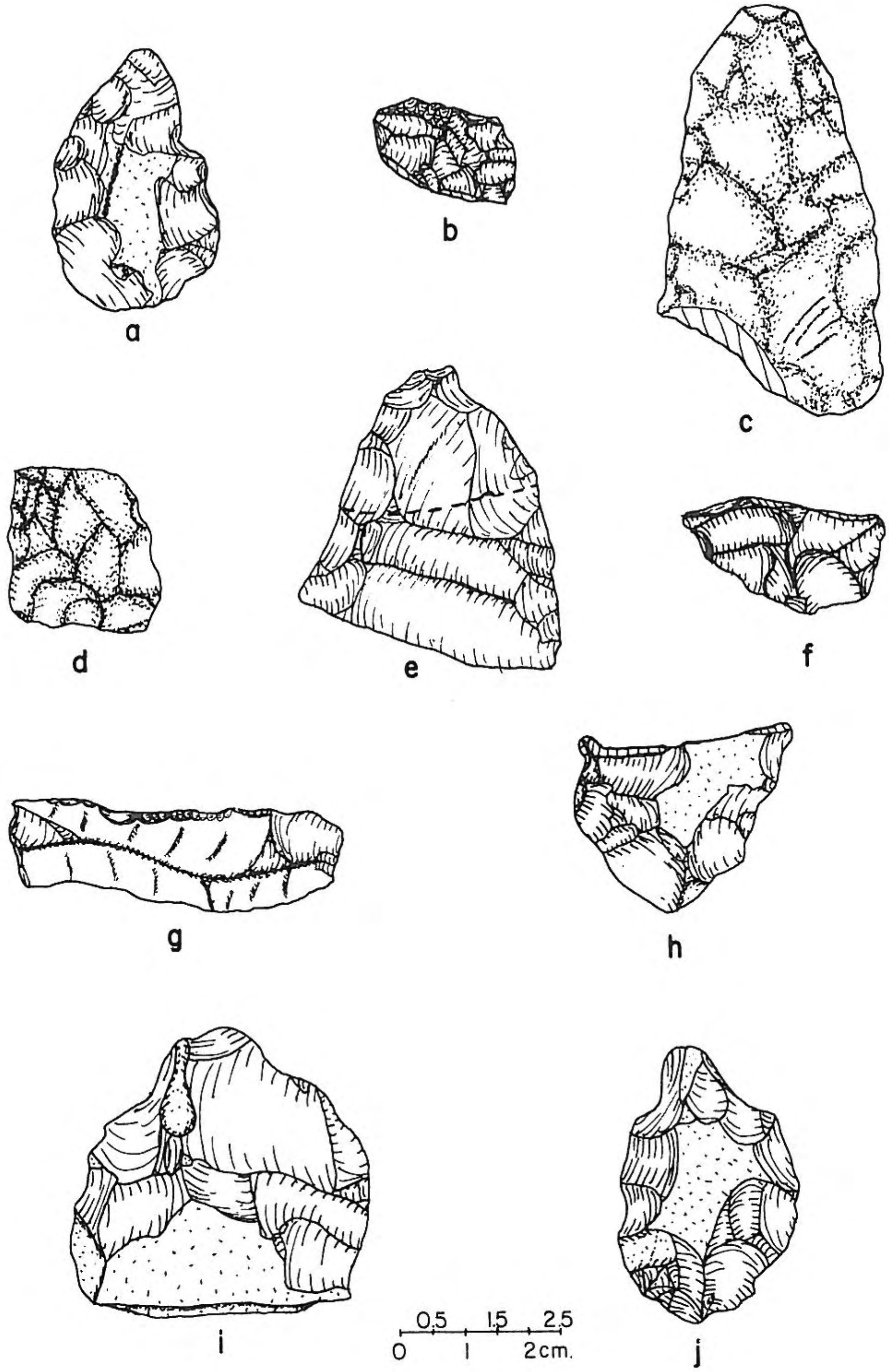

Figure 7: Bifaces and blade recovered from main bonebed area, Inman Buffalo site. a, e, j: complete bifaces; b-d, f, h-i: broken bifaces; g: retouched flake.

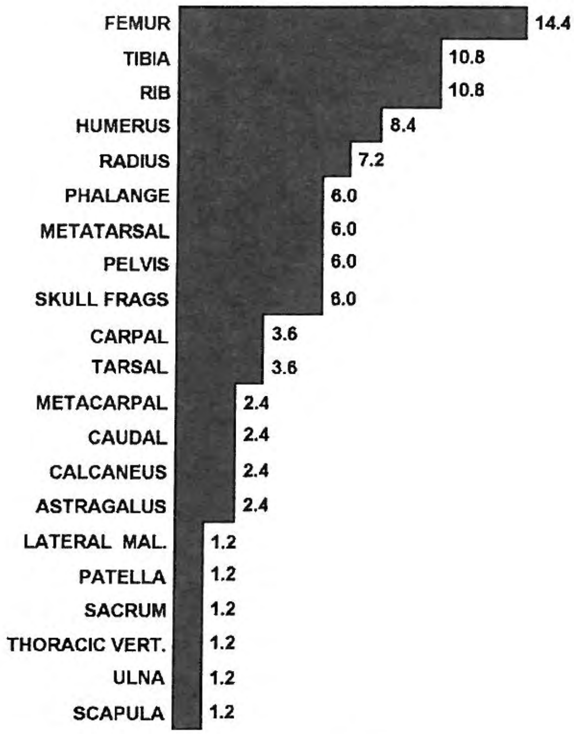

Figure 8: Frequency of Bison elements recovered from 48SW3604, Inman Buffalo site, as percentage of total NISP.

burial. Both factors would affect bone deterioration.

In turn, the non-culturally modified bone might obscure cutmarks and other possible cultural evidence, and cause changes in their patterns unrelated to any cultural activity. For instance, there are no cutmarks on bones in the test unit most affected by rodent and root activity, and most of the burned bone is in the southwestern test units. Conjoined bones show no distinct patterning except in existing more frequently in test units with more bones found.

These observations represent an attempt to recognize and show patterns in and between cultural and non-cultural modifications acting on a *Bison* bonebed. Any patterns here present possibilities of more questions; for instance, what effect does a fluctuating water table and differing ground water chemistry have on buried bone, and how far and how often are bones displaced by roots, animals, or geological slumps or slides? Many other agents could have acted on the bone to alter or change the patterning we observed. This is an attempt to illustrate an approach for studying a few possible modifying agents, an approach that could be compared to, followed or modified in future excavations of bonebeds.

The archeological evidence for meat processing has been described by Frison (1971:261-266), Vehik (1977:172-175) and Binford (1978:152-265; 1981:148-163), among others. Attributes of bone grease processing areas include small burned and unburned bone fragments, firepits, large amounts of fire-exposed rock, pottery, anvil stone and choppers (Vehik 1977:172-173). Although anvil stones and pottery were not recovered, the amount of burned rock, charcoal, and broken and splintered bone indicates this site represents a processing area where marrow and bone grease were being extracted. Most bones represent limb fragments, the major marrow producing bones. Apparently, the site represents the final phase of a small single episode kill, possibly associated with a nearby playa. Primary butchering or habitation areas were not located. These areas may be located within portions of the dune that were not excavated due to right-of-way restrictions on testing archeological sites. It is also possible that kill and primary butchering occurred elsewhere and elements present were brought back to this area for marrow extraction. These problems can only be resolved through additional excavations.

CONCLUSIONS

Analysis indicates that the Inman Buffalo site represents a single occupation, possibly by a small band or extended family. Based on the presence of distinctive projectile points within the bone scatter, as well as two radiocarbon dates from the hearth, it is suggested that this site dates to around A.D. 900. The lack of *Bison* remains in associated archeological contexts from the Washakie Basin might indicate that such exploitation was rare.

This interpretation fits Steward's model concerning prehistoric inhabitants of arid environments. Although a generalized foraging strategy was centered around plant and small animal exploitation, infrequent small scale *Bison* exploitation also occurred. Even though such kills occurred infrequently, the prehistoric residents were familiar with hunting and processing techniques needed to procure and use *Bison*.

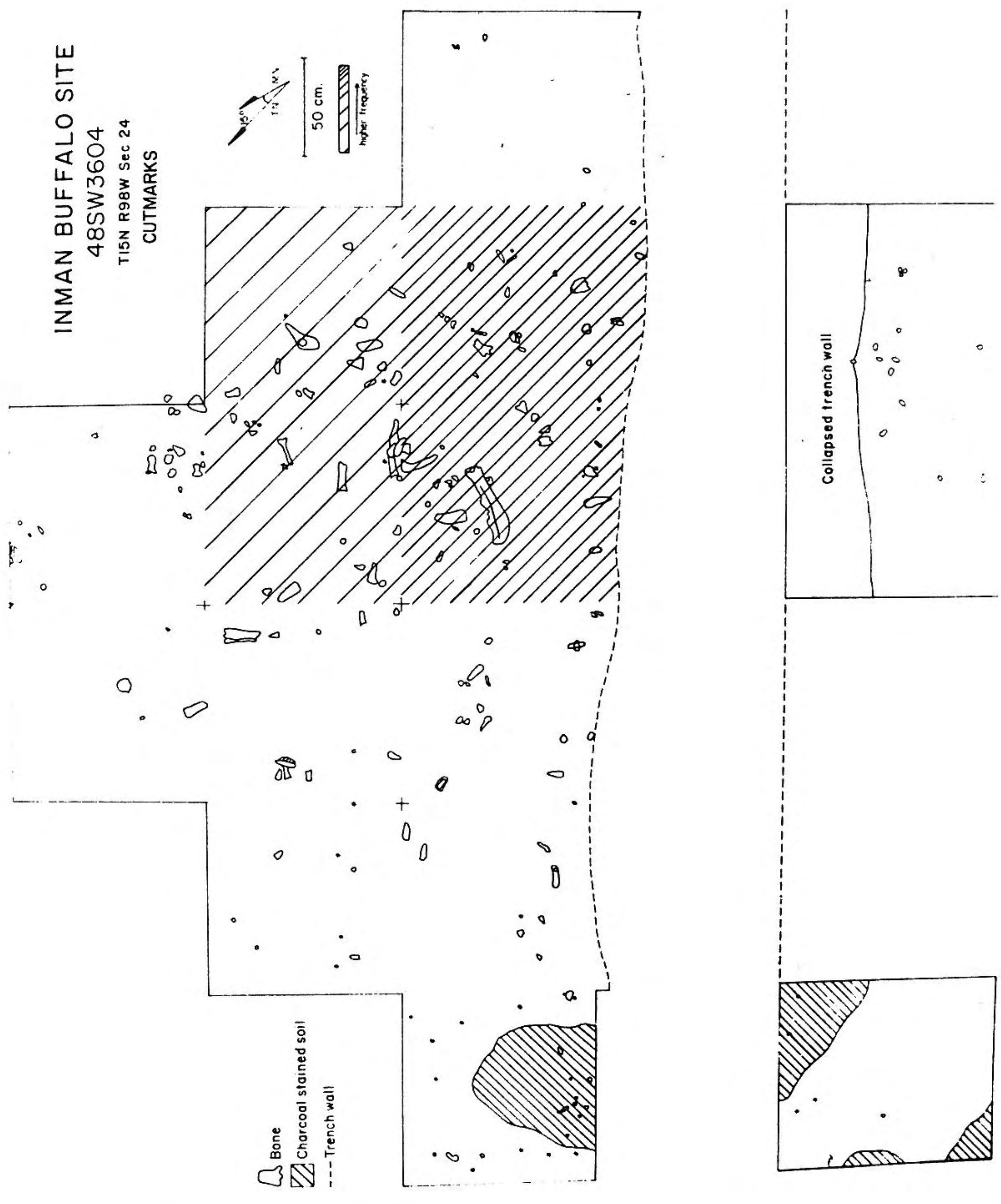

Figure 9: Frequency of cutmarks on Bison bones, 48SW3604, Inman Buffalo site.

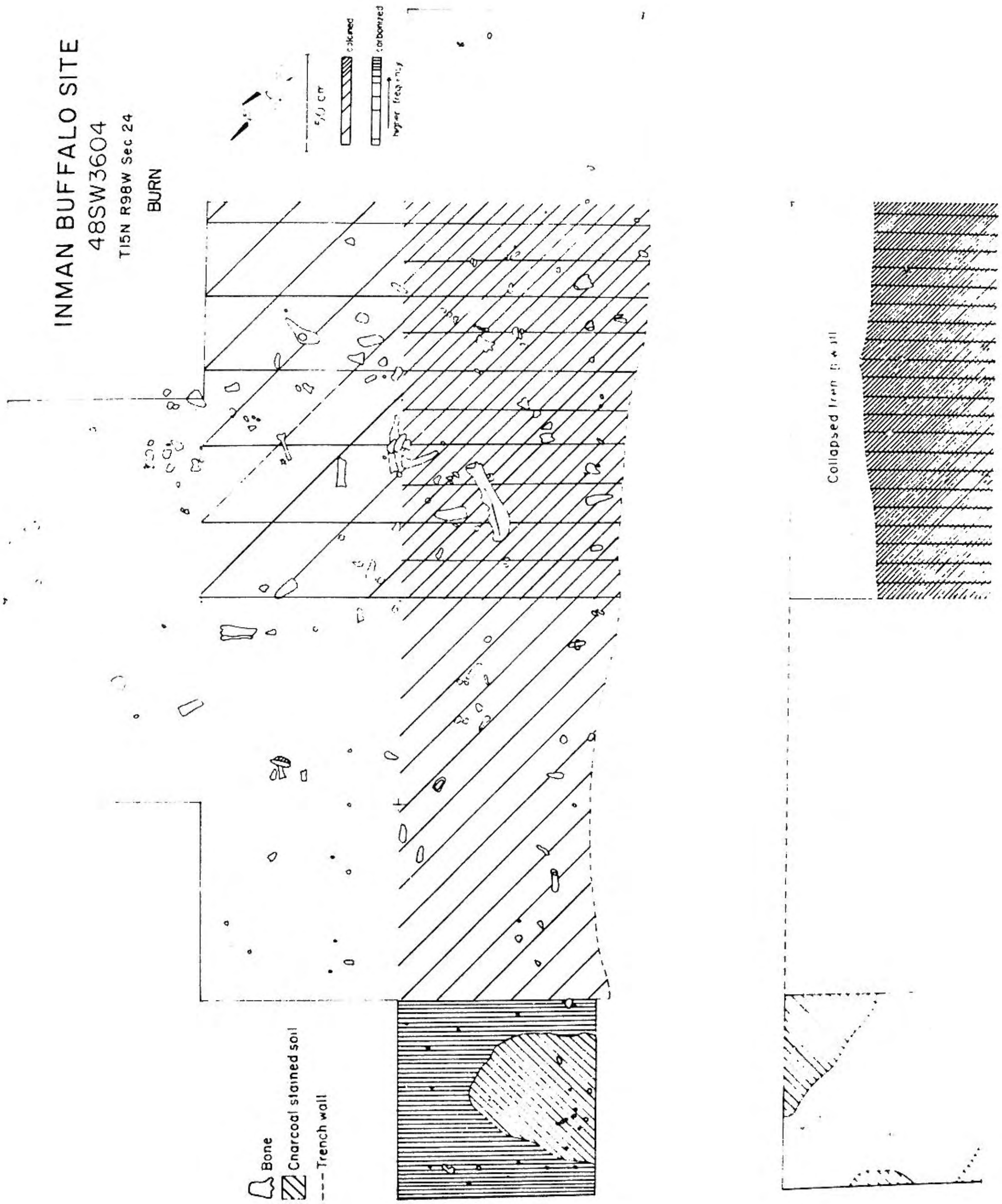

Figure 10: Frequency of calcined and carbonized Bison bone, 48SW3604, Inman Buffalo site.

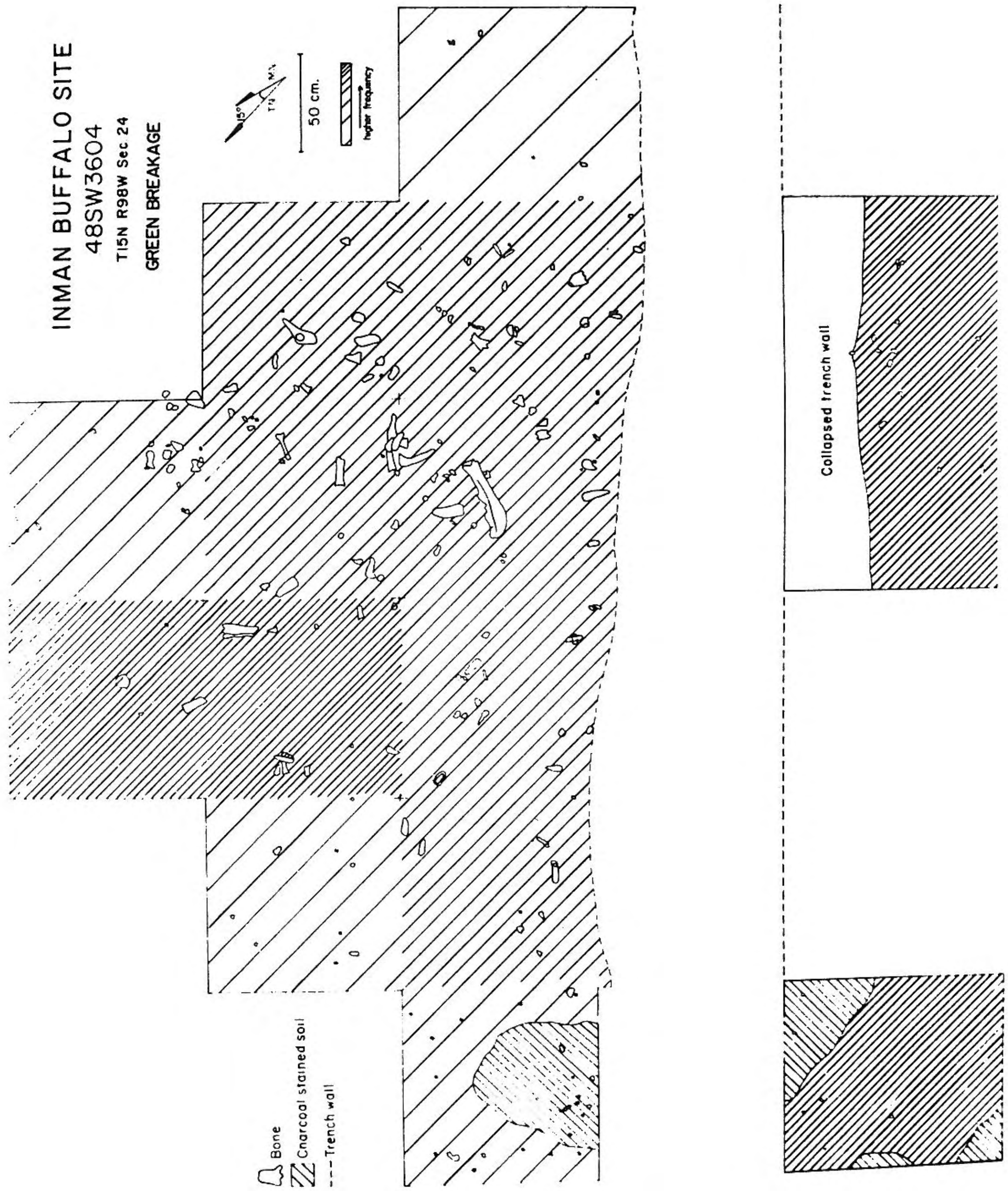

Figure 11: Frequency of green bone fractures on Bison bone, 48SW3604, Inman Buffalo site.

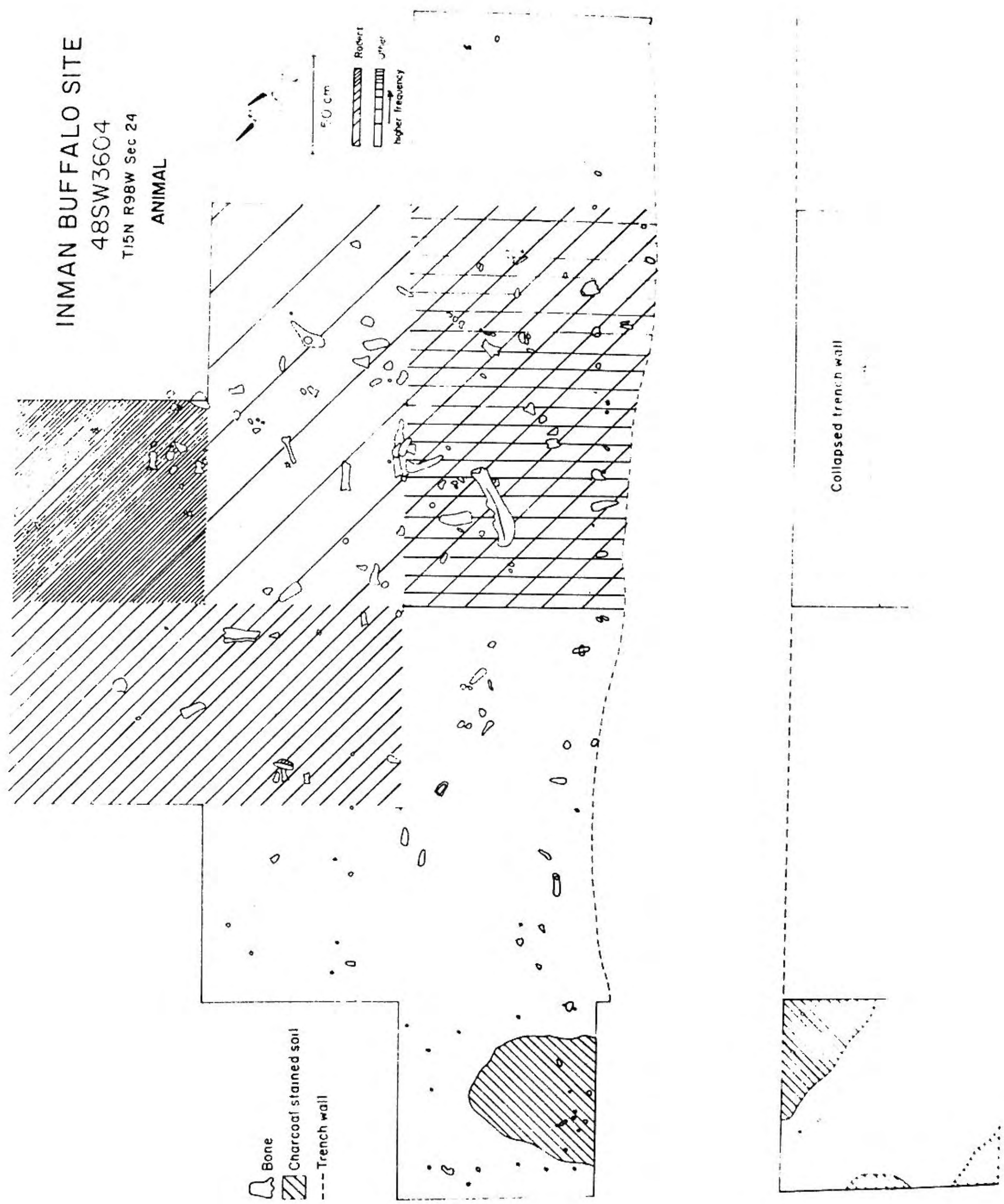

Figure 12: Frequency of animal modification to Bison bone, 48SW3604, Inman Buffalo site.

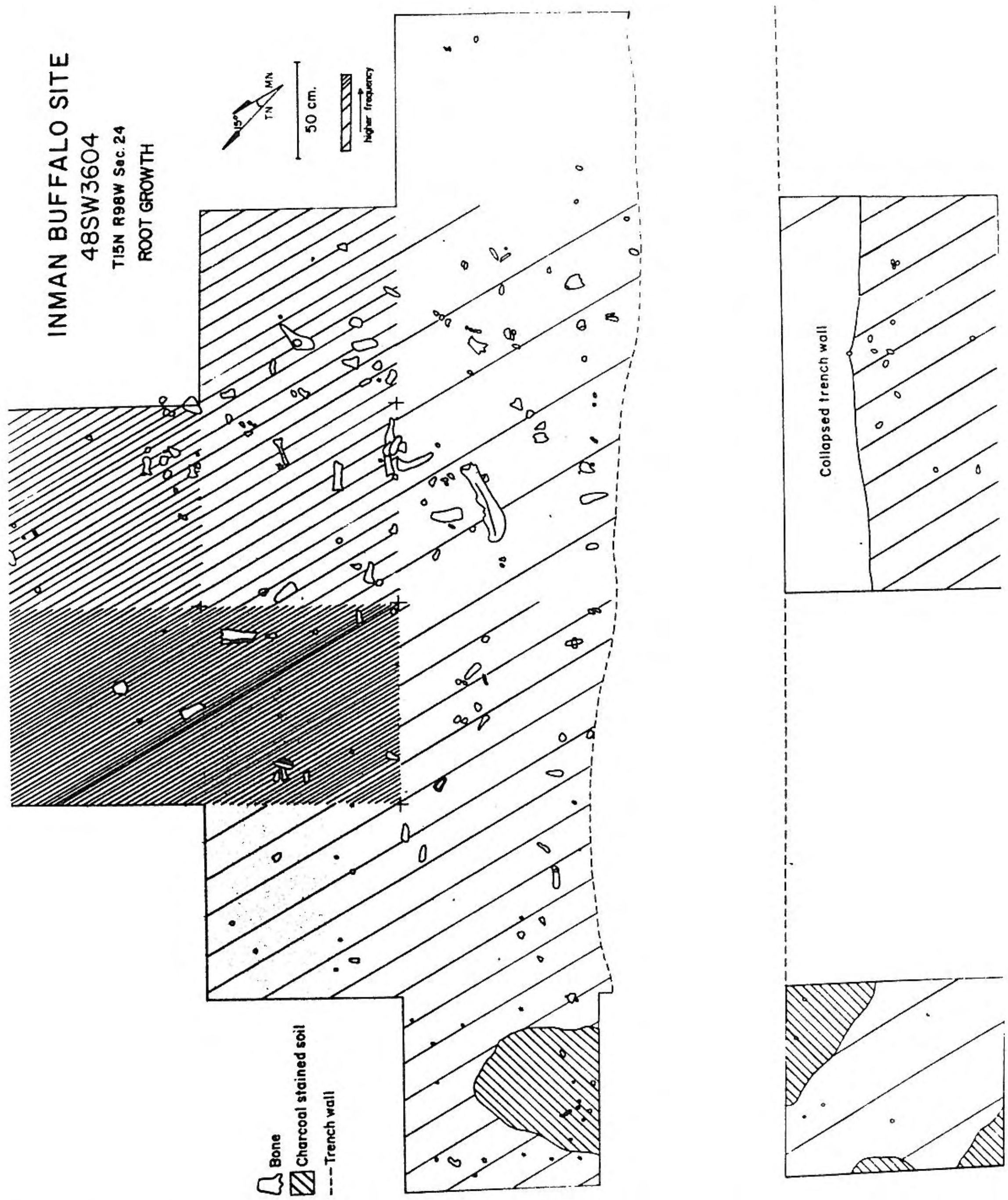

Figure 13: Frequency of root activity on Bison bone, 48SW3604, Inman Buffalo site.

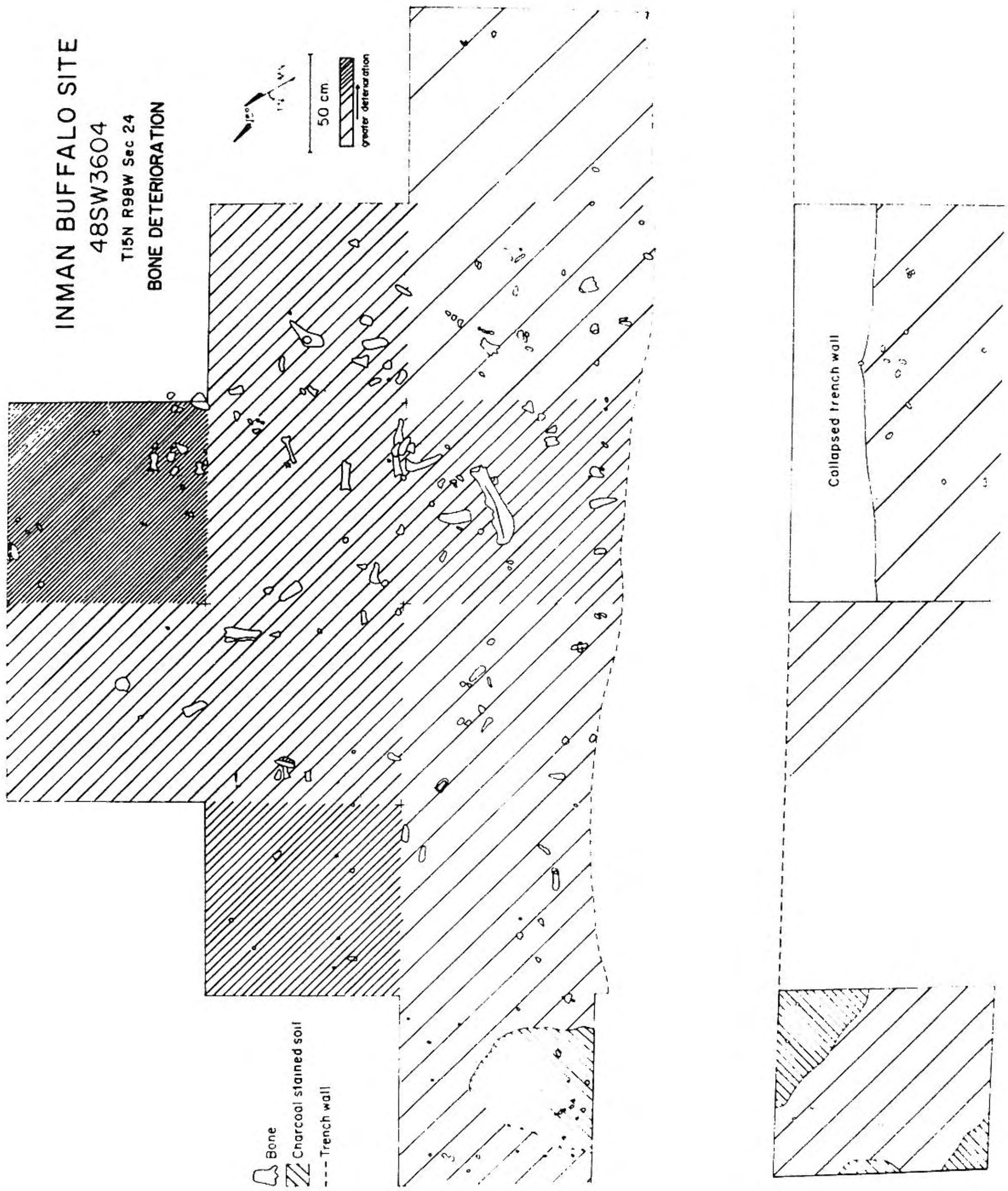

Figure 14: Frequency of Bison bone deterioration, 48SW3604, Inman Buffalo site.

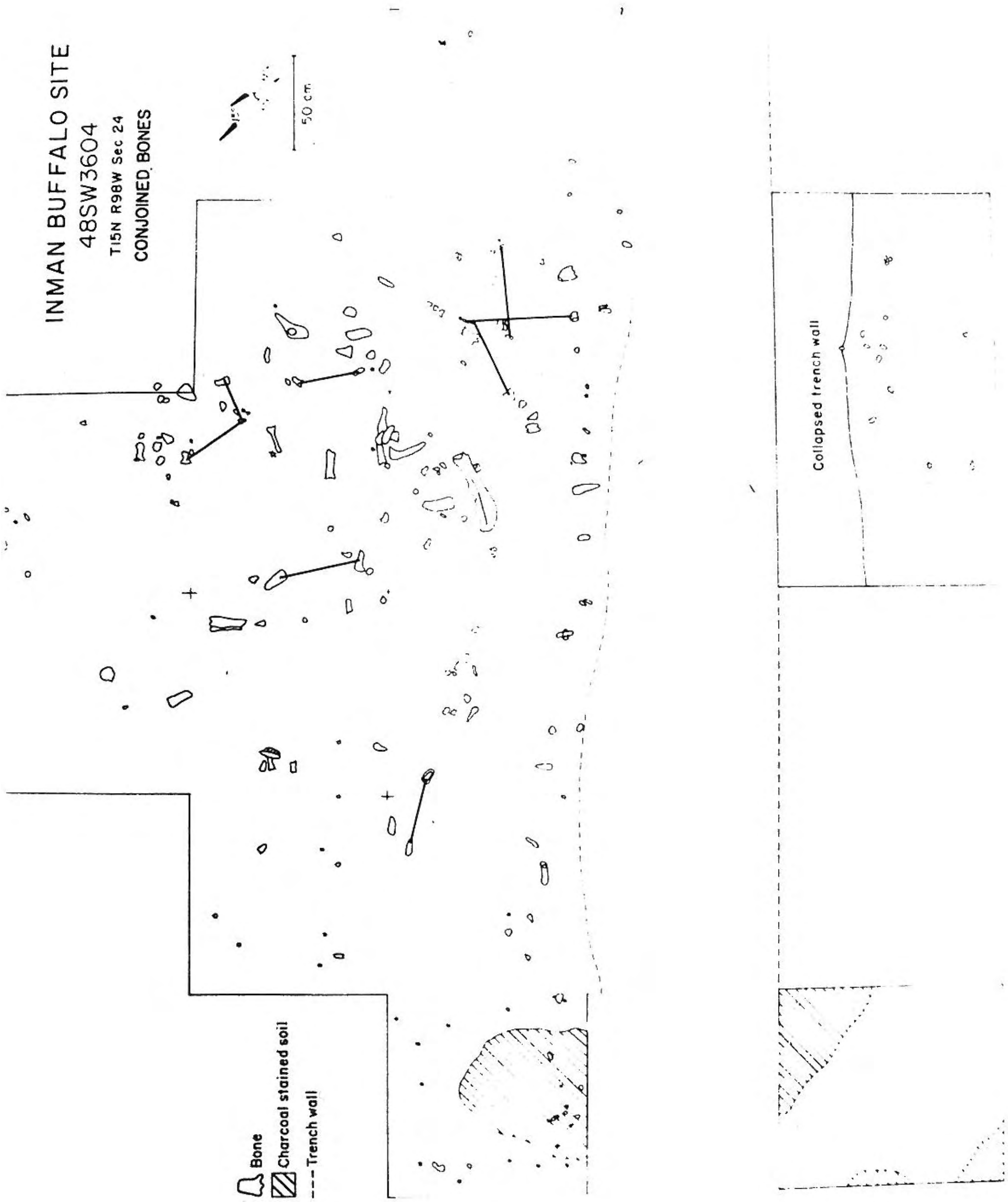

Figure 15: Mechanical refitting of Bison bone elements, 48SW3604, Inman Buffalo site.

The excavated portions of the Inman Buffalo site suggest marrow extraction and bone boiling activities associated with a small *Bison* kill site. The kill site, primary butchering area and habitation area were not located. All three of these may be buried in other dunes nearby.

Work by Reher (1977) and Reher and Frison (1980) suggests that *Bison* populations may have increased in response to favorable vegetation changes caused a series of climatic fluctuations that produced more mesic conditions. When an optimum number of *Bison* were present, it was feasible for hunters to attempt a kill, such as represented here by the Inman Buffalo site.

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William R. Latady, Jr.
Anaszi State Park
P.O. Box 1394
Boulder, Ut 84716

Lucy Hinze
P.O. Box 501
Cascade, ID 83611

Robert F. Scott, IV
Corps of Enginners CESWF-EV-R
P.O. Box 17300
Fort Worth, Texas 76102