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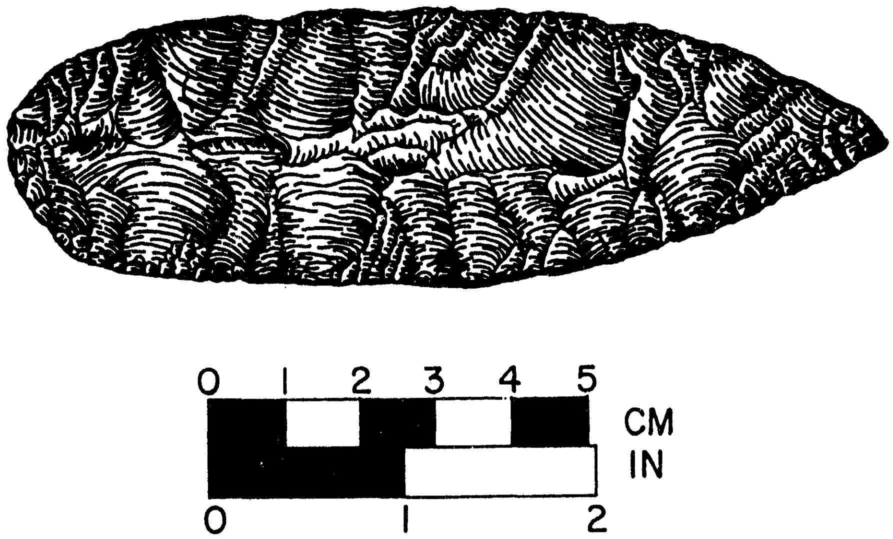
Archaeological Investigations at a Toolstone Source Area and Temporary Camp: Sample Unit 19–25, Nevada Test Site, Nye County, Nevada



Cover drawing: Biface knife recovered at site 26NY7847 (from Figure 26)

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Archaeological Investigations at a Toolstone Source Area and Temporary Camp: Sample Unit 19–25, Nevada Test Site, Nye County, Nevada

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ABSTRACT

Archaeological investigations were initiated at Sample Unit 19–25 to retrieve information concerning settlement and subsistence data on the aboriginal hunter and gatherers in the area. Studies included collection and mapping of 143,400 m^2 (35.4 acres) at site 26NY1408 and excavation and mapping of 83 m^2 (0.02 acres) at site 26NY7847. Field work was conducted intermittently between July 1991 and October 1992.

Sample Unit 19–25 covers two small eastward–sloping bedrock benches and two north–south trending drainages in a sparse to moderately dense pinyon–juniper woodland. Cultural resources include two rock and brush structures and associated caches and a large lithic toolstone source area and lithic artifact scatter. Temporally diagnostic artifacts indicate periodic use throughout the last 12,000 years; however dates associated with projectile points indicate most use was in the Middle and Late Archaic. Radiocarbon dates from the rock and brush structures at site 26NY7847 indicate a construction date of A.D. 1640 and repair between A.D. 1800 and 1950 for feature 1 and between A.D. 1330 and 1390 and repair at A.D. 1410 for feature 2. The dates associated with feature 2 place its construction significantly earlier than similar structures found elsewhere on Pahute Mesa. Sourcing of obsidian from the sample unit indicates some of it originates from Obsidian Butte and Split Ridge (within 2.5 mi of the sample unit) and from the Mt. Hicks and Garfield Hills area of Nevada (160 km northwest of Pahute Mesa). Activity areas appear to reflect temporary use of the area for procurement of available lithic and faunal resources and the manufacture of tools.

This work was conducted by the Quaternary Sciences Center at the Desert Research Institute for the Department of Energy, Nevada Operations Office (DOE/NV) in accordance with the Long Range Study Plan (LRSP). The LRSP is a program for negating potential adverse effects to the cultural resources on Pahute and Rainier Mesas on the Nevada Test Site. With the completion of the study as documented in this report, DOE/NV has met its obligation for cultural resources in Sample Unit 19–25.

ACKNOWLEDGMENTS

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Colleen M. Beck, William Gray Johnson, Richard McArthur, and Lonnie C. Pippin edited and commented on the draft of this report. Rebecca Gardiner prepared the final manuscript.

1. INTRODUCTION

The U.S. Department of Energy, Nevada Operations Office (DOE/NV), in consultations with the Nevada Division of Historic Preservation and Archeology (NDHPA), has recognized that the historic properties on Pahute and Rainier mesas within the Nevada Test Site (NTS) are potentially eligible to the National Register of Historic Places (NRHP) as components of a Pahute–Rainier Mesa Archaeological District. The DOE/NV, NDHPA, and the Advisory Council on Historic Preservation (ACHP) have acknowledged the potential for adverse effects to these historic properties from DOE/NV undertakings. In order to mitigate these effects, a Long Range Study Plan (LRSP)(Pippin 1992) has been agreed to and implemented. It is a comprehensive data recovery program that samples 11 percent of geographic space on the mesas. The purpose of the LRSP is to provide data on historic properties that are considered eligible to the NRHP under criterion d of 36 CFR Part 60.4. Data recovery within the 11 percent sample is oriented around research questions derived from the Nevada State Historic Preservation Plan.

This report documents the methods and results of the investigations conducted by the Desert Research Institute (DRI) at Sample Unit 19–25 (SU19–25)(Figures 1 and 2) as outlined in the data recovery plan submitted for this sample unit (Jones 1992a). Sample Unit 19–25 was originally named UNLV 122 as a portion of it was investigated by Bergin et al. (1979) under a program conducted through the University of Nevada, Las Vegas. Subsequently, all sample units in the LRSP have been renamed and for this report the SU19–25 designation will be used. Two sites, 26NY1408 and 26NY7847, were investigated. Site 26NY1408 is a large lithic artifact scatter and toolstone source area and small rock-shelter. The eastern boundaries for this site were not determined because of a limited time schedule which prohibited investigations outside the sample unit. Site 26NY7847 is a temporary camp consisting of two rock and brush structures and two rock caches. Data from these sites are used to address LRSP research questions about spatial relationships, raw material sources, methods of tool manufacture, and chronology.

Major topics in the following sections include environmental setting, cultural history, research objectives, data recovery methods, methods of analysis, previous investigations, results of the data recovery, a summary of the study, and management recommendations. The following discussions on the natural environment, cultural history, and resource procurement are based on Pippin (1986a, 1992) and Pippin, et al. (1992).

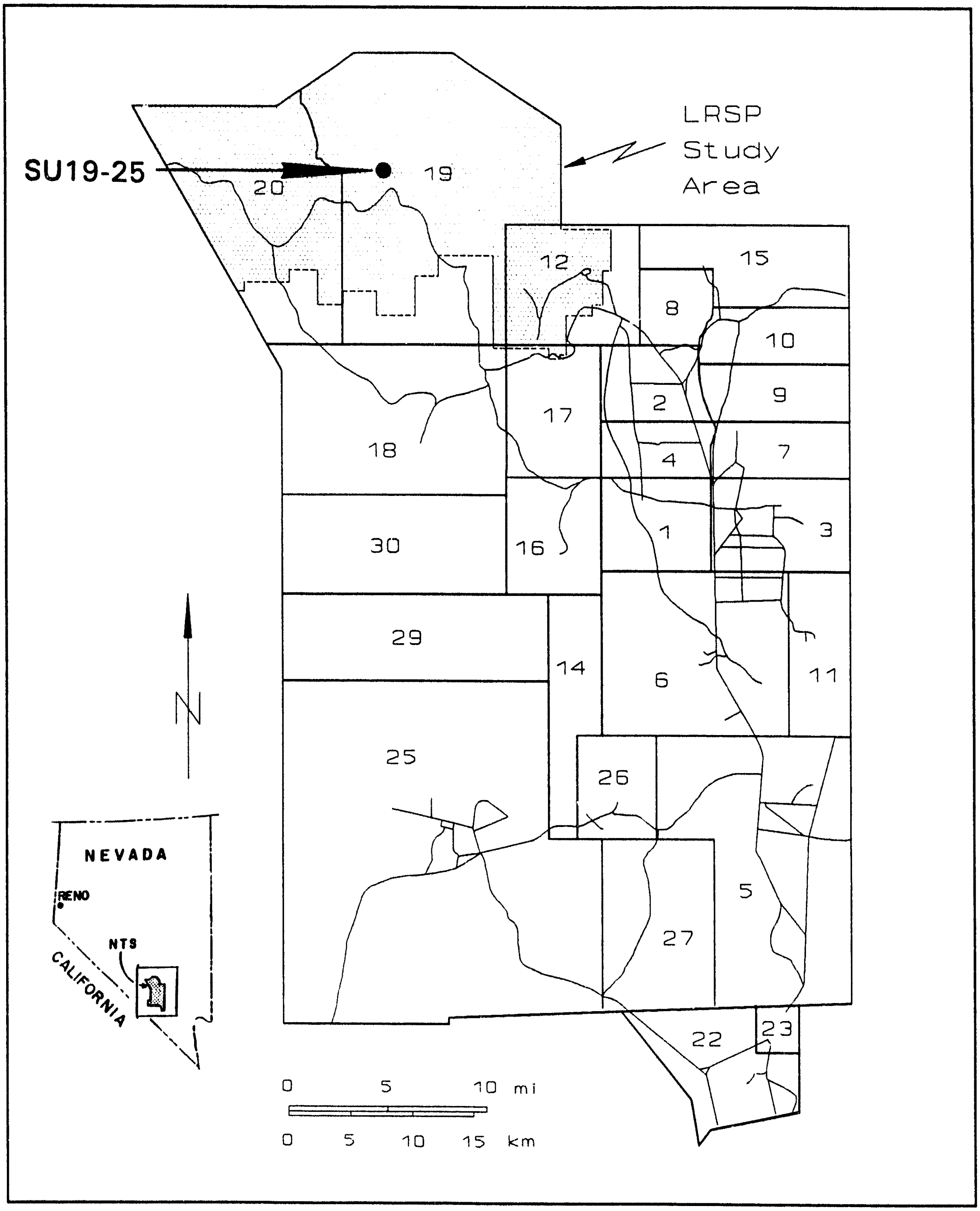

Figure 1. Location of the Long Range Study Plan Area and SU19–25 on the Nevada Test Site.

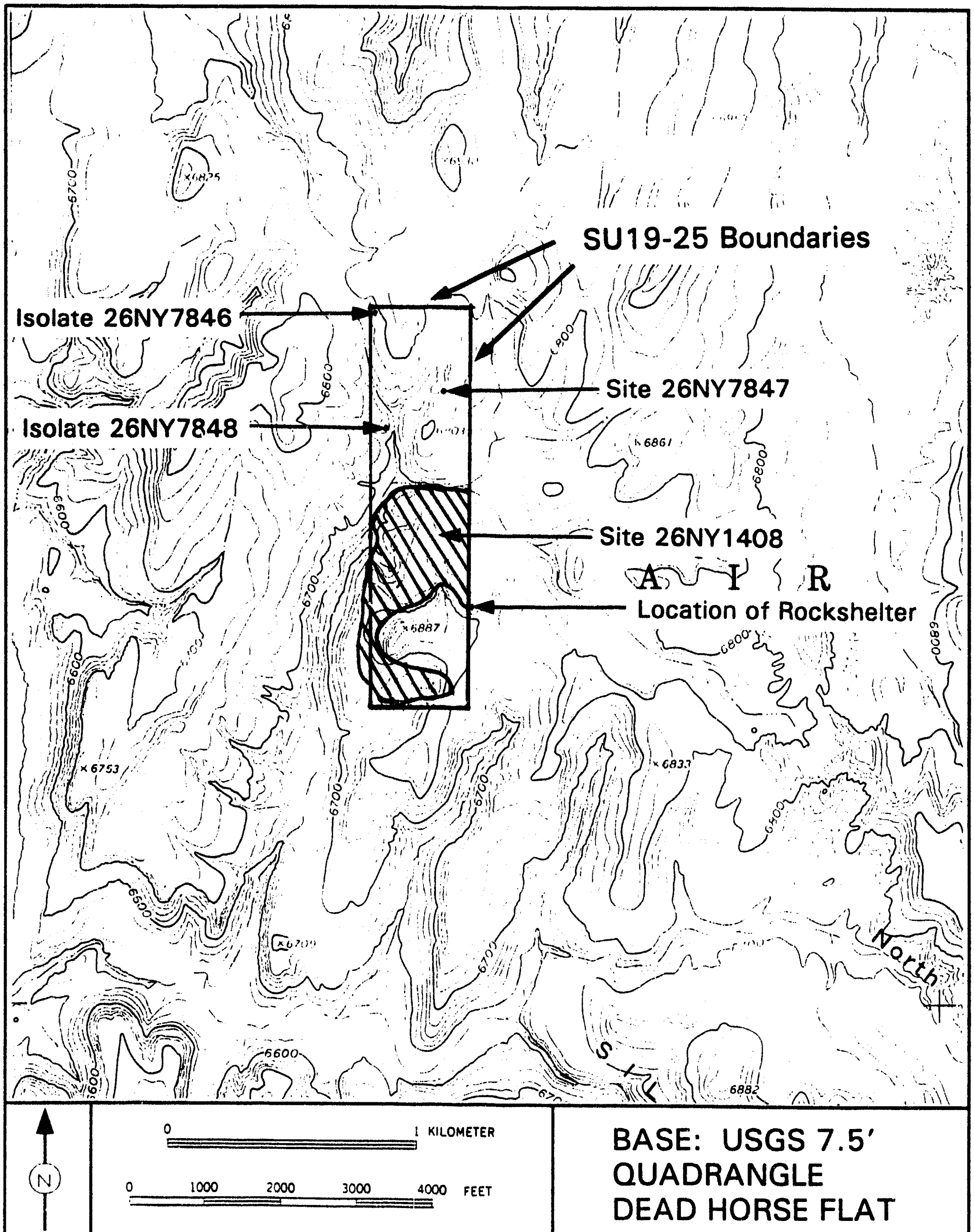

Figure 2. Location of SU19–25 and sites.

2. THE NATURAL ENVIRONMENT

SU19–25 is located on Pahute Mesa, a large mesa in southern Nevada approximately 190 km (120 miles) northwest of Las Vegas. The mesa is a broad east–west trending step–faulted rhyolitic plateau in the extreme northwest portion of the NTS and southern portions of Ranges 75 and 76 of the Nellis Air Force Range. The mesa rises to an elevation of approximately 1,750 m (5,740 ft) at the base of Black Mountain, Quartz Mountain, and Tolicha Peak in the west and to 2,296 m (7,530 ft) at Echo Peak on Split Ridge in the east. Slightly farther east of Split Ridge, Pahute Mesa joins Rainier Mesa, which rises to a maximum elevation of 2,341 m (7,679 ft) and marks the southern extent of the north–south trending Belted Range.

Geology

The geology of SU19–25, and that of Pahute and Rainier mesas, is composed of volcanic rocks from at least four separate volcanic centers. The earliest rocks were apparently extruded as ash flows and pumice–rich air–fall tuffs from the Silent Canyon volcanic center during late Miocene time some 13.5 to 16 million years ago (Byers et al. 1976; Cornwall 1972; Noble et al. 1968; and Orkild et al. 1969). Most of the later volcanic rocks were extruded from the Timber Mountain volcanic center during early Pliocene time (approximately 11 million years ago). Early Quaternary basalts occur as lava flows and dikes in the Basalt Ridge area of northwestern Pahute Mesa.

Basal vitrophyres containing nodules of densely welded glassy tuff (obsidian) occur locally. Generally these nodules are relatively small, but they provided a valuable and highly sought–after source of toolstone for ancient stone tool knappers. Opalized silica and silicified tuffs also occur within these volcanic rocks and provide another source of knappable toolstone. Large tabular to blocky tuff suitable for millingstones and manos as well as building material for caches, hunting blinds, and other structures occurs throughout the volcanic deposits in the study area.

Most Quaternary (less than 2 million years) deposition on Pahute and Rainier mesas is represented by unconsolidated alluvial, colluvial, residual, and aeolian sediments. The deeper, more conspicuous occurrences of colluvium and alluvium were mapped by Orkild et al. (1969) and Sargent and Orkild (1973), but in general these deposits have been little studied. Hoover et al. (1981) have mapped major divisions within the surficial deposits on the NTS, but their studies did not include Pahute and Rainier mesas. The relationship between these geologic deposits and the much more recent archaeological deposits is not well understood. However, most archaeological deposits on Pahute and Rainier mesas are located on the surface and very few have subsurface components.

Climate

Temperature gradients on the NTS depend largely on topography, and extreme daily temperature ranges are common. SU19–25 is at an elevation of 1,950 m (6,400 ft). Mean minimum and maximum temperatures at 1,828 m (6,000 ft) are 24° F (–4° C) and 71° F (22° C)(Beatley 1976). The recorded low temperature is –17° F (–27° C), while the high is 108° F (42° C). Rainfall fluctuates from year to year and between topographic features, but seems to increase with elevation. Precipitation on the mesas is primarily in the form of snow, which may persist most of the winter. Mean annual precipitation on the mesas ranges from 26.1 to 28.6 cm (10.3 to 11.3 in), with recorded extremes of

13.0 cm (5.1 in) and 66.3 cm (26.1 in) (Beatley 1976). Such climatic variation on Pahute and Rainier mesas presented conditions that were favorable for exploitation by the prehistoric inhabitants of southern Nevada.

Vegetation

Wild plants provided a substantial part of the diet of the prehistoric and historic inhabitants of southern Nevada. The distribution of plant resources greatly influenced the settlement patterns of these peoples (Steward 1938). Beatley (1976:58–68) describes the distribution and composition of three major vegetation communities on and around Pahute and Rainier mesas: the black sagebrush community, the big sagebrush community, and the pinyon–juniper woodlands. Although it is convenient to categorize the terrestrial vegetation in the LRSP study area according to these three zonal associations, plant species are distributed according to their individual ecological requirements and boundaries between these zones are often vague (Daubenmire 1966; McIntosh 1967; Whittaker 1967). Similarly, the aboriginal populations that occupied this region undoubtedly relied on selected plants for their sustenance. Consequently, the distribution of individual plant species, as well as overall plant communities, is important when attempting to understand ancient cultural systems.

Above 1,830 m (6,000 ft) in elevation, juniper (*Juniperus osteosperma*) and pinyon (*Pinus monophylla*) enter the sagebrush communities. At SU19–25, juniper dominates the area with only individual pinyon trees scattered throughout the sample unit. At this sample unit, and in most areas on Pahute and Rainier mesas above 1,830 m, pinyon and juniper form a more or less open woodland with park–like areas of big or black sagebrush. Shrubs found at SU19–25 include Mormon tea (*Ephedra nevadensis*), sticky–leaved rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *puberulus*), serviceberry (*Amelanchier utahensis*), bitterbrush (*Purshia glandulosa*), and cliffrose (*Cowania mexicana*), which form the understory in the pinyon–juniper woodlands. Additional shrubs at SU19–25 that are more or less restricted to the bedrock exposures and canyon edges include squaw or lemonade berry (*Rhus trilobata*), squaw currant (*Ribes cereum*), mountain mahogany (*Cercocarpus ledifolius*), prickly phlox (*Leptodactylon pungens* var. *pulchriflorum*), and Gambel oak (*Quercus gambelii*).

Beatley (1976:65–67) lists over 160 perennial and annual herbs that grow in the pinyon–juniper woodlands of Pahute and Rainier mesas. At SU19–25, known and probably used food resources among these herbs include the roots or bulbs of the wild onion (*Allium nevadense*), wild parsley (*Lomatium nevadense*), mariposa lily (*Calochortus bruneaunis*), buttercup (*Fritillaria atropurpurea*), stinkweed (*Cleomilla hillmanii*), and its seeds and various grasses (*Agropyron spicatum*, *Stipa pinetorum*, and *Elymus cinereus* among others).

Fauna

The more common mammals observed on the NTS include several species of insectivores, a variety of rodents, carnivores, ungulates, and lagomorphs (BECAMP 1990; Jorgenson and Hayward 1965; Medica 1990). The size of the fauna ranges from shrews, rats, mice, and voles to deer and sheep (*Odocoileus* spp. and *Avis canadensis*). Recently introduced species, including burros (*Equus asinus*), horses (*Equus caballus*), and cows (*Bos taurus*), are associated with Euroamerican occupation of the area.

The environmental distributions of these animals vary, but the ones regularly associated with pinyon–juniper woodlands like that of SU19–25 are various rats and mice, Merriam's shrew (*Sorex merriami*), gray fox (*Urocyon cinereoargenteus*), ringtail cat (*Bassariscus astutus*), skunk (*Spilogale putorius*), badger (*Taxidea taxus*), rock squirrel (*Spermophilus variegatus*), porcupine (*Erethizon dorsatum*), rabbit (*Lepus californicus* and *Sylvilagus* spp.), mule deer (*Odocoileus hemionus*), bobcat (*Lynx rufus*), coyote (*Canis latrans*), and mountain lion (*Felis concolor*).

Paleoenvironments

The use of Pahute and Rainier mesas for resource acquisition may have been affected by changing climatic conditions of the area. Using evidence from packrat middens found at various localities on and around the NTS, Spaulding (1983a) has postulated that postglacial warming probably began by about 9,000 to 10,000 years ago with average annual temperatures and precipitation approaching present values. Spaulding's reconstructions for full–glacial climate are intermediate between previous scenarios that envision a slightly more moist and less cold pluvial climate (Antevs 1952; Broecker and Orr 1958; Mifflin and Wheat 1979; Snyder and Langbein 1962; Van Devender 1973) and those that postulate a drier and colder late glacial maximum (Brackenridge 1978; Dohrenwend 1984).

LaMarche's (1973, 1974) studies of changes in treeline on the White Mountains of eastern California and southwestern Nevada have provided a good record of fluctuations in temperatures of southern Nevada during the last 6,000 years, a time period poorly represented in Spaulding's (1983b) packrat midden record. Tree–ring dated remains of bristlecone pine (*Pinus longaeva*) now growing above treeline in the White Mountains indicate that between 6,000 and 4,000 years ago summer temperatures may have been as much as 2° C higher than today. Summer cooling, resulting in a lowering of treeline, apparently began about 3,500 years ago and lasted until about 2,500 years ago. This was followed by a period of continued cool temperatures and apparently drier conditions as evidenced by fluctuations in lower treeline. Another major drop in treeline, probably reflecting the onset of cold and dry conditions during the Neoglacial, occurred between about 800 to 400 years ago. Finally, the well documented mid–nineteenth century warming trend (Brinkmann 1976; Mitchell 1961:247–149, figs. 1,2,4; Reitan 1974) led to high reproduction rates of bristlecone pines and the establishment of scattered seedlings at higher elevations (LaMarche 1973: 653–658; 1974, fig. 5).

Pippin et al. (1993) have summarized articles by Graybill and Nials who propose that between 8,600 and 7,300 B.P. there was a general increase in precipitation on the NTS, relative to the modern period. Between 7,300 and 6,500 B,P. a severe drought reduced the precipitation in the area, and corresponds with the Altithermal recorded by many investigators of Holocene paleoenvironments. Moderate precipitation with intermittent droughts characterizes the period between 6,500 and 4,700 B.P. Droughts of approximately 300 years begin and end the period between 4,700 and 3,400 B.P., which otherwise consisted of moderate precipitation. From 3,400 to 1,100 B.P. a variability in precipitation was recorded. Reduced precipitation followed from 1,100 to 400 B.P. with the present period again highly variable with a general increase in precipitation. This variability should have had direct impacts on the human population and thus should result in changes in the archaeological record.

3. CULTURAL HISTORY

The cultural history of the NTS ranges from the Paleoindian to the present. The current understanding of the southwestern Great Basin prehistory can be found in Lyneis (1982) and Warren and Crabtree (1986). Various and specific research topics also relevant to the prehistory are provided in d'Azevedo (1986). An overview of the historic properties on Pahute and Rainier mesas has been produced by Pippin (1986a). These syntheses indicate two general trends: an increase through time in the use of hill and mountain resources and a low reliance on processed seeds until quite late. Group size and mobility also changed correspondingly, and increased interaction outside the Great Basin occurs in the later periods. The historic period of the NTS includes early exploration, mining, transportation, ranching, and modern activities. Information about indigenous native groups and subsistence strategies is also known from the historic period.

Proposed chronologies of the Great Basin, focusing on the prehistory, are presented in Figure 3. As illustrated, separate and often contrasting chronologies have been suggested. Perhaps the most localized is the chronology provided by Worman (1969), which follows Rogers (1966), for the NTS. In order to present the results of the work reported herein, a broader perspective and a modification of the chronologies established by Jennings (1986) and Warren and Crabtree (1986) is utilized. The cultural history summarized below is divided into six broad chronological periods: Paleoindian, Early, Middle, and Late Archaic, Shoshonean, and Historic.

Paleoindian Period

Artifacts dating to the Paleoindian period (ca. 12,000 to 7000 B.P.) in the southwest Great Basin are described as the Lake Mojave or Western Pluvial Lakes assemblage. Artifacts include Lake Mojave, Parman, Silver Lake, and rare fluted projectile points, lunate and eccentric crescents, small flake engravers, specialized scrapers, leaf-shaped knives, drills, and heavy choppers or hammerstones (Warren and Crabtree 1986:184). Warren (1967) has suggested that the assemblage reflects a widespread generalized hunting tradition. Bedwell (1970, 1973) and Hester (1973) interpret the same assemblage to reflect a more specialized adaptation to lacustrine resources around the edges of evaporating pluvial lakes. Davis (1978) argues for a more generalized hunting and collecting economy in which the lakeside sites represent the exploitation of marsh resources only during a portion of a seasonal round. These diverse interpretations are a reflection that most of the Paleoindian assemblages are limited to surface sites commonly found along shores of pluvial lakes.

Lake Mojave projectile points identified with the Paleoindian period have been found at archaeological sites on Pahute Mesa (Pippin 1986a:72). However, the sites are typically large lithic artifact scatters that contain artifacts from later periods, and specific activities for the different periods have not been delineated. Nevertheless, these early artifacts present a possibility that the Paleoindians exploited resources at higher elevations.

Early Archaic Period

Warren and Crabtree (1986:184–187) view the Early Archaic period (ca. 7000 to 4000 B.P.) as a major cultural change, while others (Donnan 1964; Kowta 1969; Susia 1964:31; Tuohy 1974:100–101; Wallace 1962; Warren 1980:35–44) have postulated that environmental conditions were so ad-

YEARS B.P.	GREAT BASIN Jennings 1986	CENTRAL NEVADA Thomas 1983	SOUTHWESTERN GREAT BASIN Warren and Crabtree 1986	CLIMATIC PERIODS Antevs 1948	THIS REPORT
	Late Archaic	Yankee Blade	Shoshonean		Shoshonean
1,000		Underdown	Saratoga Springs		Late Archaic
2,000				Medithermal	
3,000	Middle Archaic	Reveille	Gypsum		Middle Archaic
4,000		Devil's Gate			
5,000			Pinto		Early Archaic
6,000		Clipper Gap		Altithermal	
7,000	Early Archaic				
8,000				Anathermal	
9,000			Lake Mojave		Paleoindian
10,000					
11,000	Pre-Archaic				
12,000					

Figure 3. Proposed chronologies and climate for the Great Basin.

verse that the southwestern Great Basin was essentially abandoned during most of this period. Early Archaic groups were apparently small and transient. Artifacts noted for the period include several varieties of Pinto projectile points, large and small leaf–shaped points and knives, domed and elongated keeled scrapers, several forms of flake scrapers similar to ones in the earlier Paleoindian period, simple milling slabs, and shallow–basin and circular–basin milling slabs at some sites (Warren and Crabtree 1986:187). Warren and Crabtree (1986:187) believe that the Early Archaic people in the Mojave Desert were ill–adapted to the environment due to the small number of known sites and their seemingly temporary nature.

Lyneis (1982:177) and others (Amsden 1935:33; Rogers 1939:52–53, 65; Susia 1964:17–18; Wallace 1977:120) contend that true millingstones are rare or missing in Early Archaic assemblages and that seed exploitation was, therefore, not an important subsistence activity. Wallace (1977:15) suggests that the Early Archaic people were game hunters much like the earlier Paleoindians. Warren and Crabtree (1986:187) postulate a "generalized hunting and gathering subsistence system with only the beginnings of a technology for processing hard seeds."

Projectile points similar to the Pinto type have been found at archaeological sites on Pahute Mesa (Pippin 1986a:79). These artifacts, like the earlier Paleoindian artifacts, are primarily within surface artifact scatters which include artifacts from later periods. However, a multidimensional scaling of the co–occurrence of temporally diagnostic artifacts at sites on Pahute Mesa has revealed that the spatial distribution of the Early Archaic points can be detected from patterns depicted by the earlier Paloeindian and the later Middle and Late Archaic cultural remains (Pippin 1986a).

Middle Archaic Period

The Middle Archaic period (ca. 4000 to 1500 B.P.) is noted for the introduction of new technologies, ritual activities, and increased socioeconomic relationships to outside areas (Warren and Crabtree 1986:189). Projectile points in the early part of the period range from medium to large stemmed and notched, and the most common types are Elko, Gypsum Cave, and Humboldt. These are replaced by the Rose Spring series toward the later part of the period with the introduction of the bow and arrow and the onset of the Late Archaic period. The technology and style of the points appear to have been influenced from areas outside the southwestern Great Basin, particularly from the western Great Basin during the early part of the period and the Southwest in the later part.

A major shift in settlement and subsistence patterns in the southwestern Great Basin during the Middle Archaic period is perceived by Lyneis (1982:177), Rogers (1939:61), Wallace (1958:12), and Warren and Crabtree (1986:187–189). This perception is based on a radical increase in the number and complexity of known sites. Lyneis (1982:177) reconstructs the settlement pattern as semi–sedentary communities on valley floors with a broader use of the landscape, particularly of highland areas. Hunting continues as the major economic pursuit, and an increased frequency of milling implements indicates an expanded reliance on hard seeds. Warren and Crabtree (1986:189) use the occurrence of mortars and pestles at sites in the Mojave Desert near existing mesquite groves to show that mesquite became an important food item. Also, the association of split–twig figurines and elaborate rock art from these sites is interpreted as an expression of an enriched ceremonial lifestyle and increased economic ties with outside areas, most notably the Southwest.

According to Pippin (1986a:80–81), the majority of the cultural resources on Pahute Mesa date to the Middle Archaic period based on the frequency of projectile points. This implies a substantial increase in the use of this upland area as postulated by Lyneis (1982:177). Pippin (1986a:142–158) believes that hunting continues to be a major economic activity based on the quantity of projectile points recovered from localities other than campsites. Also, sites with Middle Archaic artifacts contain evidence of plant food processing and storage, and, as suggested by Thomas (1982) for the central Great Basin, the exploitation of pinyon nuts was probably a major component of subsistence activities by this time in the southwestern Great Basin.

Late Archaic Period

The Late Archaic period (ca. 1500 to 700 B.P.) for the southwestern Great Basin roughly corresponds to and, as a consequence of proximity, is largely influenced by the development of the Anasazi culture of Arizona and New Mexico and the Fremont culture of Utah. A trade route following the Mojave River also linked the area to the California coast. Lyneis (1982:177) proposes that large camps on valley floors of the Middle Archaic were replaced by small temporary camps. Warren and Crabtree (1986:191), however, perceive a continuity in settlement patterns between the two periods, evidenced by the large Late Archaic village sites around Antelope Valley (McGuire et al. 1981; Sutton 1981), in Death Valley (Wallace and Taylor 1959), and on the Mojave River (Rector et al. 1979). One of the most notable changes in technology is the appearance of the bow and arrow that completely replaces the atlatl. Elston (1986:145) states that for the western Great Basin, this technological change and an associated increase in the kinds of plant processing implements "accompanied the adoption of a subsistence strategy that entailed an increase both in the diversity of resources used and in the number of ecozones exploited." According to Lyneis (1982:177), this expansion in the kinds of exploited resources also includes woodland sites above 1,829 m (6,000 ft) in the southern Great Basin.

Evidence for influence and occupation of agricultural societies in the southern Great Basin during this period exists (Fowler and Madsen 1986:175–181; Lyneis et al. 1978:178–179; Warren and Crabtree 1986: 191). The majority of these agricultural peoples, termed the Virgin Branch Anasazi, concentrated along the fertile valleys of the Muddy and lower Virgin rivers in southeastern Nevada and adjacent portions of Utah and Arizona. Some of the Virgin Branch Anasazi may have occupied the Las Vegas Valley near Big Springs (Lyneis et al. 1978:142; Rafferty 1984; Warren et al. 1978:20), and there is a possibility these people mined turquoise in the east–central Mojave Desert near Halloran Spring (Leonard and Drover 1980:251–252; Rogers 1929:12–13; Warren 1980:81–84).

Most of the evidence for Anasazi influence or occupation in the southwestern Great Basin is limited to the occurrence of pottery, which is found as far west as the Cronise Basin in California (Larson 1981; Rogers 1929). Pottery, assigned to Fremont agriculturalists centered in Utah, also occurs at sites in southern Nevada as far west as Mud Lake and Yucca Mountain (Fowler and Madsen 1986:179–180; Pippin 1984a; Self 1980:127–129). Some feel that the pottery was left by small foraging or hunting parties (Berry 1974:83–84; Fowler and Madsen 1986:180; James 1986:114–115; Rafferty 1984:30–35; Shutler 1961:7; Warren and Crabtree 1986:191), but the pottery could also reflect trade to local hunters and gatherers. Pottery may have been a traded commodity on the Old Mojave Trail trading route along with shells, turquoise, obsidian, and salt (Harrington 1927:238–239; Heizer and Treganza 1944; Hughes and Bennyhoff 1986; Morrissey 1968; Pogue 1915:46–51; Ruby 1970; Shutler 1961:58–66).

A multidimensional scaling of the co-occurrence of temporally diagnostic artifacts at sites on Pahute Mesa tends to support a continuity in settlement patterns from the Middle Archaic to the Late Archaic (Pippin 1986a:86–89). Also, there is a decrease in the number of projectile points. This change in projectile point frequency may reflect either a decrease in the emphasis on hunting or a change in hunting strategies rather than changes in population density and a decreased use of highland areas.

Shoshonean Period

The Shoshonean period dates from ca. 700 years B.P. to initial contact with Europeans or Euroamericans. Chronological markers for this time period in the southern Great Basin include Brownware pottery (Bettinger and Baumhoff 1982; Madsen 1975; Thomas and Bettinger 1976) and Desert Side-notched projectile points (Fowler and Madsen 1986:181–182; Warren and Crabtree 1986:191–192). This evidence, along with a glottochronological hypothesis advanced by Lamb (1958:99), has led some scholars to propose an expansion of Numic speakers from southern California into the Great Basin at this time. For example, Bettinger and Baumhoff (1983) postulate that changes in cultural adaptations during the Late Archaic were due to these invading Numic speakers, in that the Numa were able to displace the inhabitants because of high-cost adaptive strategies oriented around the intensive exploitation of a wide diversity of seed resources to sustain larger population densities. In addition, Warren and Crabtree (1986:191–192) tentatively define regional developments during the Shoshonean period which roughly correspond to historic boundaries of Numic and Takic language groups.

An alternative hypothesis (Gross 1977) suggests that the linguistic ancestors of the Numic speakers were occupying the Great Basin as early as 10,000 years ago, where they remained until first contact. Both Rafferty (1989) and Lyneis (1982) suggest that Archaic hunter/gatherer populations coexisted with the Anasazi and Fremont during the time when they were dominant, continued to occupy this territory after they left, and finally became the ethnographic Paiute and Shoshone described by the first Europeans to explore the southern and central Great Basin.

Historic Period

The historic period of the NTS essentially begins in 1849 when a party of emigrants wandered through the area on their way to California (Koenig 1967:37; Young 1849:272). Worman (1969:5–6) and Long (1950:104) refer to a possible earlier expedition by the Mormon Battalion, evidenced by a date of 1847 and a name of R.J. Byor carved on a rock used in the construction of a stone cabin at Cane Spring south of the mesas. However, information on the original context of the rock is not available.

The second documented exploration of the area now occupied by the NTS was in 1866 when Governor Blasdel and a party of more than 20 embarked on a search for a shorter route between the settlements in western Nevada and the Pahranagat mining district (Stretch 1867:141–147). Reports from the exploring party did not encourage others to use the area as a route across the state. The next occurrence was a mapping project led by Lieutenant George M. Wheeler for the desert lands west of the one hundredth meridian. In 1869, this project passed through Indian Springs Valley to the southeast, and in 1871 the project passed through the northern end of Yucca Flat (Hamel 1869; Wheeler 1889).

The earliest adequately mapped road system was recorded in 1905 by Ball (1907: Plate I). The road system appears to reflect the desires of travelers to get through the area as rapidly and easily as possible, and no roads are indicated on Pahute or Rainier mesas. With the establishment of the towns of Tonopah, Goldfield, Beatty, and Bullfrog (Elliott 1966, 1973), a rail link was secured to Las Vegas via the Las Vegas and Tonopah Railroad in 1906. This railroad, which lasted until 1918, tied the area into the national transportation network and by the time it went out of business the automobile provided an alternative for fast desert travel over long distances. The rails were removed in 1919 (Myrick 1963:460) and the abandoned ties became the preferred material for construction of corrals at the spring sites on the NTS. The current profusion of roads began in 1952 with the establishment of the NTS (Liverman 1977:2–12).

The isolation and extreme aridity of the NTS area combine to make animal husbandry a difficult undertaking and one that was never attempted on a large scale. However, some cattle, and perhaps sheep, have been grazed in the area, and the capture of wild horses was once a major occupation (Pippin 1986a). Most archaeological remains from ranching activities are concentrated around the major springs. Extant corrals are at Tippipah, Whiterock, Captain Jack, and Oak springs, and several miles of old fence line occurs near Tippipah Spring. Only two ranches had grazing and water rights on the NTS in 1955 when such rights were purchased by the government (Liverman 1977:2–12). The final ranching activity on the NTS was monitoring the effects of radiation on domestic cattle at an experimental farm in the northern end of Yucca Flat. It closed in 1981.

In 1941 the U.S. Army established the Las Vegas Army Air Field School and acquired over three million acres of land in Nye, Lincoln, and Clark counties for use as a gunnery and bombing range. As World War II drew to an end, the school was deactivated and in 1949 the control of this range, now known as the Nellis Air Force Range, was transferred to the U.S. Air Force (Bergin and Roske 1978). The construction of the NTS facilities began in January 1951, but the original 1,760 sq km (680 sq mi) test range area was not officially withdrawn under the control of the Atomic Energy Commission until February 1952. The first nuclear test occurred in Frenchman Flat on January 27, 1951 (Liverman 1977:12–13). Between that time and 1963, when the Limited Test Ban Treaty was ratified, there were numerous aboveground nuclear weapons tests on Yucca and Frenchman flats. Since the ratification of the Limited Test Ban Treaty, all nuclear tests on the NTS have been conducted underground, either in tunnels or vertical holes.

4. ETHNOGRAPHIC STUDIES

The first Euroamerican explorers and immigrants in the southern Great Basin encountered widely scattered groups of hunters and gatherers who spoke different dialects of closely-related Utoaztecan languages. These people usually called themselves the "Numas," "Numos," "Numes," "Nunas," etc., but are now known as Shoshone and Southern Paiute (Fowler and Fowler 1971:37). The early explorers categorized the Numa as "miserable diggers: who represented the lowest state of human existence..." (Fremont 1845:12). However, these early inhabitants practiced a highly successful adaptation to a harsh environment. Subsistence strategies revolved around seasonal movements between environmental zones according to the availability of natural resources.

Ethnographic and historic sources indicate native populations in the Great Basin generally established semi-permanent basecamps for the winter where water, food, and fuel were readily stored or available and in other seasons left in search of other resources (Davis 1965; Steward 1933, 1938; Stewart 1941; Wheat 1967). The occupation of a residential basecamp throughout the winter required stores of food either within the encampment or at various caches in the surrounding resource zones. In the settlement and subsistence system practiced, the important point is that the more permanent winter camps were the hubs of many different subsistence activities over a wide area and in various resource zones.

Steward (1938:94–95), relying on an ethnographic source, reports that at least nine Shoshone families maintained winter camps ca. A.D. 1875 or 1880 around the springs within the present environs of the NTS. The camps included *Wungiakuda* located two to three miles east of Ammonia Tanks, *Mutsi* on or adjacent to Pahute Mesa northwest of Ammonia Tanks, *Sivahwa* a few miles north of *Mutsi*, *Tuna'va* at Whiterock Spring, *Wi:va* at Oak Spring, *Kuikun* at Captain Jack Spring, *Tupipa* at Tippipah Spring, *Hugwap* at Cane Spring, and *Pokopa* at Topopah Spring just south of Shoshone Mountain in the northern end of Topopah Valley. The camps normally consisted of single nuclear families, and a total population estimate is given of 42 people for the nine camps. The families were linked through marriage or cooperation with groups of similar lifestyle living near Beatty in Oasis Valley, with a population estimate of 29 people, and some were also linked by marriage to Paiute groups to the south or east. The people also cooperated with the Kawich Mountain groups when seasonal resources were poor in one area or the other.

Aboriginal Patterns of Resource Procurement

Determining the various kinds of biotic resources used and understanding the strategies through which they were exploited is one of the questions asked in the LRSP. This question primarily concerns past strategies of resource utilization, but because there is a direct relationship between the subsistence strategies and settlement systems of hunters and gatherers, the two cannot be divorced and studies conducted under this question must build on the information obtained through addressing the spatial distribution of cultural remains in the Pahute and Rainier Mesa Archaeological District.

Pine nut procurement

Although several resources are available on Pahute Mesa, ethnographic records indicate the most important resources for subsistence are pine nuts and game such as deer and rabbit (Dutcher 1893; Fenenga 1975; Lanner 1981; Little 1938; McGuire and Garfinkel 1976; Pippin 1979; Steward 1933, 1938; Thomas 1969). Several pine nut procurement and hunting strategies are represented in the ethnographic record. Pine nut collecting strategies range from a simple pattern of small social groups making short term excursions from a residential base outside the pinyon/juniper woodland to a more complex strategy of basecamps in the woodland. Because the maintenance of a population over an extended period of time would require foodstuffs other than just stored pinyon nuts, an expectation is that the pine nut procurement strategy was combined with the exploitation of other available resources.

To strengthen th: resource strategy, the dissemination of environmentally relevant information, that is, shared information concerning the location and abundance of critical resources such as water, game, and pinyon nuts, was of importance to the early inhabitants of the area. Thomas (1972:146–148) has postulated that *fandangos* operated as "clearing houses" for this information. These *fandangos* were commonly held at the larger semi-permanent villages, and attracted up to 300 people in some areas of the Great Basin (Harris 1940:53; Steward 1938:237). These gatherings have commonly been viewed as effective mechanisms of social integration during which kinship ties and group solidarity were strengthened (Harris 1940:68–69; Steward 1938:90).

Hunting Strategies

Steward (1938:33) felt that the procurement of game was only of secondary importance in Great Basin aboriginal subsistence activities and this view has been widely echoed in the archaeological literature (Heizer and Baumhoff 1962:210–218; Thomas 1969:398–399). Nonetheless, as emphasized by Thomas (1983:41–57), the Numa exploited a large range of fauna and the tactics used in this procurement undoubtedly had a major influence on their adaptive strategies. Binford (1978) has distinguished between two major strategies of hunting game: the encounter and the intercept. Briefly, the encounter strategy, typically used to exploit low density game, includes both the intentional and opportunistic search for game by traversing a region inhabited by that game. The intercept strategy, on the other hand, involves the monitoring of game movements, usually as herds, and the attempt to ambush this game at predetermined hunting locations.

Intercept strategy. Driving game past concealed hunters was a common intercept strategy used by the early inhabitants of the Great Basin in the procurement of large game (Stewart 1941:366–367). Muir (1894:320–322) recorded many nest-like stone enclosures on Great Basin summits that were probably used in the procurement of bighorn sheep (Pippin 1979). Hunting ambushes of this nature are commonly recorded in the Great Basin archaeological record (Casjens 1974:11–12; Cressman 1942:66, 69; Fowler and Sharrock 1973:101; Heizer and Baumhoff 1962:18–20, 38–45, 52–56). Stewart (1941:366–367) notes that the Northern Paiute of western Nevada dug pits beside trails and springs where hunters would lie in wait of game. Although this strategy of hunting could require a large group effort, hunting parties probably consisted of only a few individuals.

Encounter strategy. The individual encounter strategy of hunting large game was probably the most common, but least efficient, hunting strategy employed by the early inhabitants of the Great Basin. Steward (1938:36) associated this method particularly with the hunting of deer, although it was probably used for procuring all large game. Several groups used animal skin disguises while stalking game (Lowie 1909:185; 1924:195–197; Stewart 1941:219), while others hid behind tufts of rabbitbrush (Kelly 1964:50) or simply tracked the game to opportunistic killing zones (Fowler and Fowler 1971:47). As pointed out by Thomas (1983:52–53), this strategy of hunting, because it lacks the need for facilities for ambushes and game drives, would result in rather low archaeological visibility.

The fall rabbit drive, the only true communal economic activity noted close to the LRSP study area, was held in Yucca Flat south of Whiterock Spring and attended by the Belted Range Shoshone, Beatty Shoshone, Kawich Shoshone and, occasionally, the Southern Paiute from the vicinity of Ash Meadows as well as various Northern Paiute and Washo groups of western Nevada (Davis 1965:34–35; Downs 1966:27–32; Wheat 1967:14–15). The rabbit drive was usually preceded by a fall festival or *fandango* held either at *Wungiakuda* or at Beatty when rabbit populations were low in Yucca Flat (Steward 1938:98). Steward (1933:254, 1938:54) notes that the Owens Valley Paiute held communal rabbit, deer, and other large game drives during the fall after the pinyon harvest.

Trade and Exchange

Shell beads, probably traded from the coast of California, are a common occurrence in Great Basin archaeological sites and have been widely used in cross–dating these sites (Bennyhoff and Heizer 1958; Gifford 1947; Tuohy 1970). Prehistorians have long recognized that southern Nevada was an important source of salt for prehistoric peoples (Harrington 1925, 1926). Shutler (1961:58–61) has summarized the evidence for the mining and trading of both salt and turquoise in southern Nevada. Weigand et al. (1977) have also identified the region around Tonopah, northwest of Pahute and Rainier mesas, to have been an important prehistoric source for turquoise. The Oak Springs region just east of Rainier Mesa was a historic source of chrysocolla, but its prehistoric use for that commodity has yet to be established.

Other possible evidence of trade and exchange comes from obsidian. Nelson (1984) characterizes and summarizes numerous sources of obsidian in the Great Basin and Elston and Zeier (1984) have described the Sugarloaf Obsidian Quarry near Little Lake, California, southwest of the NTS. Preliminary studies of obsidian sources on the NTS have indicated that although these obsidians have distinct geochemistries and are capable of being sourced, a single geochemical point source model of resource availability does not adequately describe their distribution. Actual acquisition of obsidian usually occurs along alluvial exposures which have a combination of geochemically distinct obsidians.

5. RESEARCH OBJECTIVES

A sampling strategy has been proposed for the treatment of cultural resources on Pahute and Rainier mesas in the LRSP (Pippin 1992). The objective of the sampling strategy is to obtain an 11 percent sample that is geographically representative of the mesas. Data recovery for SU19–25 is designed to retrieve a large enough sample of artifacts and features so that variability in those assemblages can be adequately addressed and to retrieve information regarding the spatial distribution of the variability in the artifact assemblages and features. Data recovery procedures for SU19–25 include mapping, surface collections, shovel tests, augering, and full scale excavations.

LRSP Questions

A series of general research questions have been set forth in the LRSP (Pippin 1992) regarding the archaeology on Pahute and Rainier mesas. These questions are in agreement with the state plan of the Nevada Division of Historic Preservation and Archeology (Lyneis 1982). The questions listed below are taken from the LRSP and follow the numbering in that document. The major concerns addressed by these questions include chronology, spatial relationships, and behavioral variability. These questions have been addressed more thoroughly by Pippin (1992). They are presented here as the research questions that have guided the work conducted at SU19–25.

1. What are the spatial relationships of cultural remains to each other and to available natural resources?

4. What are the sources of raw materials used in artifacts and features found at cultural resources?

5. What behavioral information is represented by refuse at lithic scatters?

7. What strategies of subsistence resource utilization are represented in the archaeological record and how has this resource utilization changed through time and affected settlement patterns?

8. What is the history and what are the processes of hunter and gatherer mobility and demography?

The spatial relationships of the sites to each other and available natural resources are thought to represent distinctive patterns that express cultural adaptations. The lithic materials recovered at the sites provide data on lithic refuse patterning, while strategies of subsistence resource utilization are indicated through use-wear studies of some lithic tools. Temporal parameters for occupation may be discerned through analysis of artifacts found at the sample unit.

6. DATA RECOVERY METHODS

Testing

Testing at SU19–25 was conducted during the survey of the sample unit (Jones 1991). It involved the excavation of seven test pits. Five of the test pits measured 6 x 6 m, 4 x 3 m, 3 x 3 m, 2 x 2 m, 1 x 1 m, and two measured 50 x 50 cm. The loose sediments, removed in 5-cm increments, were screened through 1/4– and 1/8–inch wire mesh screens. Artifacts were collected, bagged, and recorded separately from those on the surface. No test pits were deeper than 20 cm.

Because of unsafe conditions, testing at the rockshelter was terminated and no results were included in the survey report of SU19–25 (Jones 1991). An alternative method of testing at the rockshelter, augering, was proposed in the Data Recovery Plan for SU19–25 (Jones 1992a). Augering was performed by using a simple screw auger and handle extensions to penetrate the surface. The subsurface sample, removed in 10-cm increments, was screened through 1/4– and 1/8–inch wire mesh screens. Two auger holes, 7.5 cm (3 in) in diameter were placed inside of the rockshelter at site 26NY1408 in this manner to a depth of 35 cm; however, no artifacts were found.

Mapping

The topography, environmental characteristics, and surface distributions of artifacts and cultural features were mapped for the area of data recovery. Sites 26NY1408 and 26NY7847 were mapped planimetrically, with a grid system used for provenience and locations of test excavations. This was accomplished by superimposing a metric grid system over the data recovery area. In general, a Brunton compass was used for establishing grid systems and baselines as well as for taking azimuth notations from datums. Distances were measured using 30–m metal/cloth tapes and calibrated rope grids. Diagnostic artifacts and features were plotted to exact locations. Also, individual feature locations were mapped to a larger scale than site maps for clarity.

Surface Collections

Surface collections centered around identifiable concentrations of artifacts or features, and collection units were selectively placed to provide an accurate representation of the spatial, functional, and technological variability exhibited in the artifact assemblage. Site boundaries cannot be adequately defined during the initial surveys because of the limited time requirements. It is only during the more intensive surface examination while conducting surface collections that researchers have been able to adequately define concentration boundaries and components (Pippin 1992).

Surface collection was the principal data recovery technique at SU19–25. The materials were provenienced using a metric grid system superimposed over the sample unit. A datum (1000N, 1000E) was placed along the east side of the sample unit with coordinates expressed in meters either north or east of this point. This provides comparable data on the nature, density, and spatial distribution of cultural remains at each cultural resource. Cultural material was collected according to grid square, with the northeast corner of each square serving as the primary coordinate. Cultural remains were collected in 10–x–10–m and 4–x–4–m grid squares with diagnostic artifacts and other cultural remains of specific interest (e.g., features, curated tools, etc.) plotted to exact locations.

The grid system for surface collection was oriented true north with the use of a Brunton Compass. The initial north–south and east–west baselines were established with flagged laths at 150-m intervals. Later, additional laths were spaced at 30-m intervals along the 150-m baselines to divide the square into manageable axes. Finally, four ropes, calibrated to 30 m in length and marked every 10 m, were placed perpendicular to one of the axes, thus creating nine 10–x–10–m squares. These served as the principal collection units. However, due to an extraordinary amount of lithic shatter at the largest exposure of the toolstone source area at site 26NY1408 and a limited time schedule, a sampling strategy was devised to retrieve a representative sample of the shatter. This was achieved by totally collecting all lithic material from a 4 x 4 m square in the northeast corner of each 10 x 10 m unit. In the remaining area of the 10 x 10 m units, shatter was excluded from the cultural materials that were collected. A total of 60 4–x–4–m squares were collected out of the 1,434 10–x–10–m collection grids at the site. These were selected based on the density of lithic material at this site.

All the units were inspected by archaeologists walking at closely spaced intervals. The artifacts were collected and referenced to the coordinates of the corresponding square. After completing the inspection of the nine units, the ropes were pulled and a new set of units created. Accuracy in direction was maintained by use of a Brunton compass.

Full Scale Excavations

The intent of test excavations was to determine whether or not certain cultural resources contain buried cultural components and to provide information on which to base more detailed excavations or other management alternatives. Those test excavations were not, designed to mitigate potential adverse impacts to cultural resources through data recovery. The primary intent of full scale excavations, on the other hand, was to retrieve an adequate sample of the data pertinent to the full research potential of a cultural resource within the area of potential adverse effect. Full scale excavations were conducted under the data recovery plan submitted for this sample unit (Jones 1992a).

At site 26NY7847, full scale excavations of the rock and brush structures were proposed. This was because many rock and brush structures previously investigated on Pahute Mesa were simply tested by the placement of a single 1–x–1–m excavation unit inside the structure and sometimes one outside. Full scale excavations at site 26NY7847 were controlled by both a horizontal grid system and by measuring the depth of recovered remains below a single permanent datum. As with test excavations, all excavated deposits were screened through 1/4– and 1/8–inch mesh screens. The standard excavational unit was 1 x 1 m and was excavated in 10-cm-thick levels.

7. MATERIAL ANALYSIS

Artifacts were checked for radioactive contamination by radiological safety personnel on the NTS, then transported to the DRI Archaeology Laboratory in Las Vegas for processing. At the lab, all artifacts were assigned a unique artifact number consisting of a permanent site number, a reference number, and a sequential specimen number. All artifacts, except shatter, were then sorted into rough types, measured, weighed, and cataloged. Shatter was grouped by material types and weighed, then assigned specimen numbers according to provience. This general catalog information was entered into a database for analysis. The final disposition of these materials is to be at the DRI curation facility in Reno.

Methods of Analyses

The analysis of artifacts from SU19–25 consisted of typological studies, technological studies, and limited functional analyses. These three approaches are closely interrelated, but differ in focus. Technological studies are aimed at the techniques used to produce artifacts; functional analyses address the uses to which these artifacts were subjected; and typological studies organize artifacts into groups that are significant for comparative purposes. Analysis of the age, function, and technology of the various artifacts is essential for inferring the activities of prehistoric and historic people in the project area.

Technological Studies

It should be emphasized that any stage of artifact manufacture may represent a finished tool. For example, primary flakes with unmodified working edges may be more efficient for certain tasks than those carefully prepared by retouching (Gould et al. 1971:152, 156; Walker 1978). Also, worn working edges may have been resharpened or rejuvenated several times before the tool was discarded. Secondly, artifacts recovered in the archaeological record may represent a variety of unfinished or rejected tools or by–products of tool manufacture (Holmes 1890:11–13).

By isolating ancient techniques and methods represented in each stage of lithic tool production, researchers may accurately characterize ancient patterns of lithic technology, as well as provide data pertinent to interpreting site function and resource procurement. In addition, if differences in production techniques are represented and can be separated, possible technological, chronological, and functional information may be revealed and defined for a particular stage form. The strategies of tool manufacture and use also may vary according to several other factors. Among these are the spatial locations of raw materials in relationship to the spatial locations of resources or tasks for which the tools were used, the suitability of available raw material for technological and task–specific functions, and the overall strategy of seasonal human population movement in the Pahute Mesa region.

Functional Analysis

The functional analysis of the material culture from SU19–25 focused on two goals: the interpretation of specific tool use and the delineation of artifact assemblages and site functions as they reflect the ancient systems of resource procurement on Pahute Mesa. The first goal has been approached through use–wear analyses. Data amassed during the typological, technological, and artifact use–wear studies were interpreted in the context of artifact assemblages and site functions. Through this perspective, various hypotheses were tested concerning the past systems of resource exploitation on Pahute Mesa. For example, artifact assemblages resulting from hunting or butchering activities might be typified by artifacts (e.g., projectile points, bifacial knives, and steep-edged scrapers) discarded or lost during such procurement (Bettinger 1975:69–99). Here, it is important to heed Jelinek's (1976:31) warning that the discarded artifacts were probably viewed as trash by those who discarded them. Thus artifact assemblages do not necessarily reflect complete tool kits, but rather a restricted, and often biased, sample of only a segment of any particular activity.

Typological classifications

Typological classification is the grouping of objects into artifact classes. A definition of the artifact classes represented by artifacts found at SU19–25 follows. In addition, typological classification of production errors is explicated, size-grading is defined, and stone material types are provided.

Cores. Cores are pieces of toolstone exhibiting one or more flake scars from intentional flake production (Pippin and Hattori 1980:19). Cores may be used solely to produce flakes, or they may be part of a delayed reduction strategy wherein a core could be subsequently reduced to a finished product. Therefore, cores result from production of flakes according to a technological strategy of reduction. Theoretically, the morphology of cores reflects this strategy.

Four categories of cores have been identified at SU19–25: assayed, unidirectional, multidirectional, and bifacial. Assayed cores are characterized as having relatively few flake scars, a high percentage of cortex, and an irregular shape. The presence of these characteristics implies that the toolstone was tested for its flaking potential and subsequently discarded. Unidirectional cores are characterized as having regular flake removals from one or more platforms, all in the same direction. Multidirectional cores have flake removals originating from a number of platforms, in several directions. Bifacial cores have irregularly spaced flake removals along one or more bifacially edged platforms. The distinguishing characteristics between a bifacial core and a Stage I biface (defined below) are gradational and overlapping and therefore often difficult to discern. For the purpose of this study, bifacial cores are distinguished by irregularly spaced flake removals, greater thickness, and greater amounts of cortex than Stage I bifaces.

Much of the lithic material at the toolstone source area at SU19–25 is not very homogeneous (e.g., flaws, cracks, and vugs), and the pieces will separate along planes of weakness during extreme thermal conditions (e.g., freeze-thaw, heat treating, and grass fires) which can produce shatter that may resemble cores. Extra care was taken to denote platform remnants above flake scars before classifying a lithic sample as a core. The cores were then classified into one of four categories based on the number and orientation of flake scars and the overall shape of the core. The attributes measured during this analysis included maximum length, maximum width, thickness to the nearest 0.01 mm, and weight to the nearest 0.1 g.

Uniface. A uniface is a lithic artifact flaked on one surface only. The flaked surface may be a proximal, lateral, or distal edge or the ventral or dorsal surface of a piece of toolstone. In contrast to a utilized flake, a uniface has been shaped prior to use. Attributes measured for unifaces include weight, length, width, and thickness and raw material type. Uniface types include adze, axe, chopper, gouge or chisel, graver, scraper, and spokeshave. Segment types include complete, proximal, medial, distal, undifferentiated fragment, haft, and lateral. Blank types include block shatter, decortication flake, core reduction flake, biface thinning flake, indeterminate flake, cobble, tabular, thermal shatter, and indeterminate. Cortex was estimated by percent. Alteration of unifaces was either none, heat treated, burned, or indeterminate. Fracture types include none, edge collapse, excessive force, hinge, internal flaw, impact, overshot, perverse, snap, thermal or combinations of the above. Secondary use includes battering and ground.

Bifacial Stage Forms. A biface is an artifact bearing flake scars on both faces. In the manufacture of bifacial tools, an initial piece of toolstone is reduced (flaked) until an acceptable tool is produced or the reduced specimen is discarded (e.g., because of breakage or because the toolstone becomes unsuited for forming the desired tool). This manufacturing process provides a series of reduction types that are represented by flake removal. Four types are distinguished.

Type I bifaces are thick, angular specimens with large, frequently irregular, flake removals that produce a variety of shapes with uneven sections and edges. The primary goals of the knapper are to remove cortex, establish striking platforms, and detach flakes. These bifaces can be made from a flake or natural nodule. Outline and thickness are presumed to be of secondary concern to knapper. The form can be relatively thick and very irregular in planar view. Edges are very sinuous and roughly centered when viewed edge–on. The specimen is angular in cross–section with a sinuous mid–line ridge. It often exhibits cortex or original flake surface remnants, and flake scars frequently extend across the mid–line.

The primary goal in the reduction of Type II bifaces is to roughly thin and regularize edges through percussion flaking. Platforms are maintained through strengthening and repositioning. The biface is thick with cross–section less angular and more rounded. The mid–line ridge is prominent, moderately regular, and centered though sinuous. In addition, the tip and base are distinguishable.

Type III bifaces are characterized by the thinning of the biface's cross–section. Flakes are often removed in series, extending across mid–line. Flake scars are broad and expanding and are commonly removed with soft billets. Pressure edge retouch may be located irregularly along the edge in preparation for flake removals. The object form is thin (approximately the thickness of the final desired tool), tip and base are well delineated though not notched, edges are nearly straight viewed edge–on and are often centered. Lanceolate forms may exhibit parallel, oblique flake removals for this type.

The primary goal of Type IV bifaces is the production of regular edge outlines which are straight when viewed edge–on. Thick arris remnants along the edge are removed through pressure flaking. The tool form is complete except for hafting element formation. This often constitutes a "preform stage."

Because the production sequence may terminate at any time after the first flake is removed, it is technologically meaningful to categorize bifacially thinned artifacts according to an idealized model of type forms directed toward a desired end product. The model conceptualizes a sequence proceeding from platform establishment through edge regularization, thinning, shaping, and haft preparation. Nevertheless, the artisan may not follow the proposed model. For example, any type of biface could be a desired finished product, or a type may be manufactured from a thin flake blank that only requires sharpening and notching to be finished. In addition, any type of biface could be part of a delayed reduction strategy and may have been used for a number of purposes prior to being reduced to a final product and subsequently discarded.

Biface tools. Biface tools are defined here as any biface whose functional use can be distinguished from the biface categories above (except projectile points). This category includes axes, adzes, choppers, drills, gouges, chisels, gravers, knifes, and scrapers. Attributes measured include the artifact's weight, length, width, and thickness. Each value was recorded to the nearest 0.01 mm or 0.1 g. When segments were analyzed, they were classified into seven types: complete, proximal, medial, distal, haft, lateral, and indeterminate. Cortex was recorded as none, >0 to 25 percent, >25 to 75 percent, and >75 percent. Thermal alteration included none, cultural, non-cultural, and indeterminate. Fracture types include edge collapse, impact, internal flaw, overshot, perverse, snap, thermal, and indeterminate.

Projectile Points. Projectile points are artifacts designed for hafting and propulsion by an arrow, atlatl dart, or spear. However, as with any tool, any particular projectile point might have been used for a variety of functions (e.g., cutting, scraping, perforating) before being abandoned. Attributes measured during the analysis included the artifact's weight, length, width, and thickness. Each value was recorded to the nearest 0.01 mm or 0.1 g. Several other attributes were also used for analysis of the projectile points. When segments were analyzed, they were classified into seven types: complete, proximal, medial, distal, haft, lateral, and indeterminate. Cortex was recorded as none, >0 to 25 percent, >25 to 75 percent, and >75 percent. Thermal alteration includes none, cultural, non-cultural, and indeterminate. Fracture types include edge collapse, impact, internal flaw, overshot, perverse, snap, thermal, and indeterminate. Twelve types of projectile points were recovered at SU19-25 in 1991 and 1992: Silver Lake, Elko series, Elko Corner-notched, Elko Eared, Large Side-notched, Humboldt Series, Humboldt Small, Humboldt Large, Rose Spring Corner-notched, Eastgate, indeterminate arrow, and indeterminate.

Projectile point typologies furnish archaeological data which are important on several levels. The most frequent use is chronology building. At sites without stratified deposits, data from projectile point typologies may be the only basis for determination of the relative age of the site. Projectile points can be used to define chronological periods because their forms change through time. With the development of radiocarbon dating, chronologically sensitive point types have been identified within particular regions. This assignment of age to points associated with reliable C-14 dates allows sites with projectile points but without radiocarbon associations to be dated.

Another important aspect of projectile point studies is that they yield important information about prehistoric technological practices. The life history of a tool can be documented in the production, rejuvenation, reuse, and final disposal patterns characteristic of each point. In turn, this information provides important clues about the subsistence practices of the maker.

In the following sections the technological and morphological characteristics of projectile points typically found on the NTS are described. A modified version of Thomas's (1981) Monitor Valley Key was used during this analysis to assign the points to various categories. Approximate ages, if known, are provided for each projectile point style. Documented variation within each type is also described, as is variation of the types across geographic areas within the Great Basin and the Mojave Desert.

Silver Lake Points. Silver Lake projectile points (Figure 4) are similar to Lake Mohave points and Warren and Crabtree (1986) place them in the same chronological period (10,000 to 5000 B.C.). These points have more defined shoulders and the base is shorter and less tapering than that of Lake Mohave points. The base is never more than half the whole length; usually it is about 1/3 of the entire length. It is always rounded at the proximal end. Technological aspects of the production of this style of point are similar to those for the Lake Mohave complex. That is, for both types there is a large degree of variability. Some points are completed using only percussion flaking, while others are finished with fine pressure retouch.

Elko Series Projectile Points. Elko series projectile points (Figure 5) are defined by Thomas (1983) as large corner–notched points with a basal width greater than 10 mm and a proximal shoulder angle of 110° to 150°. In SU19–25, two forms of this triangular point are found: eared and corner–notched. Corner–notched points (Figure 5a,b,c,g) have a basal indentation ratio greater than 0.93. Eared points (Figure 5d,e,f) feature a basal indentation ratio less than or equal to 0.93. These points can be attributed to occupation of the NTS from 2000 B.C. to A.D. 500. The large size of these points suggests dart or atlatl hunting techniques.

Large Side–notched Points. Large Side–notched points (Figure 6a,b) groups a number of previously defined Great Basin projectile point types which include Northern Side–notched, Bitterroot Side–notched, Madeline Dunes Side–notched, Elko Side–notched, and Rose Spring Side–notched. These are large side–notched points that weigh more than 1.5 g and have a proximal shoulder angle greater than 150°.

Humboldt Points. Warren and Crabtree (1986) assign Humboldt points (Figure 7) to the same chronological time frame as Elko Series and Gypsum/Gatecliff Contracting–stem points. These relatively poor time markers are commonly found in artifact assemblages dating from 2050 B.C. to A.D. 450. Thomas (1981) provides slightly different dates for this type; he believes that in the Monitor Valley this types dates from ca. 3000 B.C. to 700 A.D. Humboldt projectile points vary in size, hence the proposal of many researchers that the larger types, often called Humboldt A (Figure 7b–e), are older while smaller points, called Humboldt B (Figure 8a), are younger within the long time span when these points were in common use. The two sizes were differentiated in this study, but no claims to the earlier chronology are made for the larger type. These shoulderless points are described by Thomas (1981:17) as "...unnotched, lanceolate, concave base projectile points of variable size." Pippin (1986a:81) discusses dating problems associated with the Humboldt points but concludes that they are at least 1300 years old.

Rose Spring and Eastgate Points. While morphologically different, Rose Spring and Eastgate points are considered by Thomas (1981) to be temporally equivalent. Therefore, he combines them in a group called the Rosegate Series. His evidence suggests that Rosegate projectile points span the period from 700 through 1300 A.D. In form, Rose Spring (Figures 8, 9, and 10a–d) and Eastgate points (Figure10e) are smaller versions of Elko Series points. Rose Spring (and Eastgate) points are "small...corner–notched...stem expands, but usually not markedly" (Lanning 1963:252). The main difference between Rose Spring and Eastgate type projectile points is in the degree of basal indentation. Rose Spring types feature a straight or only slightly indented base, while Eastgate points feature a pronounced basal indentation. Thomas (1981) indicates that these points

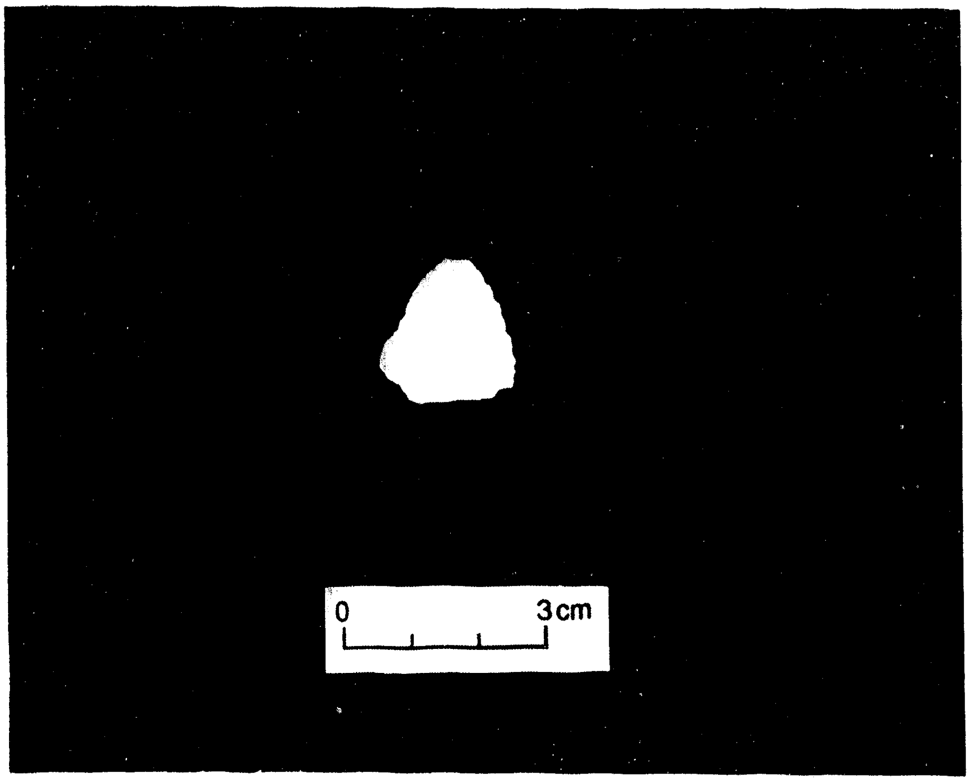

Figure 4. Silver Lake projectile point found at site 26NY1408.

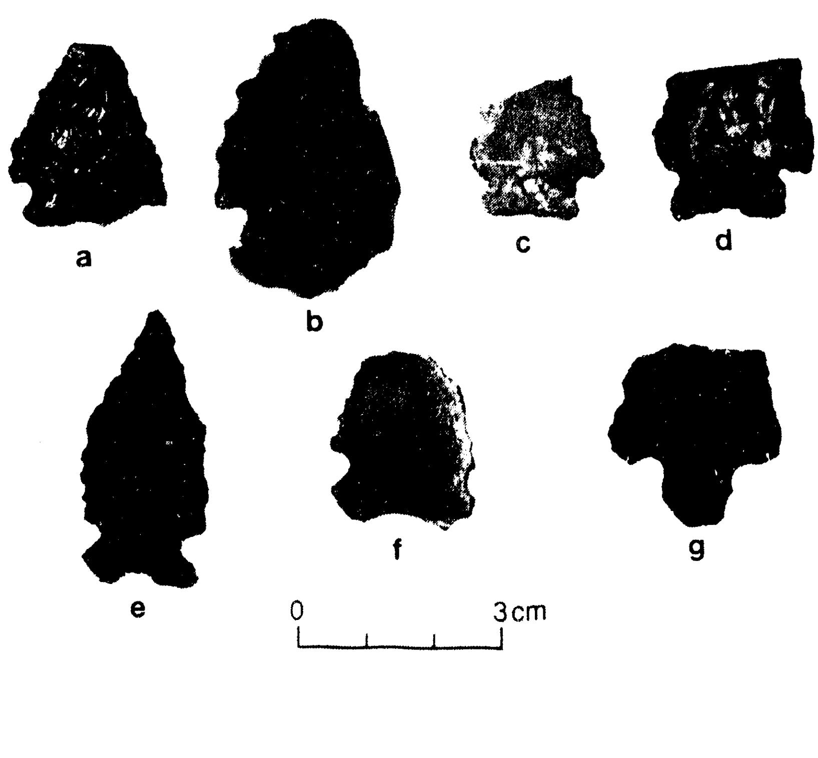

Figure 5. Elko projectile points found at site 26NY1408.

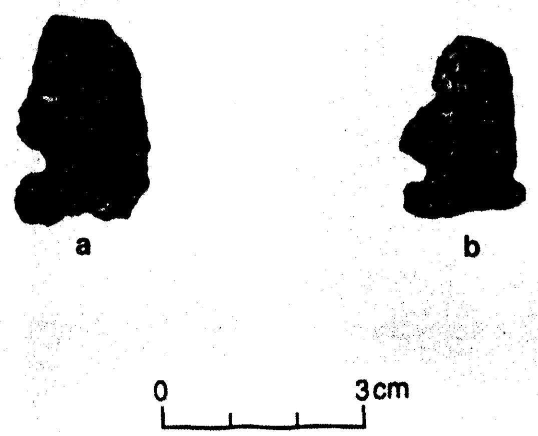

Figure 6. Large side–notched projectile points found at site 26NY1408.

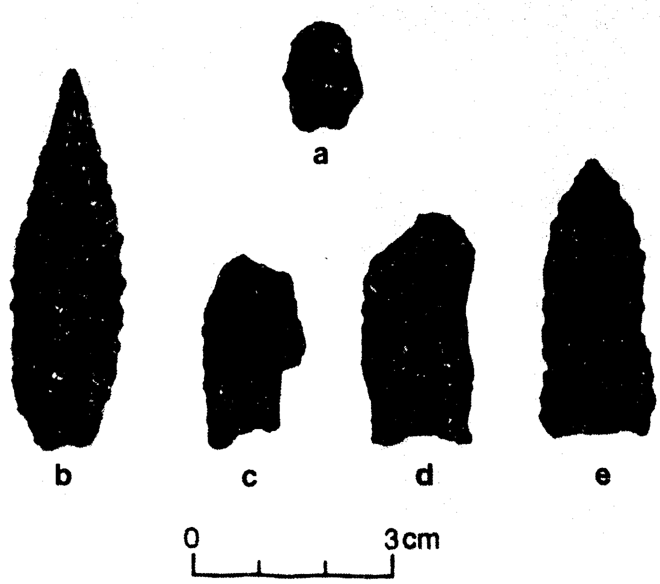

Figure 7. Humboldt projectile points found at site 26NY1408.

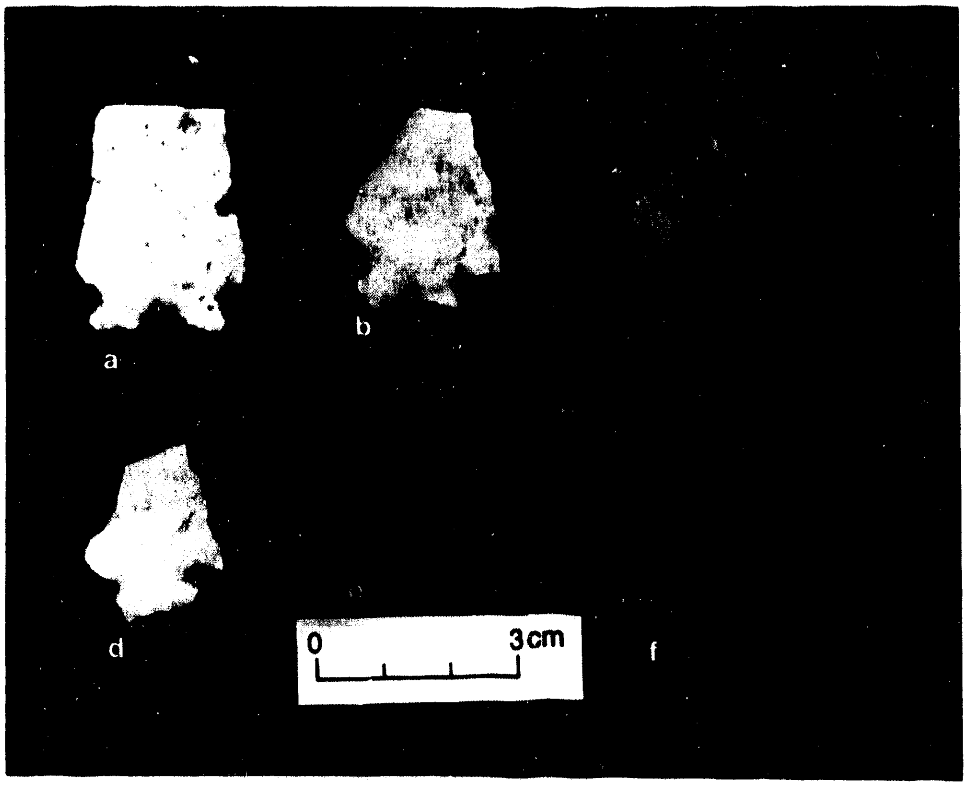

Figure 8. Rose Spring projectile points found at site 26NY1408.

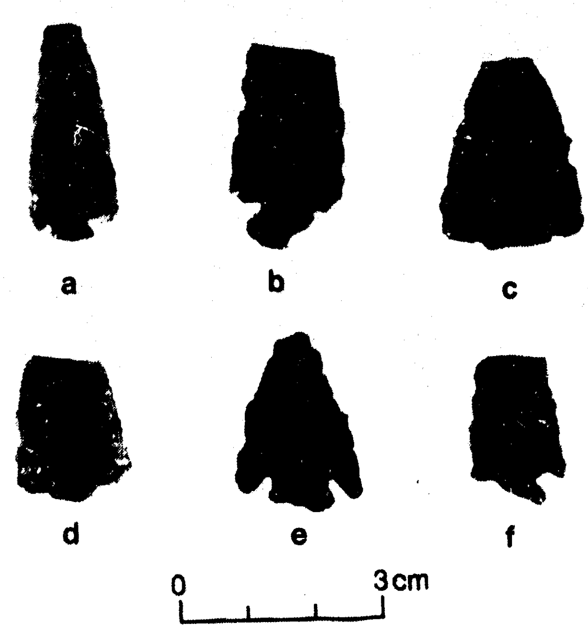

Figure 9. Rose Spring projectile points found at site 26NY1408.

Figure 10. Rose Spring and Eastgate projectile points found at site 26NY1408.

have a basal width less than or equal to 10 mm, have proximal shoulder angles between 90° and 130°, and have expanding stems. Straight and contracting stem specimens are found commonly in many of the NTS assemblages that DRI has investigated.

Indeterminate and Indeterminate Arrow. The indeterminate category is for points that can not be placed in a known projectile point typology. These are usually fragments of projectile points that retain few of their original morphological characteristics. Indeterminate arrows are similar to the indeterminate points; however, it can de discerned that they are arrow and not dart points.

Discussion. It appears that Elko Eared and Elko Corner–notched points represent an overlapping sequence of types. Elko Eared and Elko Corner–notched points occur at about 2000 to 1500 B.C. After this time smaller points of similar form proliferate (Warren and Crabtree 1986:188).

One of the major problems which resulted from the use of a modified version of Thomas's (1981) Monitor Valley Key was that his comparative work is mainly limited to the central and northern Great Basin. The only two southern Great Basin sites he included were Conaway and O'Malley Shelters (Fowler et al. 1973). While we were able to fit most of our projectile points into is categories, this does not mean that the chronological associations are necessarily the same for the two regions of the Great Basin. It appears that both Mojave Desert and Central Great Basin artifact assemblages and their chronological associations overlap here. The implications of this mix are not clear; more archaeological sites from the southern Great Basin need projectile point chronologies with firmly associated radiocarbon dates. When the point types are securely dated, these kinds of chronologies will be useful for interpreting open sites where carbon for dating is not preserved and lithic materials make up the main portion of the artifact assemblage.

Modified and Utilized Flake Tools. Among the artifacts collected during data recovery at SU19–25 were modified and utilized flake tools. A modified flake tool is one which exhibits unifacial or bifacial retouch focused at either shaping or resharpening an edge. Utilized flake tools, on the other hand, exhibit alterations or edge damage, usually very small flake removals or edge dulling and rounding, that is the direct result of use. Edge damage similar to that exhibited by the utilized flake tools from SU19–25 can occur by natural weathering processes or trampling. However, natural edge damage is usually either continuous over the entire surface of a flake or relatively irregular when compared to use–wear. In all cases, any natural edge damage that could be distinguished was segregated out of the analysis.

Debitage. Debitage refers to residual flakes and shatter produced during the manufacture of lithic tools. Debitage was classified into six general flake types based on experimental observations and variability in the nature of platforms.

<u>Decortication Flakes</u>. Decortication flakes are produced during the primary reduction stage and display more than 25 percent cortex on their dorsal surface. High frequencies of these flakes at a knapping locality are interpreted as the early stages of tool manufacture or the assaying of locally available toolstone.

<u>Core Reduction Flakes</u>. Core reduction flakes are relatively thick flakes with a flat or cortex covered, but not multifaceted, platform. These flakes are removed to form tools or flake blanks or to shape the toolstone into a desired shape. Previous flake scars may occur along various orientations across the flake's dorsal surface. This flake category includes all flakes which cannot be assigned to one of the following flake categories except indeterminate.

<u>Biface Thinning Flakes</u>. Late stage reduction flakes include bifacial thinning flakes which are thin, curved, expanding– or lanceolate–shaped with previous flake scars oriented at various angles across the dorsal flake surface. This flake type should exhibit a bifacial or multifaceted platform, truncated or diffuse bulb of applied force, and usually a lip formed directly below the platform on the ventral flake surface.

<u>Pressure or Platform Preparation Flakes</u>. Pressure or platform preparation flakes are relative small, lanceolate– or expanding–shaped flakes displaying an acuminate bulb, longitudinal curvature, and dorsal flake scars from the platform. These flakes may exhibit bifacial edge remnants or flat platforms. Pressure flakes in the debitage assemblage signify the final shaping or resharpening of flaked stone tools. However, because these small flakes are difficult to observe during surveys, recovery of any pressure flakes at a locality can be regarded as an indicator that many others are not.

<u>Shatter</u>. Shatter is characterized as all angular, blocky specimens which do not display identifiable platforms, bulbs of applied force, or rings of force which are generally produced during the initial stages of reduction. The knapping of cores produces a varied quantity of residual lithic shatter.

Indeterminate Flakes. Finally, the indeterminate debitage category includes both whole or nearly complete flakes that did not retain enough characteristics to be confidently assigned to one of the other flake groups. Whenever the analyst was not totally confident about classification or when identifying characteristics were absent due to breakage, the flake was assigned to the indeterminate category.

Groundstone. Metates are stone upon which materials are ground. Only the slab type of metate was found during the data recovery at SU19–25. Slab metates are thin, tabular stones which can have shaped edges. Thickness of the material is generally 5 cm or less depending upon the parent material. The grinding surface is flat, but after usage, cross–sections may be biconvex, biconcave, plano–convex, plano–concave, plano–plano, or irregular. All the groundstone recovered at SU19–25 was fragments, several of which could be refitted. However, complete sizes and shapes could not be determined. Attributes recorded during the analysis include material type, segment, blank type, form, alteration, cross–section, facial use, secondary use, and texture.

Fire–affected rock. Since fire–affected rock may include discarded material from the categories described above, an effort will be made to determine its original use. However, much of this material may be rock collected specifically for hearth stones. Analysis of fire–affected rock includes weight, length, width, and thickness. Each value was recorded to the nearest 0.01 mm or 0.1 g.

Production errors. The manufacture of chipped stone tools is governed by the properties of the conchoidal fracture which is characteristic of cryptocrystalline material such as chert. The knapper of chert material is aware of the unavoidable properties of conchoidal fracture and organizes the manufacturing process accordingly to control the fracture to produce a finished tool. However, production failures do occur because of material flaw or from a wrong judgment by the knapper. The errors in production provide a means to view the sequence of reduction, in that errors interrupt the continuum of production to "freeze" or fossilize the techniques of production at a particular stage.

In the succeeding analysis of the tools, only one fracture type that was the primary cause of rejection is considered even though a combination of fractures is present. For example, step and hinge fractures can lead to other type of fractures such as perverse or snap, but the ultimate cause of rejection and discard by the knapper was the latter fracture and not the former.

Step and Hinge Fractures. The step fracture occurs when a flake terminates abruptly in a right angle break at the point of distal detachment (Crabtree 1982:37,53; Johnson 1979:25). The fracture is caused by an erratic dispersal of force and the collapse of the flake. The hinge fracture is similar to the step fracture, but is noted by a rounded break rather than a sharp angle break (Crabtree 1982). Both fracture types can produce a buildup of mass during manufacture which can lead to discard of the piece or cause other types of fractures when too much force is applied to remove the mass. Step and hinge fractures occur in use as well, usually along the working edge of the tool, which leads to maintenance and eventual discard of the implement.

Material Flaws. Material flaws consist of natural inclusions in the raw material, such as fossils or geodes, that cause unpredictable fractures or early flake terminations (Shafer 1985). Johnson (1979:25) describes another type of flaw, which he terms incipient fracture plane, that is inherent in the material and caused by the natural movement of the geological formation from which the material resides. The movement produces a fracture in the material that is difficult to detect until it appears in manufacture. This break is characterized by a flat fracture face.

Perverse Fracture. The perverse fracture is initiated at the edge of the piece and results when the plane of force twists on a rotating axis (Crabtree 1982:46; Johnson 1979:25). The fracture is generally undulating, and at times difficult to distinguish from the snap and overshot fractures. Causes of this fracture are material flaws, excessive force, and a mass that is too great for the force to overcome, thereby diverting energy on a different fracture plane (Crabtree 1982).

Overshot Fracture. The overshot fracture is also called reverse (Johnson 1979, 1981) or *outrepasse* (Crabtree 1982:46). It is described as a fracture that is at the origin but curves or reverses back into the piece and removes the opposite edge instead of terminating at the intended location (Johnson 1979:25; Shafer 1985:285). Johnson (1981:27) has described another form of this fracture which he terms longitudinal reverse. Rather than at the edge, the longitudinal reverse fracture begins at one end of the piece and removes the opposite end.

Snap Fracture. The snap fracture is a transverse fracture that bisects the piece laterally. It has been classified in different terms or subclasses, such as lateral snap (Johnson 1979:25; Purdy 1975:135) side blow snap (Johnson 1981:27; Rondeau 1981), and end shock (Crabtree 1982:53; Shafer 1985:283). On the concave side of the fracture face is a rolled edge that is S–shaped similar to a bending fracture (Shafer 1985:283). The fracture results when bending vibrations from the force of the blow exceed the elastic properties of the mass. The fracture usually occurs away from the point of percussion. Purdy (1975:135) indicates that the fracture occurs when the piece is not adequately supported when the impact blow is delivered, thus creating a zone of stress leading to fracture. It can also occur when there is a weakness in the piece, such as a material flaw or an interior fracture from a previous percussion blow.

Thermal Fractures. Thermal fractures consist of three basic types: crenated, potlids, and expansion (Johnson 1979, 1981; Purdy 1975). They are usually associated with improper heat treatment of the material in trying to make it more annealable for flake removal, especially for coarse material that is difficult to reduce in its natural state. Thermal alteration also causes a reduction in the strength of the material, which increases the likelihood of other types of fractures during manufacture (Purdy 1975:135). Crenated fractures form a sinuous line across the artifact and result from too rapid cooling (Johnson 1979:25; Purdy 1975:137). Potlids or heat spalls are distinguished by shallow cone–shaped depressions on the surface of the piece (Johnson 1979:26). These spalls often overlap one another, and are attributed to a too rapid rise in temperature during treatment (Purdy 1975:136). An expansion fracture is similar to a potlid but is larger and tends to truncate the piece (Johnson 1981:27).

Size. Size distribution can refer to any object or series of objects found in an archaeological deposit. At least two uses for size distribution have recently been employed in archaeology: lithic technology (Ahler 1989; Baumler and Downum 1989) and site structure and formation processes (Binford 1987; Graham 1989; Hull 1987; Murray 1980; O'Connell 1987; Schiffer 1987).

Size distribution for lithic assemblages is a method of mass analysis that reveals general technological differences or similarities between samples or assemblages based on size and frequencies. Ahler (1989) has advanced the theoretical aspects of this method for debitage and states the procedure is dependent upon two assumptions. One theoretical aspect relies on the nature of the reduction process. By–products of lithic reduction are subject to predictable and repetitive size constraints: no by–product can be larger than the maximum dimension of the parent material. Consequently, as the parent material is reduced in size so is the size of the by–product. Basically, the inference is that early stage debitage and techniques appear more frequently in the larger size–grades, with later stage debitage and techniques in the smaller size–grades. A second theoretical aspect is that variations in techniques, such as different impact or pressure forces or angles of force, produce corresponding variations in the size and shape of the debitage. That is, variations in techniques should produce different patterns of size distribution.

In an experiment by Baumler and Downum (1989) distinguishing between core reduction and flake tool manufacture, both techniques were found to produce large amounts of small size debitage, but only core reduction produced considerable amounts of large size debitage. The experiment also indicated morphological differences between the two activities for a particular size–grade of debitage. For material between 2 and 4 mm, core reduction has markedly higher frequencies of shatter and lower frequencies of complete flakes. Similarly, Magne and Pokotylo (1981) in an experiment found greater amounts of shatter and broken flakes in core reduction as compared to late stage biface manufacture.

All artifacts were screened through nested geological sieves of decreasing sizes. Each size has been assigned a size–grade. Size–grades and sieve sizes are:

1) > 8 in (203.20 mm)
2) 4 – 8 in (101.60 – 203.20 mm)
3) 2 – 4 in (50.8 – 101.60 mm)
4) 1 – 2 in (25.4 – 50.80 mm)
5) 3/4 – 1 in (19.05 – 25.40 mm)
6) 1/2 – 3/4 in (12.70 – 19.05 mm)
7) 1/4 – 1/2 in (6.35 – 12.7 mm)
8) 1/8 – 1/4 in (3.18 – 6.35 mm)
9) < 1/8 in (3.18 mm)

Stone Material. The analysis of stone artifacts begins with the identification and description of the various stone resources found in the assemblage. For example, where is the resource located, what is the average size of individual pieces, and what is the quality and quantity of the toolstone? This type of information provides baseline data concerning the various lithic industries evident on Pahute Mesa. However, obtaining all of this type of information from a single assemblage is rare, particularly when only late stage processes are present for a material type. To date, three common toolstone resources have been identified for the volcanic formations of Pahute Mesa: obsidian, silicified volcanics, and welded tuff. The obsidian has been tentatively traced to several members of the Thirsty Canyon Tuff and to the Ammonia Tanks and Rainier Mesa members of the Timber Mountain Tuff. The distribution of the silicified volcanics has not been as well defined; this material may occur in several formations. However, outcrops do occur and they are composed of large tabular to blocky rhyolite welded tuffs exposed throughout Pahute Mesa and in many cases are bedrock exposures. Other resources, which include chert, jasper, and chalcedony, are assumed to be in sedimentary formations off Pahute Mesa (e.g., Reno and Pippin 1986:125–131). Thus, when found in archaeological sites, these material types are assumed to have been imported to the Pahute Mesa area.

A description of the lithic materials recovered at SU19–25 is presented in Appendix A at the end of this report. The descriptions have been derived from a variety of sources, including Cornwall (1972), Kleinhampl and Ziony (1984), Luedtke (1992), Mottana et al. (1978) and Pough (1983). Some of the descriptions are supplemented by direct observation of the resources on Pahute Mesa and by previous studies in the area (Amick et al. 1991; Hicks 1990; Pippin 1986a; Reno and Pippin 1986).

Ceramics. Attributes recorded during the initial phase of ceramic analysis include type, vessel form and part, method of construction, finishing technique and surface treatment, and thickness to the nearest 0.01 mm, weight to the nearest 0.01 g, and size–grade. The next phase of analysis consisted of temper identification and observations on paste texture using a binocular microscope at 20X. Munsell color charts were used to determine surface and core color for the sherds. The third stage included the characterization of all rim sherds and decorated sherds on the basis of rim form and design style. Orifice diameters on all rim sherds large enough to allow estimates were also done at this time. Finally, limited reconstruction of the ceramic materials was attempted to aid in determining the number of vessels present at the site, and to give more precise estimates of vessel size and form.

Classification of type. Recognizing that variation in Great Basin ceramics has not yet been described in adequate detail, no attempt was made to assign the Brownware pottery to a specific category. Taking a conservative approach, this analysis follows Pippin (1986b:19) in using the term Intermountain Brownware to describe the common Basin ceramic tradition. This classification includes the pottery types known as Southern Paiute Utility Ware, Shoshone Ware, and Owens Valley Brownware but it avoids assumed cultural affiliations that have not been adequately demonstrated.

Grayware and red ware ceramics were categorized according to the more traditional organizational structure of wares, series, and types whenever possible. Colton's (1952) pottery classification system was used for the Anasazi materials. Identification of Fremont ceramic types followed Madsen's (1977) descriptions.

8. PREVIOUS INVESTIGATIONS

The earliest documented investigation of cultural resources on the NTS was conducted by Mark R. Harrington in 1925. In a letter to the governor of Nevada, he describes his trip along Fortymile Canyon with particular attention to Big George's Cave (26NY213) located near East Cat and Brushy canyons (Pippin 1986a:6). The next documented exploration occurred in 1940 when Rosco Wright, a local prospector familiar with the area, guided Sidney M. Wheeler through Fortymile Canyon and to the sites of Basket Cave, Indian Retreat, and Sunken Park along the southern edge of Pahute Mesa (Wheeler 1940). Richard Shutler (1961:11, Plates 18–20) examined some of the archaeological features in Fortymile Canyon in 1955. Frederick C.V. Worman, an avocational archaeologist employed by Los Alamos National Laboratory, and Donald Tuohy, of the Nevada State Museum, conducted research on Pahute Mesa in the 1960s (Tuohy 1965; Worman 1966).

There was a hiatus in archaeological investigations on Pahute Mesa until the late 1970s when portions were sampled by the Archeological Research Center of the Museum of Natural History, University of Nevada, Las Vegas, as part of an overview and reconnaissance of the Nellis Air Force Range (Pippin 1986a:6–9). Six sample units were inspected and eight archaeological sites recorded (Bergin et al 1979:138–141).

DRI began cultural resource studies of the mesas in 1978 with surveys of two sample units, A1a–54 and A2a–140, as part of a stratified random sample strategy for the mesas (Pippin 1986a:6–9). The first preconstruction surveys of nuclear test locations also began in 1978. Three drill holes, U20AC, U20AD, and U20AE, were the first inspected (Budy 1978). Since the inception of the program, DRI has conducted numerous surveys and excavations on Pahute and Rainier mesas (Pippin 1986a, 1992).

Site Types in the Area of SU19–25

The purpose of the LRSP is to delineate and understand the settlement and subsistence systems of past hunters and gatherers who occupied the NTS. Binford (1982:28) has stated that both occupational redundancy and the differentiation of activities among places in both form and frequency carries direct information about the organization of past systems. This information is contained in the functional similarities of gross assemblages present at sites. Archaeological sites on Pahute and Rainier mesas have been classified into types on the basis of the artifact assemblages found at the site. These site types are residential bases, temporary camps, localities, and sites of undetermined function.

Residential bases

Residential bases are those sites at which a residential group maintained itself over a period of time and from which all subsistence activities originated. According to Binford's (1980) model, residential bases are common to both collecting and foraging subsistence strategies. However, residential bases occupied by collectors should exhibit evidence of decreased residential mobility such as storage facilities, coarse–grained, heterogeneous artifact assemblages, and diverse botanical and zoological remains and settlement locations optimally situated between several potential resource zones. Residential bases produced by a foraging strategy should lack the above evidence of long–term occupation. Rather, they should exhibit a fine–grained, homogeneous artifact assemblage within each site, but increased interassemblage variability (Binford 1980:17–19).

Temporary camps

Temporary camps are those sites at which logistically organized task groups maintain themselves while away from their residential base. Consequently, temporary camps portray a collecting strategy in theory. But, temporary camps of collectors may be difficult to distinguish from residential bases of foragers. Because temporary camps are occupied by task groups seeking specific resources, their nature should vary with the resources being sought and the size of the task group used to exploit these resources. Like residential bases, temporary camps should be located in relatively close proximity to food, fuel, and water resources, but these resources may be of temporary duration or be transported for use at the temporary camp.

Locations

Locations are those places where hunters and gatherers extracted specific resources. Under a foraging strategy oriented toward the low–bulk extraction of resources, locations are likely to be widely scattered over a resource zone and provide a relatively low artifact input into the archaeological record (Binford 1980:9; Hayden 1978:190–191). Conversely, under collecting strategies generally focused on the high–bulk extraction of resources, these locations might be expected to be more concentrated and yield higher artifact densities. However, the nature of specific locations might be influenced most by the nature and distribution of the exploited resources (Thomas 1983:41–47). Hence, toolstone quarries are likely to produce more concentrated artifact distributions than might be expected in zones of seed procurement. In fact, the extraction of certain resources might involve artifacts of a highly perishable nature and, hence, be invisible in an ancient archaeological record.

Quarry or toolstone source area.

Haury (1984) defines three methods of chert procurement: (1) excavation of shallow pits in the upland surface to extract chert from bedrock beneath the shallow soil; (2) removing chert from exposed bedrock along the bluffs and ledges of hills; and (3) expedient collection of secondary chert from nearby river gravels or upland regoliths. Quarrying is the actual excavation to locate and remove raw material from its geological matrix as defined in method 1. A quarry then is a location of excavation to extract lithic materials as was undertaken at the Flint Hills (Haury 1984) of Kansas and Nebraska or in Nevada at the West Sinter Quarry (Livingston and Pierce 1988) and the Tosawihi Quarries (Elston et al. 1987). Livingston and Pierce (1988) note the cluster of quarry pits at the West Sinter Quarry. Even though Elston et al., (1987) define quarries somewhat differently, they do report on a large number of quarry pits in the Tosawihi area.

In the previous survey reports and data recovery plan for SU19–25, site 26NY1408 was referred to as a quarry site. However, because of subsequent investigations, the use of the term quarry to describe this site does not seem appropriate. This is due to the lack of quarry pits or evidence of past excavations and lack of quarry related tools (i.e., mauls, levers, digging sticks). However, this does not preclude that the debitage assemblage reflects quarrying activities. At this site, toolstone can be simply removed in the form of cobbles and tabular slabs that are exposed on the surface. Much of this silicified volcanic simply rests upon more of the same material with no matrix binding it together. Since site 26NY1408 does not fit the definition of a quarry previously cited, toolstone source area may be more appropriate to describe the site and will be used in this report.

Discussion

The typical site types found in the area around SU19–25 are temporary camps and locations. A list of the site types found within a 1.6 km (1 mile) radius is contained in Appendix B, Table 1. Artifact assemblages and features associated with the temporary camps and locations in the vicinity of SU19–25 include lithic artifact scatters, groundstone, pottery, rock rings, and hearths. The assemblages at these sites are generally diffuse, with one or more concentration areas within the site boundary. These assemblages reflect two categories of resource utilization systems, food and lithic raw materials.

Groundstone and hearth areas usually signify the processing of food–related items. Pottery in artifact assemblages may indicate either the storage or transport of food products. Rock rings on Pahute and Rainier mesas have been interpreted to reflect ancient pinyon caches, but other interpretations such as roasting ovens, hunting blinds, or habitation areas can not be overlooked (Pippin 1986a). As stated earlier, the procurement of pine nuts has been well documented on Pahute and Rainier mesas. From the artifact assemblages recorded in the SU19–25 area, it can be assumed that small foraging parties entered the area in search of pine nuts which were then transported to other locations. Thus, a hypothesis may be proposed that food procurement and processing was a primary function of temporary camps and locations in the vicinity of SU19–25.

Lithic artifact scatters reflect a subsistence strategy related to the processing of lithic raw material into useable tools. Before this material can be processed, however, it must be located and acquired. The dominant material utilized in this area is a white silicified volcanic. The only silicified volcanic toolstone source recorded in this area is at site 26NY1408 in SU19–25. Site 26NY3944, approximately 1,500 m (4920 ft) west of SU19–25 is also a source for this type of toolstone. However, lithic materials on Pahute and Rainier mesas can be obtained from the colluvium that covers many of the slopes and from outcrops exposed on the slopes and in drainages of the area (Drollinger 1993). These outcrops are usually thin lenticular exposures of varying quality material. After the material is acquired, it is generally reduced in several stages. The primary reduction may take place where the material is acquired to reduce in size and weight and to obtain the most homogeneous material. The secondary reduction process may then take place elsewhere, such as temporary camps and locations. Consequently, a second hypothesis may be proposed that lithic procurement and processing was a primary function of temporary camps and locations in the vicinity of SU19–25.

9. INVESTIGATIONS AT SU19–25

Surveys

In 1978, the Archaeological Research Center of the Museum of Natural History at the University of Nevada, Las Vegas performed a Class II cultural resources reconnaissance within the Nellis Air Force Range which included the original UNLV 122 sample unit (Bergin et al. 1979). The survey included the investigation of a 0.32–km^2 (1/8 x 1 mi) area. During this survey one archaeological site was recorded. The site, 26NY1408, was described as a quarry and lithic scatter with four artifacts. The site area was estimated to be 0.32 hectares (0.79 acres). No collection was undertaken at that time.

On July 9–10, 1991, DRI performed a Class III cultural resources reconnaissance at the expanded sample unit as a part of the LRSP (Jones 1991). SU19–25 was expanded from the original UNLV 122 sample unit of 0.32 km^2 to 0.64 km^2. This survey relocated site 26NY1408 and three new sites (26NY7846, 26NY7847, and 26NY7848). The boundaries at site 26NY1408 were redefined to include 30.1 hectares (74.4 acres). In addition, a small rockshelter was included within the site boundaries. Of the three new sites, site 26NY7847 consists of two rock and brush structures with two associated rock caches and sites 26NY7846 and 26NY7848 are isolates.

Testing Results

In 1991, subsurface testing was conducted at sites 26NY1408 and 26NY7847. These investigations yielded subsurface artifacts that consisted mainly of debitage flakes. Depth of the surface test units varied due to the presence of bedrock which was encountered at the surface and at 15 cm. Testing at the rockshelter ended at 35 cm where bedrock was encountered. Based on these tests and the data from the survey, a data recovery plan was developed for completing the investigations at the sample unit under the LRSP (Jones 1992a).

Site 26NY1408

After the initial survey, five test units were excavated at site 26NY1408 to determine if buried deposits exist at the site (Figure 11). Test unit 1 is 2 x 2 m, test unit 2 is 4 x 3 m, test unit 3 is 6 x 6 m, test unit 4 is 3 x 3 m, and test unit 5 is 50 x 50 cm. All but test unit 5 correspond to defined activity areas.

Test unit 1, located at activity area 1, produced several secondary and tertiary flakes of brown, white, and red chalcedony, a white chalcedony biface, and North Creek Gray, Shivwits, and Little Colorado Series pottery sherds. This test unit produced cultural material only in the 0–5 cm level even though testing proceeded to 10 cm. Testing to a depth of 10 cm in test unit 2, located at activity area 2, produced several tertiary flakes of brown, white, and red chalcedony only in the 0–5 cm level. Dates associated with the pottery sherds range from A.D. 700 to 1150.

Test units 3 and 4, located at activity areas 3 and 4, respectively, produced sparse chalcedony flakes, with brownware pottery at test unit 4. These flakes were mainly core reduction flakes and decortication flakes. Test unit 3 was investigated to a depth of 10 cm with cultural material being found only in the 0–5 cm level. Test unit 4 was taken down to 15 cm with cultural material found only in the 0–5 cm level. Rodent activity in the southeast corner of test unit 4 was investigated, but no cultural material was recovered. Dates commonly associated with the brownware pottery range from 650 B.P. to historic times, although Pippin (1986b) has indicated that a date of 450 B.P.

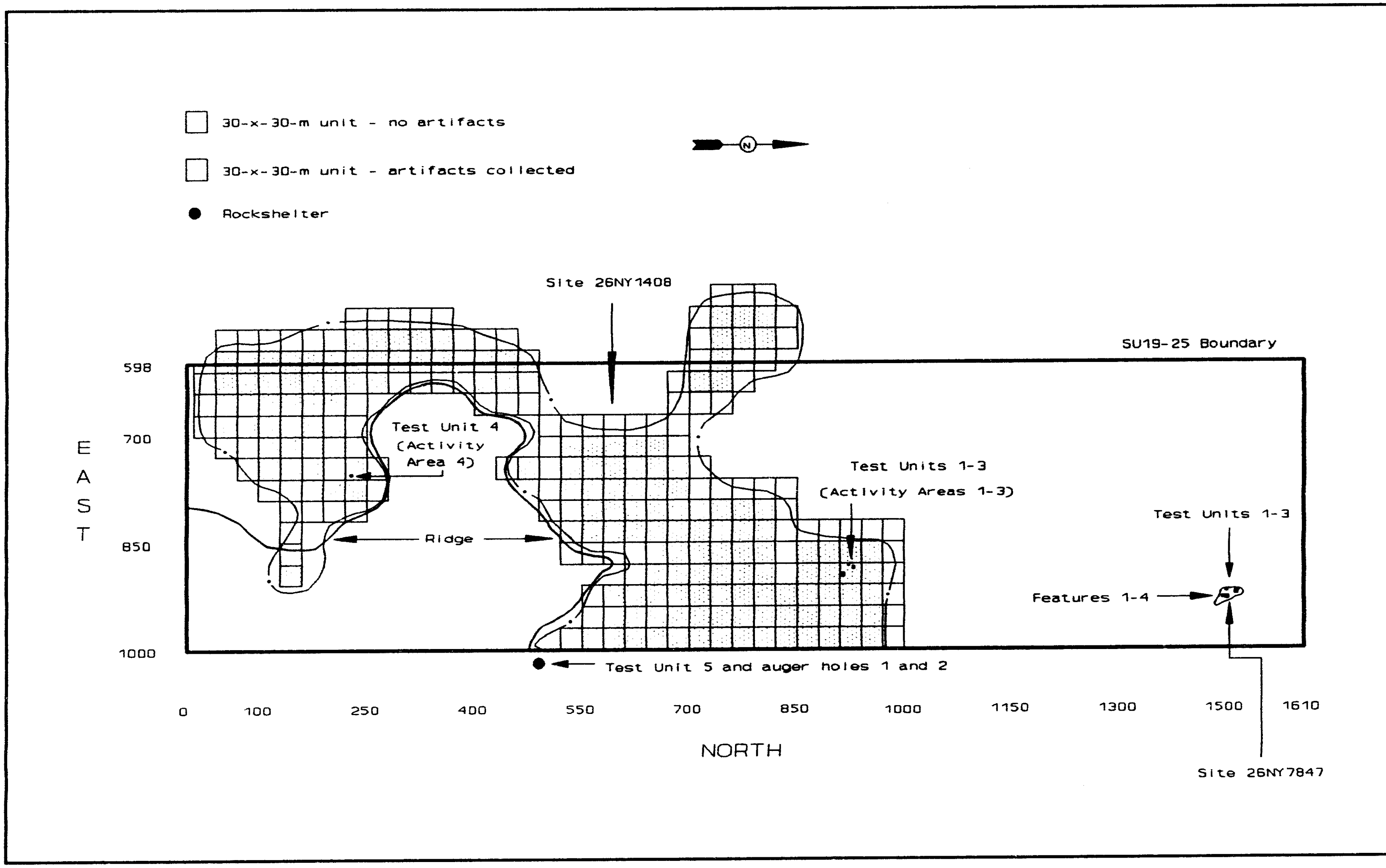

Figure 11. Plan view of SU19–25.

may be more accurate. Test unit 5 is explained in the following section.

Rockshelter

Testing at the rockshelter at site 26NY1408 (Figure 12) included the partial excavation of one 50–x–50–cm test pit (test unit 5) and two auger tests. The test pit excavation was suspended at 20 cm when sonic booms in the area began to loosen rocks and debris above the rockshelter. Thus, it was decided that any further testing at this location would not include physically entering the rockshelter. Thus, the test pit was never completed and augering the subsurface was chosen as a safe alternative method of testing. Augering could be accomplished without entering the rockshelter. The archaeologist, standing in a safe area, attached handle extensions to the auger which extended the device inside the shelter. The auger was then rotated to drill a small hole into the subsurface to retrieve a sample of the sediments to determine if any cultural materials were present. Two auger holes, which terminated at 35 cm because of the presence of bedrock, were placed inside of rockshelter. These and test unit 5 produced no artifacts. Examination of the limb (Figure 12) determined it not to be charred but darkened due to natural decay.

Site 26NY7847

At site 26NY7847 (Figure 13), test units 1 and 2 (50 x 50 cm) were undertaken in feature 1, the northernmost rock and brush structure. Test unit 1 yielded 2 core reduction flakes, 3 flakes of an indeterminate stage, and 1 piece of shatter, all of a white silicified volcanic material in the 0–5 cm level. In the 5–10 cm level, 1 piece of shatter and 4 flakes of an indeterminate stage were recovered. The 10–15 cm level produced no cultural material. Test unit 2, placed 1 m south and 2 m east of test unit 1, was investigated to a depth of 10 cm and produced no artifacts.

Test unit 3 (1 x 1 m), 15 cm in depth, was undertaken in feature 2 (Figure 13), the southernmost rock and brush structure. The 0–5 cm level produced 1 slate pendant in association with 1 core reduction flake, 1 biface thinning flake, and 1 piece of shatter of a white silicified volcanic material. At 5–10 cm, 1 obsidian biface fragment was recovered in association with 1 core reduction flake and 2 biface thinning flakes of a white silicified volcanic material. A third level at 10–15 cm produced no artifacts.

Even though testing produced a limited number of cultural artifacts at site 26NY7847, it was determined that full–scale excavation of the two rock and brush structures and two caches was necessary because of adequate deposition and because the features had the potential of providing additional information related to such structures. Full–scale excavations were not proposed at site 26NY1408 because testing had indicated that most of the cultural material was limited to the surface and would be retrieved during surface collection.

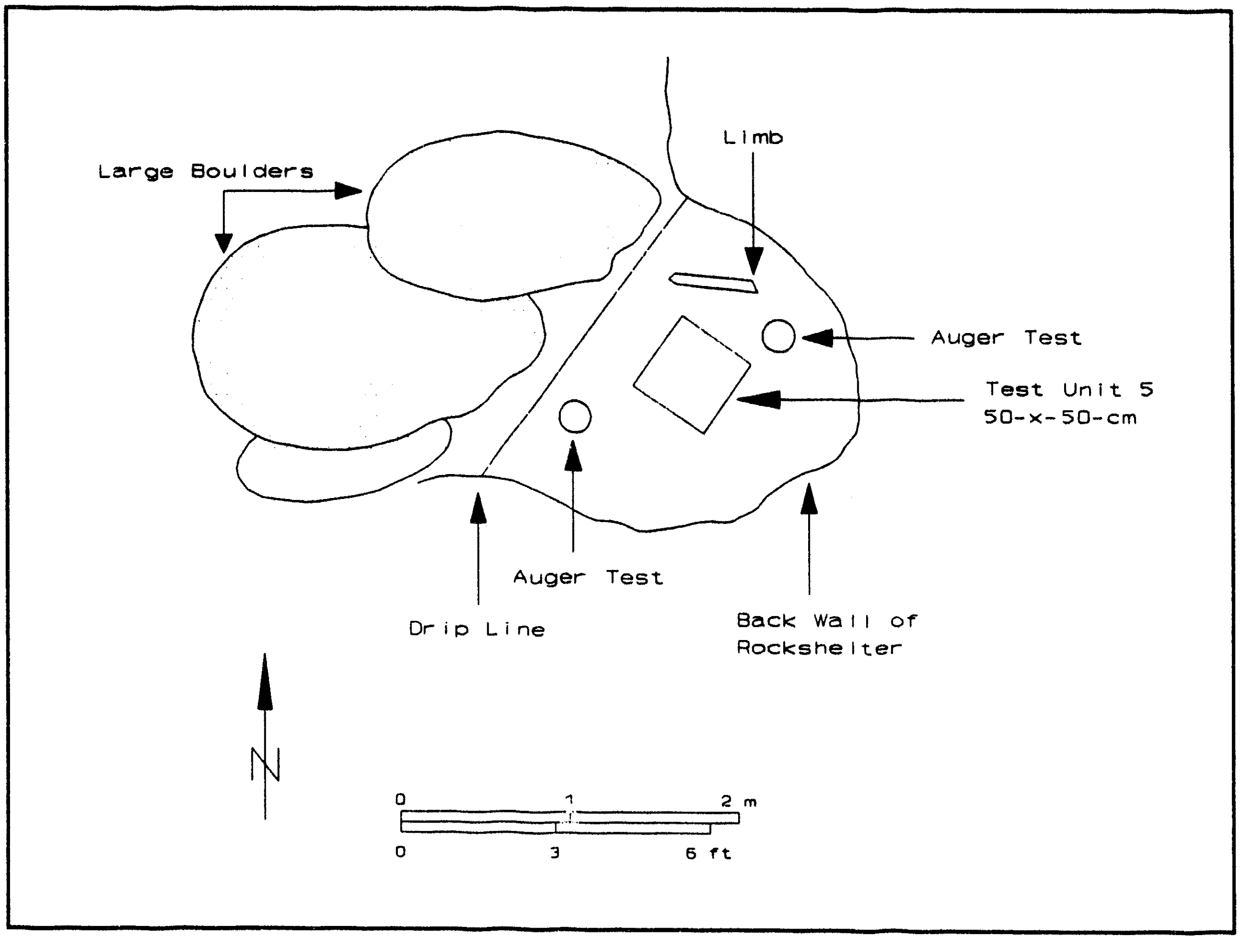

Figure 12. Schematic of rockshelter, test unit, and auger tests at site 26NY1408.

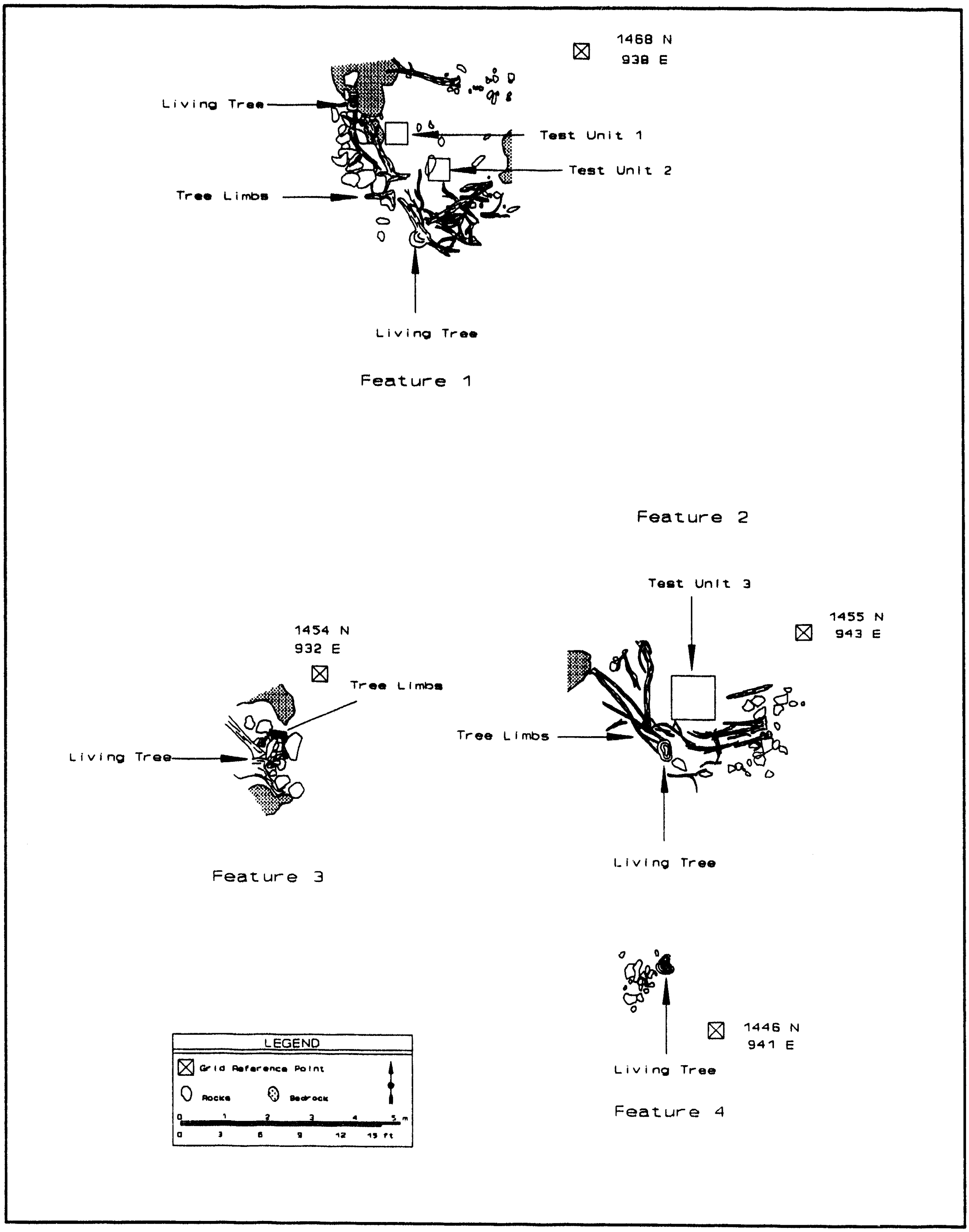

Figure 13. Plan view of site 26NY7847.

10. MATERIAL ANALYSIS FROM DATA RECOVERY AT SU19–25

The following narratives describes the material analysis of the artifacts recovered at sites 26NY1408 and 26NY7847 in the data recovery efforts. The information derived from this section is used to draw conclusions about the archaeology of this sample unit. Radiocarbon dating was performed by Beta Analytic, Inc., obsidian sourcing and obsidian hydration were performed by John Ericson and Richard Hughes, flotation for pollen analysis is underway by Peter Wigand (no report at this time), and all bones were analyzed by Barbara Holz.

Site 26NY1408

Site 26NY1408 is a large lithic artifact scatter and toolstone source area with an associated rockshelter (Figure 11). The toolstone source area consists of a layer of white silicified volcanic exposed in several areas at the base of a small ridge located in the southern one–third of the sample unit. The silicified volcanic is found in the form of nodules and slabs up to 1 m (3.3 ft) in length. Comparison of samples of the silicified volcanic to soil color charts (Munsell 1992) produced colors including white (N–8 and N–7), red (2YR 3/6, 5YR 6/3, and 10R 6/4), yellow/brown (10YR 6/2 and 10YR 7/8), and translucent. Also, the texture of the material ranges from medium–grained, with many secondary mineral inclusions, fractures, and vugs, to a homogeneous fine–grained cryptocrystalline material. The lithic artifact scatter at this site associated with the silicified volcanic toolstone exposure. The largest amount of artifacts were recovered at the highest density exposure of toolstone located at the northernmost extension of the ridge that crosses the sample unit (Figure 14). At this location, the silicified volcanic exposure originates from the base of the ridge approximately 3 m (10 ft) above the surrounding area.

Surface collection was the final data recovery undertaken at this site. Previous testing of the site had indicated that all cultural resources were restricted to a very thin zone within 10 cm (5 in) of the surface. Surface collection of 143,400 m^2 (35.4 acres) (Figure 11) proceeded under the data recovery methods presented earlier. A total of 83,414 artifacts were recovered during surface collection which produces an artifact density of 1 per 1.7 m^2 (18 ft^2). Four activity areas (Figure 11) were located at the northern and southern boundaries of this site and will be described separately from the toolstone source area. These activity areas were originally excavated as shovel scrapes during the testing phase of data recovery.

Activity Area 1

Activity Area 1 (Test Unit 1) consists of cores, bifaces, drills, projectile points, lithic debitage, groundstone, and ceramics recovered on the surface and from the subsurface of a 6–x–6–m (19.7–x–19.7–ft) area (Table 1). No artifacts were recovered below 5 cm (2 in) of the surface. This area was excavated as a shovel scrape during the survey and testing phase of data recovery. The activity area is located in a relatively flat region on the top of a small rocky ridge in the center of the sample unit (Figure 11). No trees are within 50 m of this activity area, which is dominated by sage and rabbitbrush.

Figure 14. Ridge from which toolstone originates at site 26NY1408.

Table 1. Artifacts recovered at Activity Area 1, site 26NY1408.

	Surface	Subsurface	Total
Cores	2	0	2
Bifaces	5	5	10
Drills	2	1	3
Projectile Points	2	9	11
Debitage	50	743	793
Shatter	162	0	162
Groundstone	1	8	9
Ceramics	29	60	89
Total	253	826	1079

Cores. Two cores were found on the surface at Activity Area 1. One is a white silicified volcanic assayed core cobble that measures 30 x 23.3 x 17.9 mm (1.2 x 0.9 x 0.7 in) and weighed 11.1 g. The second is a gray welded tuff assayed core that measures 37.2 x 25.7 x 11.6 mm (1.5 x 1.0 x 0.5 in) and weighed 8.8 g. Blank type for both pieces is a core reduction flake. Assayed cores indicate that the toolstone was tested for its flaking potential and subsequently discarded.

Bifaces. The analysis of artifacts from Activity Area 1 indicates that one of the processes taking place at this activity area was the production of bifaces. This is evident from the presence of 10 bifaces and the fracture types noted on them during analysis. All of the fracture types are manufacture type errors (Table 2).

Of the bifaces recovered at Activity Area 1, 70 percent (n=7) were Type III and IV and 30 percent (n=3) were Type II. This suggests that late stage reduction was the main focus of biface production. Also, as will be discussed later, the large amount of debitage recovered in this area confirms that production and not just maintenance or retooling was of major importance. Distribution of the bifaces was consistent, with five on the surface and five in the subsurface.

Drills. Three biface drill fragments were recovered in Activity Area 1. Two of the drills were found on the surface. One is a white silicified volcanic distal fragment with a snap fracture that measures 10.4 x 4.7 x 1.8 mm (0.41 x 0.19 x 0.07 in). The second is a white chert medial fragment with a snap fracture that measures 17.2 x 9.7 x 3.4 mm (0.68 x 0.38 x 0.13 in). The third, found in the subsurface, is a white silicified volcanic distal fragment with a snap fracture that measures 8.6 x 5.3 x 2.1 mm (0.34 x 0.21 x 0.08 in). Drills are specialized bifaces and therefore the attributes of drills are similar to those of bifaces. Snap fractures on drills, as on bifaces, are indicative of manufacturing errors. However, snap fractures on drills may occur when pressure is applied to the side of the tool during use. These snap fractures are considered to be manufacturing errors because no use–wear was noted on the drills.

Table 2. Bifaces recovered at Activity Area 1, site 26NY1408.

	Material	Color	Type	Segment	Fracture	Alteration	Total
Surface	Silicified Volcanic	Translucent	III	Proximal	Thermal	Heat Treated	1
	Chert	Red	IV	Distal	Snap	Heat Treated	1
	Chert	Red	III	Proximal	Snap	None	1
	Chert	Purple	II	Proximal	Hinge	None	1
	Chert	Purple	II	Fragment	Snap	None	1
Subsurface	Silicified Volcanic	White	IV	Medial	Hinge	None	1
	Silicified Volcanic	White	IV	Lateral	Thermal	Heat Treated	1
	Silicified Volcanic	Buff	IV	Medial	Snap	None	1
	Chert	Buff	II	Distal	Snap	None	1
	Chert	Buff	III	Proximal	Snap	None	1
Total							10

Projectile points. Eleven projectile points of varying types were recovered at Activity Area 1 (Table 3). Only five of these points were identifiable and these consist of Rose Spring and Eastgate types. Dates associated with these point types range from A.D. 700 to 1300 (Thomas 1981). Projectile points, like drills, are specialized bifaces and therefore the attributes of projectile points are similar to those of bifaces. Fracture types associated with the projectile points are indicative of manufacturing errors.

Groundstone. Nine groundstone fragments, with at least three from the same slab, were found at Activity Area 1. The one surface find is a purple/brown fine–grained welded tuff uniface metate slab fragment that is plano–concave in cross–section. Of the eight subsurface finds, one is a coarse–grained gray welded tuff uniface metate slab fragments that is plano–concave in cross–section. The remaining seven are coarse–grained gray welded tuff uniface slab fragments that are plano–plano in cross–section. Minimal grinding was found on all fragments.

Debitage. Debitage at Activity Area 1 consisted of 794 pieces of varying colored silicified volcanic. Only six percent (n=50) of the debitage was found on the surface (Table 4). Size–grading of the debitage from the surface produced flakes of size–grade 5, 6, 7, or 8 with only 1 surface flake a size–grade 5. Core reduction flakes accounted for 12 percent (n=6) of the surface debitage. Core reduction flakes are indicative of early stage lithic reduction processes. The remaining flakes are biface thinning flakes (76 percent; n=38) and pressure or platform preparation flakes (12 percent; n=6).

In the subsurface, 743 flakes of size–grade 6–8 were found (Table 5). These flakes are smaller than 2 cm (3/4 in) and this may be the reason most of the material was located in the subsurface. Smaller flakes have the potential of being buried more easily than larger flakes. Even though most of the debitage was found in the subsurface, nothing was found deeper than 5 cm from the surface with much of the material found within the top 2 cm. Core reduction flakes accounted for only 2 percent (n=15) of the subsurface debitage, biface thinning flakes accounted for 9 percent (n=68), 1 percent (n=4) of the debitage consisted of flakes of an indeterminate type, and 88 percent (n=656) of the debitage was pressure or platform preparation flakes.

Table 3. Projectile points recovered at Activity Area 1, site 26NY1408.

	Material	Color	Type	Segment	Fracture	Alteration	Total
Surface	Silicified Volcanic	White	Eastegate	Distal	Snap	Heat Treated	1
	Silicified Volcanic	Buff	Rose Spring Corner-notched	Proximal	Thermal	Heat Treated	1
Subtotal							2
Subsurface	Silicified Volcanic	Buff	Rose Spring Corner-notched	Proximal	Thermal	Heat Treated	1
	Silicified Volcanic	White	Rose Spring Corner-notched	Proximal	Thermal	Heat Treated	1
	Silicified Volcanic	Buff	Rose Spring Corner-notched	Proximal	Snap	Heat Treated	1
	Silicified Volcanic	White	Indeterminate Arrow	Proximal	Snap	Heat Treated	1
	Silicified Volcanic	Buff	Indeterminate Arrow	Distal	Thermal	Heat Treated	1
	Silicified Volcanic	White	Indeterminate Arrow	Distal	Snap	None	1
	Silicified Volcanic	White	Indeterminate Arrow	Distal	Snap	None	1
	Chert	Gray	Indeterminate Arrow	Distal	Snap	None	2
Subtotal							9
Total							11

Table 4. Surface debitage recovered at Activity Area 1, site 26NY1408.

Type	Size-Grade	Color	Platform	Alteration	Total
Core Reduction Flake	5	White	Multifaceted	None	1
Core Reduction Flake	6	Red	Collapsed	None	1
Core Reduction Flake	6	White	Collapsed	None	1
Core Reduction Flake	7	Pink	Multifaceted	None	1
Core Reduction Flake	7	Red	Indeterminate	Heat Treated	1
Core Reduction Flake	7	White	Collapsed	None	1
Biface Thinning Flake	6	Purple	Collapsed	None	1
Biface Thinning Flake	6	Red	Collapsed	Heat Treated	1
Biface Thinning Flake	6	White	Collapsed	None	1
Biface Thinning Flake	7	Buff	Collapsed	Heat Treated	1
Biface Thinning Flake	7	Buff	Single-faceted	None	1
Biface Thinning Flake	7	Translucent	Indeterminate	None	1
Biface Thinning Flake	7	Translucent	Single-faceted	None	1
Biface Thinning Flake	7	Pink	Collapsed	None	6
Biface Thinning Flake	7	Pink	Collapsed	Heat Treated	2
Biface Thinning Flake	7	Pink	Multifaceted	None	1
Biface Thinning Flake	7	Pink	Single-faceted	None	1
Biface Thinning Flake	7	Pink	Single-faceted	Heat Treated	1
Biface Thinning Flake	7	Red	Collapsed	Heat Treated	3
Biface Thinning Flake	7	Red	Double-faceted	None	1
Biface Thinning Flake	7	Red	Indeterminate	Heat Treated	1

Continued

Table 4. Continued.

Type	Size–Grade	Color	Platform	Alteration	Total
Biface Thinning Flake	7	Red	Multifaceted	Heat Treated	1
Biface Thinning Flake	7	Red	Single–faceted	Heat Treated	2
Biface Thinning Flake	7	White	Collapsed	Heat Treated	2
Biface Thinning Flake	7	White	Multifaceted	Heat Treated	1
Biface Thinning Flake	7	Yellow	Collapsed	Heat Treated	2
Biface Thinning Flake	7	Yellow	Multifaceted	Heat Treated	1
Biface Thinning Flake	8	Translucent	Single–faceted	None	1
Biface Thinning Flake	8	Pink	Collapsed	None	1
Biface Thinning Flake	8	Pink	Multifaceted	None	1
Biface Thinning Flake	8	Red	Indeterminate	Heat Treated	1
Biface Thinning Flake	8	Red	Multifaceted	None	1
Biface Thinning Flake	8	White	Indeterminate	None	1
Pressure Flake	7	Gray	Collapsed	Heat Treated	1
Pressure Flake	7	Pink	Collapsed	Heat Treated	1
Pressure Flake	7	White	Collapsed	None	1
Pressure Flake	7	Yellow	Collapsed	Heat Treated	1
Pressure Flake	8	Pink	Single–faceted	None	1
Pressure Flake	8	Yellow	Single–faceted	Heat Treated	1
Total					50

Table 5. Subsurface debitage recovered at Activity Area 1, site 26NY1408.

Type	Size–Grade	Color	Platform	Alteration	Total
Core Reduction Flake	6	Gray	Collapsed	None	1
Core Reduction Flake	6	Gray	Collapsed	Heat Treated	1
Core Reduction Flake	6	Gray	Indeterminate	None	1
Core Reduction Flake	6	Gray	Multifaceted	None	1
Core Reduction Flake	6	Red	Collapsed	None	1
Core Reduction Flake	6	White	Collapsed	None	1
Core Reduction Flake	7	Gray	Indeterminate	None	1
Core Reduction Flake	7	Gray	Multifaceted	None	1
Core Reduction Flake	7	Gray	Single–faceted	None	1
Core Reduction Flake	7	White	Collapsed	None	1
Core Reduction Flake	7	White	Double–faceted	None	1
Core Reduction Flake	7	White	Indeterminate	None	1
Core Reduction Flake	7	White	Single–faceted	None	2
Core Reduction Flake	7	Yellow	Collapsed	Heat Treated	1
Biface Thinning Flake	7	Gray	Collapsed	None	5
Biface Thinning Flake	7	Gray	Double–faceted	None	1
Biface Thinning Flake	7	Gray	Indeterminate	None	4
Biface Thinning Flake	7	Gray	Multifaceted	None	1
Biface Thinning Flake	7	Gray	Single–faceted	None	6
Biface Thinning Flake	7	Purple	Collapsed	Heat Treated	1

Continued

Table 5. Continued.

Type	Size-Grade	Color	Platform	Alteration	Total
Biface Thinning Flake	7	Red	Collapsed	None	1
Biface Thinning Flake	7	Red	Collapsed	Heat Treated	4
Biface Thinning Flake	7	Red	Indeterminate	Heat Treated	4
Biface Thinning Flake	7	Red	Multifaceted	Heat Treated	1
Biface Thinning Flake	7	Red	Single-faceted	Heat Treated	4
Biface Thinning Flake	7	White	Collapsed	None	2
Biface Thinning Flake	7	White	Collapsed	Heat Treated	1
Biface Thinning Flake	7	White	Indeterminate	None	3
Biface Thinning Flake	7	White	Indeterminate	Heat Treated	1
Biface Thinning Flake	7	White	Single-faceted	Heat Treated	3
Biface Thinning Flake	7	Yellow	Collapsed	None	9
Biface Thinning Flake	7	Yellow	Indeterminate	None	5
Biface Thinning Flake	7	Yellow	Indeterminate	Heat Treated	1
Biface Thinning Flake	7	Yellow	Multifaceted	None	1
Biface Thinning Flake	7	Yellow	Single-faceted	None	10
Pressure Flake	7	Green	Collapsed	None	2
Pressure Flake	7	Gray	Collapsed	None	6
Pressure Flake	7	Gray	Collapsed	Heat Treated	19
Pressure Flake	7	Gray	Double-faceted	Heat Treated	2
Pressure Flake	7	Gray	Indeterminate	None	1
Pressure Flake	7	Gray	Indeterminate	Heat Treated	14
Pressure Flake	7	Gray	Multifaceted	Heat Treated	2
Pressure Flake	7	Gray	Single-faceted	None	2
Pressure Flake	7	Gray	Single-faceted	Heat Treated	19
Pressure Flake	7	Pink	Collapsed	None	1
Pressure Flake	7	Pink	Collapsed	Heat Treated	1
Pressure Flake	7	Pink	Indeterminate	Heat Treated	2
Pressure Flake	7	Pink	Single-faceted	Heat Treated	4
Pressure Flake	7	Red	Collapsed	Heat Treated	12
Pressure Flake	7	Red	Indeterminate	Heat Treated	4
Pressure Flake	7	Red	Multifaceted	Heat Treated	2
Pressure Flake	7	Red	Single-faceted	Heat Treated	6
Pressure Flake	7	Red	Collapsed	Heat Treated	6
Pressure Flake	7	Red	Indeterminate	Heat Treated	1
Pressure Flake	7	Red	Multifaceted	Heat Treated	4
Pressure Flake	7	Red	Single-faceted	Heat Treated	6
Pressure Flake	7	White	Collapsed	None	12
Pressure Flake	7	White	Collapsed	Heat Treated	4
Pressure Flake	7	White	Indeterminate	None	1
Pressure Flake	7	White	Indeterminate	Heat Treated	1
Pressure Flake	7	White	Multifaceted	None	4
Pressure Flake	7	White	Multifaceted	Heat Treated	1
Pressure Flake	7	White	Single-faceted	None	4
Pressure Flake	7	White	Single-faceted	Heat Treated	2

Continued

Table 5. Continued.

Type	Size–Grade	Color	Platform	Alteration	Total
Pressure Flake	7	Yellow	Collapsed	None	4
Pressure Flake	7	Yellow	Collapsed	Heat Treated	4
Pressure Flake	7	Yellow	Multifaceted	Heat Treated	1
Pressure Flake	7	Yellow	Single–faceted	None	1
Pressure Flake	7	Yellow	Single–faceted	Heat Treated	4
Pressure Flake	8	Purple	Single–faceted	None	1
Pressure Flake	8	Gray	Collapsed	None	1
Pressure Flake	8	Gray	Collapsed	Heat Treated	43
Pressure Flake	8	Gray	Double–faceted	Heat Treated	4
Pressure Flake	8	Gray	Indeterminate	Heat Treated	32
Pressure Flake	8	Gray	Multifaceted	Heat Treated	4
Pressure Flake	8	Gray	Single–faceted	None	1
Pressure Flake	8	Gray	Single–faceted	Heat Treated	35
Pressure Flake	8	Pink	Collapsed	Heat Treated	10
Pressure Flake	8	Pink	Indeterminate	Heat Treated	4
Pressure Flake	8	Pink	Multifaceted	Heat Treated	2
Pressure Flake	8	Pink	Single–faceted	Heat Treated	10
Pressure Flake	8	Red	Collapsed	Heat Treated	59
Pressure Flake	8	Red	Double–faceted	Heat Treated	6
Pressure Flake	8	Red	Indeterminate	Heat Treated	32
Pressure Flake	8	Red	Multifaceted	Heat Treated	9
Pressure Flake	8	Red	Single–faceted	Heat Treated	42
Pressure Flake	8	White	Collapsed	None	39
Pressure Flake	8	White	Collapsed	Heat Treated	7
Pressure Flake	8	White	Double–faceted	None	2
Pressure Flake	8	White	Indeterminate	None	15
Pressure Flake	8	White	Multifaceted	None	3
Pressure Flake	8	White	Single–faceted	None	28
Pressure Flake	8	White	Single–faceted	Heat Treated	10
Pressure Flake	8	Yellow	Collapsed	None	4
Pressure Flake	8	Yellow	Collapsed	Heat Treated	36
Pressure Flake	8	Yellow	Double–faceted	None	1
Pressure Flake	8	Yellow	Double–faceted	Heat Treated	1
Pressure Flake	8	Yellow	Indeterminate	None	1
Pressure Flake	8	Yellow	Indeterminate	Heat Treated	31
Pressure Flake	8	Yellow	Single–faceted	None	3
Pressure Flake	8	Yellow	Single–faceted	Heat Treated	30
Indeterminate	7	White	Indeterminate	None	3
Indeterminate	8	Yellow	Indeterminate	Heat Treated	1
Total					743

Shatter. Shatter is angular, blocky lithic specimens which do not display identifiable platforms, bulbs of applied force, or rings of force. It is generally produced during the initial stages of reduction. At Activity Area 1, 159 pieces of white silicified volcanic, 2 pieces of purple silicified volcanic, and 1 piece of fine-grained black basalt shatter were recovered.

Ceramics. At Activity Area 1, 29 pottery sherds were found on the surface and 60 were recovered from the subsurface. All of the surface sherds were Anasazi Grayware (Shivwits Plain) body sherds made using coil and scrape manufacture and hand smoothing. None of the sherds could be identified as to what vessel form they represented. In the subsurface, 57 of the sherds were the same type and manufacture as those found on the surface and 52 of the sherds represented a globular jar. One subsurface sherd was from a North Creek Gray bowl and two sherds were from a Little Colorado Series bowl. Dates generally associated with the Shivwits Plain and the North Creek Gray range from A.D. 700 to 1100, while dates for the Little Colorado Series range from A.D. 1000 to 1150 (Colton 1952).

Discussion

Activity Area 1 at site 26NY1408 was a temporary camp utilized for resource acquisition and the production of late stage bifaces related to hunting activities. Dates associated with the projectile points indicate that the area was occupied between A.D. 700 to 1300. These dates are consistent with the ones from other regions that are associated with the Shivwits Plain, North Creek Gray, and Little Colorado pottery types that range from A.D. 700 to 1150.

Both biface and debitage analysis support the temporary camp interpretation in that late stage production was the dominant process at this activity area and most of the tools have fractures which are indicative of breakage during manufacture. No evidence of use breakage was noted in the bifacial tools recovered from this activity area. Even though use damage was not found on the discarded projectile points, their manufacture indicates that hunting activities were undertaken in the area. Also, the presence of groundstone indicates that the area was utilized for the processing of subsistence resources even though it was probably for a limited duration. Finally, most of the lithic material was silicified volcanic which is readily available at the toolstone source area approximately 300 m south of this activity area.

A chi-square test of surface and subsurface artifacts indicates a significant difference between them (Table 6). The quantity of artifacts is relatively higher for the subsurface compared to the surface. Two possible explanations for the difference between the surface and subsurface are collection strategies and behavioral activities. Surface artifacts are recovered only by visual identification whereas subsurface artifact recovery involves passing the matrix through a small mesh screen. This may result in a collection bias in the recovery of artifacts. However, all things being equal, it is more likely that the differences are based on behavioral activities that were carried out at the activity area. Even though both contexts reflect a full range of lithic reduction activities, the surface contains a more even diversity of material and exhibits more biface thinning, while the subsurface contains a greater proportion of pressure or preparation flakes. If the surface artifacts are representative of later activities and the subsurface artifacts are indicative of earlier activities, then one could argue that differences in behavioral activities through time are represented at this locale.

Table 6. Chi–square for surface and subsurface artifacts at Activity Area 1.

Frequency Expected Percent Row Pct Col Pct	Surface	Subsurface	Total
Bifaces	5 2.3519 0.46 50.00 1.97	5 7.6481 0.46 50.00 0.61	10 0.93
Ceramics	29 20.931 2.69 32.58 11.42	60 68.069 5.56 67.42 7.26	89 8.24
Cores	2 0.4704 0.19 100.00 0.79	0 1.5296 0.00 0.00 0.00	2 0.19
Debitage Flakes	51 186.74 4.72 6.42 20.08	743 607.26 68.80 93.58 89.95	794 73.52
Drills	2 0.7056 0.19 66.67 0.79	1 2.2944 0.09 33.33 0.12	3 0.28
Groundstone	1 2.1167 0.09 11.11 0.39	8 6.8833 0.74 88.89 0.97	9 0.83
Projectile Points	2 2.587 0.19 18.18 0.79	9 8.413 0.83 81.82 1.09	11 1.02
Shatter	162 38.1 15.00 100.00 63.78	0 123.9 0.00 0.00 0.00	162 15.00
Total	254 23.52	826 76.48	1080 100.00

Statistic	DF	Value	Probablility
Chi–Square	7	674.344	0.000
Likelihood Ratio Chi–Square	7	652.794	0.000
Mantel–Haenszel Chi–Square	1	410.593	0.000
Phi Coefficient		0.790	
Contingency Coefficient		0.620	
Cramer's V		0.790	

Activity Area 2

Activity Area 2 consists of cores, lithic debitage, and groundstone recovered on the surface and from the subsurface of a 2–x–2–m (6.6–x–6.6–ft) area (Table 7). No artifacts were recovered below the depth of 5 cm (2 in). This 2–x–2–m area was excavated as Test Unit 2 during the survey and testing phase of data recovery. The activity area is located in a relatively flat area on the top of a small rocky ridge in the center of the sample unit, 7 m (23 ft) north and 15 m (50 ft) east of Activity Area 1 (Figure 11). No trees are within 50 m of this activity area, which is dominated by sage and rabbitbrush.

Cores. No cores were found on the surface of Activity Area 2; however, four cores were recovered from the subsurface. All of the cores were of chert, which has no known source in this area of Pahute Mesa. Two are yellow/red chert assayed cores. One measures 34.4 x 29.3 x 15 mm (1.4 x 1.2 x 0.6 in) and weighs 12.5 g and the second measures 29.8 x 19.5 x 11.7 mm (1.2 x 0.8 x 0.5 in) and weighs 8.2 g. One is a yellow/red chert multidirectional core that is 26.5 x 26 x 12.4 mm (1 x 1 x 0.5 in) and weighs 7.5 g and one is a multidirectional gray chert core that measures 49.4 x 40.4 x 30.6 mm (1.9 x 1.5 x 1.2 in) and weighs 61.5 g. Blank types for all of the cores were core reduction flakes.

Groundstone. Six groundstone fragments representing a minimum of three metates were found at Activity Area 2. Four of the fragments are coarse–grained gray welded tuff from a tabular uniface metate that is plano–convex in cross–section. These four fragments fit together. Of the other two fragments, one is a coarse–grained brown welded tuff from a tabular metate that is plano–plano in cross–section and the other is a fine–grained gray welded tuff tabular bifacial circular metate that is plano–convex in cross–section. Only minimal grinding was found on the fragments.

Debitage. Debitage at Activity Area 2 consisted of 59 pieces of variously colored silicified volcanic. Fifty–eight percent (n=34) of the debitage was found on the surface (Table 8). Size–grading of the debitage from the surface produced flakes of size–grade 4, 6, 7, or 8 with only 1 surface flake a size–grade 4. Core reduction flakes accounted for 21 percent (n=7) of the surface debitage. Core reduction flakes are indicative of early stage lithic reduction processes. The remaining flakes are biface thinning flakes (24 percent; n=8) and pressure or platform preparation flakes (55 percent; n=19) . Biface thinning flakes and pressure flakes are indicative of late stage reduction activities related to biface manufacture.

In the subsurface, 25 flakes of size–grade 6–8 were found (Table 9). Even though most of the debitage was found in the subsurface, nothing was found deeper than 5 cm from the surface with much of the material found within the top 2 cm. Core reduction flakes accounted for 8 percent (n=2) of the subsurface debitage, biface thinning flakes accounted for 24 percent (n=6), and pressure or platform preparation flakes accounted for 68 percent (n=17)

Shatter. At Activity Area 2, two pieces of white silicified volcanic were recovered on the surface. In the subsurface, 9 pieces of white silicified volcanic, 10 pieces of red silicified volcanic, 14 pieces of yellow silicified volcanic, and 1 piece of fine–grained black basalt shatter were recovered.

Table 7. Artifacts recovered at Activity Area 2, site 26NY1408.

	Surface	Subsurface	Total
Cores	0	4	4
Debitage	34	25	59
Shatter	48	0	48
Groundstone	0	6	6
Total	82	35	117

Table 8. Surface debitage recovered at Activity Area 2, site 26NY1408.

Type	Size–Grade	Color	Platform	Alteration	Total
Core Reduction Flake	4	White	Cortex–Faceted	None	1
Core Reduction Flake	6	Purple	Collapsed	None	1
Core Reduction Flake	6	Red	Indeterminate	Heat Treated	1
Core Reduction Flake	6	Yellow	Collapsed	Heat Treated	1
Core Reduction Flake	6	Yellow	Indeterminate	Heat Treated	1
Core Reduction Flake	7	Red	Indeterminate	Heat Treated	1
Core Reduction Flake	7	Red	Single–faceted	Heat Treated	1
Biface Thinning Flake	6	Brown	Single–faceted	None	1
Biface Thinning Flake	6	Red	Collapsed	Heat Treated	1
Biface Thinning Flake	6	White	Collapsed	None	1
Biface Thinning Flake	7	White	Collapsed	None	1
Biface Thinning Flake	7	White	Single–faceted	None	1
Biface Thinning Flake	7	Yellow	Collapsed	Heat Treated	1
Biface Thinning Flake	7	Yellow	Indeterminate	Heat Treated	1
Biface Thinning Flake	7	Yellow	Single–faceted	Heat Treated	1
Pressure Flake	7	Red	Collapsed	Heat Treated	3
Pressure Flake	7	Red	Single–faceted	Heat Treated	1
Pressure Flake	7	Yellow	Collapsed	Heat Treated	4
Pressure Flake	7	Yellow	Single–faceted	Heat Treated	1
Pressure Flake	8	Red	Collapsed	Heat Treated	2
Pressure Flake	8	Red	Indeterminate	Heat Treated	2
Pressure Flake	8	White	Indeterminate	None	1
Pressure Flake	8	White	Indeterminate	Heat Treated	2
Pressure Flake	8	Yellow	Collapsed	Heat Treated	1
Pressure Flake	8	Yellow	Multifaceted	Heat Treated	1
Pressure Flake	8	Yellow	Single–faceted	Heat Treated	1
Total					34

Table 9. Subsurface debitage recovered at Activity Area 2, site 26NY1408.

Type	Size–Grade	Color	Platform	Alteration	Total
Core Reduction Flake	6	Yellow	Collapsed	Heat Treated	1
Core Reduction Flake	7	Yellow	Indeterminate	Heat Treated	1
Biface Thinning Flake	6	Purple	Collapsed	Heat Treated	1
Biface Thinning Flake	6	Red	Double–faceted	Heat Treated	1
Biface Thinning Flake	7	Red	Single–faceted	Heat Treated	3
Biface Thinning Flake	7	White	Collapsed	Heat Treated	1
Pressure Flake	7	Yellow	Collapsed	Heat Treated	3
Pressure Flake	7	Yellow	Double–faceted	Heat Treated	1
Pressure Flake	7	Yellow	Indeterminate	Heat Treated	1
Pressure Flake	8	Purple	Indeterminate	Heat Treated	1
Pressure Flake	8	Red	Collapsed	Heat Treated	3
Pressure Flake	8	Red	Double–faceted	Heat Treated	1
Pressure Flake	8	Red	Indeterminate	Heat Treated	1
Pressure Flake	8	White	Collapsed	Heat Treated	3
Pressure Flake	8	White	Single–faceted	Heat Treated	1
Pressure Flake	8	Yellow	Collapsed	Heat Treated	1
Pressure Flake	8	Yellow	Indeterminate	Heat Treated	1
Total					25

Discussion

Activity Area 2 at site 26NY1408 was a temporary camp and lithic reduction area utilized through multiple occupations. All stages of lithic reduction were noted in both the surface and subsurface; however, late stage debitage was dominant in both assemblages recovered at the activity area. The presence of groundstone indicates that the area was utilized for the processing of subsistence resources, but because of the minimal amount of grinding on the surface of the metate fragments, a temporary use of the area is proposed. Finally, most of the lithic material was silicified volcanic which is readily available at the toolstone source area approximately 300 m south of this activity area. No datable cultural material was recovered, but the close proximity of Activity Area 2 to Activity Area 1 and their similarity in lithic reduction activities suggests contemporaneous occupations.

A chi–square test of the artifacts recovered from this activity area indicates a significant difference between the surface and subsurface (Table 10). However, unlike Activity Area 1, the quantity of artifacts is relatively higher for the surface compared to the subsurface. The explanation for this discrepancy may be related to behavioral activities during different occupations of the area. Subsurface artifacts reflect a complete range of lithic reduction activities and the processing of food products while the surface artifacts indicate only lithic reduction activities. The subsurface artifacts indicate a temporary camp while the surface artifacts indicate a lithic reduction area. Deposition, although limited on the mesas, is argued to have separated the occupations at this area.

Table 10. Chi–square for surface and subsurface artifacts at Activity Area 2.

Frequency Expected Percent Row Pct Col Pct	Surface	Subsurface	Total
Cores	0 2.8034 0.00 0.00 0.00	4 1.1966 3.42 100.00 11.43	4 3.42
Debitage	34 41.35 29.06 57.63 41.46	25 17.65 21.37 42.37 71.43	59 50.43
Groundstone	0 4.2051 0.00 0.00 0.00	6 1.7949 5.13 100.00 17.14	6 5.13
Shatter	48 33.641 41.03 100.00 58.54	0 14.359 0.00 0.00 0.00	48 41.03
Total	82 70.09	35 29.91	117 100.00

Statistic	DF	Value	Probability
Chi–Square	3	48.284	0.000
Likelihood Ratio Chi–Square	3	62.359	0.000
Mantel–Haenszel Chi–Square	1	29.426	0.000
Phi Coefficient		0.642	
Contingency Coefficient		0.540	
Cramer's V		0.642	

Activity Area 3

Activity Area 3 consists of a biface, lithic debitage, and pottery, recovered on the surface and from the subsurface of a 4–x–3–m (13–x–10–ft) area (Table 11). No artifacts were recovered below 5 cm (2 in) of the surface. The activity area was tested during the survey and testing phase of data recovery. It is located in a relatively flat area on the top of a small rocky ridge in the center of the sample unit, 7 m (23 ft) north and 4 m (13 ft) east of Activity Area 2 (Figure 11). No trees are within 50 m of this activity area which is dominated by sage and rabbitbrush.

Biface. One white silicified volcanic stage II biface fragment that measures 36.6 x 17.3 x 8.3 mm (1.4 x 0.7 x 0.3 in) and weighes 5.2 g was found at Activity Area 3. Fracture type for this biface was indeterminate and cortex covered approximately 25 percent of its dorsal surface.

Table 11. Artifacts recovered at Activity Area 3, site 26NY1408.

	Surface	Subsurface	Total
Biface	0	1	1
Debitage	164	620	784
Ceramics	9	7	16
Total	173	628	801

Ceramics. On the surface of Activity Area 3, nine Anasazi Grayware (Shivwits Plain) body sherds were found. All of the sherds were from a globular jar made using coil and scrape manufacture and hand smoothing. In the subsurface, seven sherds of the same pottery type, vessel type, and manufacture were found. Dates generally associated with the Shivwits Plain range from A.D. 700 to 1100 (Colton 1952).

Debitage. Debitage at Activity Area 3 consisted of 785 pieces of varyiously colored silicified volcanic. Twenty–one percent (n=164) of the debitage was found on the surface (Table 12). Size–grading of the debitage from the surface produced flakes of size–grade 6, 7, and 8. One decortication flake and two core reduction flakes were recovered on the surface which accounted for two percent of the debitage. Core reduction and decortication flakes are indicative of early stage lithic reduction processes. The remaining flakes are 33 percent (n=55) biface thinning flakes and 65 percent (n=106) pressure or platform preparation flakes. Biface thinning flakes and pressure flakes are indicative of late stage reduction activities related to biface manufacture. Additionally, all of the debitage recovered at this activity area appears to have been heat treated.

In the subsurface, 620 flakes of size–grade 6–8 were found (Table 13). Even though most of the debitage was found in the subsurface, nothing was found deeper than 5 cm from the surface with much of the material found within the top 2 cm. Core reduction flakes accounted for less than one percent (n=5) of the subsurface debitage, biface thinning flakes accounted for 13 percent (n=80), and 86 percent (n=535) of the debitage was pressure or platform preparation flakes. As on the surface, all the debitage in the subsurface appears to have been heat treated.

Discussion

Activity Area 3, like Activity Area 2, is a temporary camp utilized for late stage lithic production activities. Late stage debitage was dominant in the assemblage recovered at the activity area and the lack of shatter is consistent with late stage reduction activities. Most of the lithic material was silicified volcanic which is readily available at the toolstone source area approximately 300 m south of this activity area. Pottery recovered at this activity area was Shivwits Plain. Dates associated with this pottery type range from A.D. 700 to 1150. The similar pottery styles tie Activity Areas 1 and 3 together temporally. Also, their close proximity to each other and their similarity in lithic reduction activities support contemporaneous occupations.

A chi–square test for artifacts indicates a significant difference between the surface and subsurface (Table 14). Like Activity Area 1, the quantity of artifacts is relatively higher for the subsurface compared to the surface. The two possible explanations for the difference between the surface and subsurface includes collection strategies and behavioral activities described at Activity Area 1.

Table 12. Surface debitage recovered at Activity Area 3, site 26NY1408 in 1991.

Type	Size–Grade	Color	Platform	Total
Decortication Flake	7	Yellow	Single–faceted	1
Core Reduction Flake	6	Yellow	Indeterminate	1
Core Reduction Flake	6	Yellow	Single–faceted	1
Biface Thinning Flake	6	Purple	Collapsed	1
Biface Thinning Flake	6	Red	Collapsed	1
Biface Thinning Flake	6	Red	Double–faceted	1
Biface Thinning Flake	6	Red	Single–faceted	2
Biface Thinning Flake	6	Yellow	Double–faceted	1
Biface Thinning Flake	6	Yellow	Multifaceted	1
Biface Thinning Flake	6	Yellow	Single–faceted	3
Biface Thinning Flake	7	Red	Collapsed	1
Biface Thinning Flake	7	Red	Double–faceted	1
Biface Thinning Flake	7	Red	Indeterminate	1
Biface Thinning Flake	7	Red	Single–faceted	4
Biface Thinning Flake	7	White	Indeterminate	1
Biface Thinning Flake	7	White	Single–faceted	3
Biface Thinning Flake	7	Yellow	Collapsed	14
Biface Thinning Flake	7	Yellow	Indeterminate	6
Biface Thinning Flake	7	Yellow	Multifaceted	2
Biface Thinning Flake	7	Yellow	Single–faceted	12
Pressure Flake	7	Purple	Collapsed	1
Pressure Flake	7	Purple	Indeterminate	2
Pressure Flake	7	Purple	Single–faceted	1
Pressure Flake	7	Red	Collapsed	12
Pressure Flake	7	Red	Cortex/Faceted	1
Pressure Flake	7	Red	Double–faceted	1
Pressure Flake	7	Red	Indeterminate	8
Pressure Flake	7	Red	Single–faceted	6
Pressure Flake	7	White	Collapsed	2
Pressure Flake	7	White	Indeterminate	5
Pressure Flake	7	Yellow	Collapsed	13
Pressure Flake	7	Yellow	Indeterminate	5
Pressure Flake	7	Yellow	Multifaceted	4
Pressure Flake	7	Yellow	Single–faceted	9
Pressure Flake	8	Red	Collapsed	2
Pressure Flake	8	Red	Indeterminate	2
Pressure Flake	8	Red	Single–faceted	1
Pressure Flake	8	White	Collapsed	3
Pressure Flake	8	White	Indeterminate	1
Pressure Flake	8	White	Single–faceted	1
Pressure Flake	8	Yellow	Collapsed	11
Pressure Flake	8	Yellow	Indeterminate	8
Pressure Flake	8	Yellow	Multifaceted	1
Pressure Flake	8	Yellow	Single–faceted	6
Total				165

Table 13. Subsurface debitage recovered at Activity Area 3, site 26NY1408 in 1991.

Type	Size–Grade	Color	Platform	Total
Core Reduction Flake	7	White	Indeterminate	1
Core Reduction Flake	7	White	Multifaceted	1
Core Reduction Flake	7	Yellow	Indeterminate	3
Biface Thinning Flake	6	Red	Double–faceted	1
Biface Thinning Flake	6	Red	Indeterminate	1
Biface Thinning Flake	6	Red	Single–faceted	1
Biface Thinning Flake	6	White	Single–faceted	2
Biface Thinning Flake	6	Yellow	Collapsed	3
Biface Thinning Flake	6	Yellow	Indeterminate	4
Biface Thinning Flake	6	Yellow	Collapsed	1
Biface Thinning Flake	7	Purple	Collapsed	3
Biface Thinning Flake	7	Purple	Indeterminate	1
Biface Thinning Flake	7	Purple	Multifaceted	1
Biface Thinning Flake	7	Purple	Single–faceted	3
Biface Thinning Flake	7	Red	Collapsed	10
Biface Thinning Flake	7	Red	Double–faceted	1
Biface Thinning Flake	7	Red	Indeterminate	5
Biface Thinning Flake	7	Red	Multifaceted	1
Biface Thinning Flake	7	Red	Single–faceted	5
Biface Thinning Flake	7	White	Collapsed	1
Biface Thinning Flake	7	White	Cortex/Faceted	1
Biface Thinning Flake	7	White	Indeterminate	1
Biface Thinning Flake	7	White	Single–faceted	5
Biface Thinning Flake	7	White	Single	1
Biface Thinning Flake	8	Yellow	Collapsed	5
Biface Thinning Flake	8	Yellow	Double–faceted	1
Biface Thinning Flake	8	Yellow	Indeterminate	9
Biface Thinning Flake	8	Yellow	Multifaceted	1
Biface Thinning Flake	8	Yellow	Single–faceted	12
Pressure Flake	7	Purple	Collapsed	4
Pressure Flake	7	Purple	Indeterminate	3
Pressure Flake	7	Purple	Single–faceted	7
Pressure Flake	7	Red	Collapsed	25
Pressure Flake	7	Red	Double–faceted	4
Pressure Flake	7	Red	Indeterminate	18
Pressure Flake	7	Red	Multifaceted	5
Pressure Flake	7	Red	Single–faceted	17
Pressure Flake	7	White	Collapsed	6
Pressure Flake	7	White	Indeterminate	3
Pressure Flake	7	White	Single–faceted	6
Pressure Flake	7	Yellow	Collapsed	33
Pressure Flake	7	Yellow	Double–faceted	2
Pressure Flake	7	Yellow	Indeterminate	29
Pressure Flake	7	Yellow	Multifaceted	3

Continued

Table 13. Continued.

Type	Size–Grade	Color	Platform	Total
Pressure Flake	7	Yellow	Single–faceted	14
Pressure Flake	8	Purple	Collapsed	12
Pressure Flake	8	Purple	Double–faceted	1
Pressure Flake	8	Purple	Indeterminate	5
Pressure Flake	8	Purple	Single–faceted	5
Pressure Flake	8	Red	Collapsed	29
Pressure Flake	8	Red	Indeterminate	30
Pressure Flake	8	Red	Multifaceted	1
Pressure Flake	8	Red	Single–faceted	15
Pressure Flake	8	White	Collapsed	12
Pressure Flake	8	White	Double–faceted	1
Pressure Flake	8	White	Indeterminate	22
Pressure Flake	8	White	Multifaceted	1
Pressure Flake	8	White	Single–faceted	11
Pressure Flake	8	Yellow	Collapsed	49
Pressure Flake	8	Yellow	Double–faceted	1
Pressure Flake	8	Yellow	Indeterminate	90
Pressure Flake	8	Yellow	Multifaceted	4
Pressure Flake	8	Yellow	Single–faceted	67
Total				620

Table 14. Chi–square for surface and subsurface artifacts at Activity Area 3.

Frequency Expected Percent Row Pct Col Pct	Surface	Subsurface	Total
Bifaces	0 0.217 0.00 0.00 0.00	1 0.783 0.12 100.00 0.16	1 0.12
Ceramics	9 3.4713 1.12 56.25 5.17	7 12.529 0.87 43.75 1.11	16 2.00
Debitage	165 170.31 20.57 21.02 94.83	620 614.69 77.31 78.98 98.73	785 97.88
Total	174 21.70	628 78.30	802 100.00

Continued

Table14. Continued

Statistic	DF	Value	Probability
Chi–Square	2	11.734	0.003
Likelihood Ratio Chi–Square	2	9.701	0.008
Mantel–Haenszel Chi–Square	1	7.787	0.005
Phi Coefficient		0.121	
Contingency Coefficient		0.120	
Cramer's V		0.121	

Activity Area 4

Activity Area 4 consists of lithic debitage and pottery recovered on the surface and from the subsurface of a 3 x 3 m (10 x 10 ft) area (Table 15). No artifacts were recovered below a depth of 5 cm (2 inches). This 3 x 3 m area was excavated as Test Unit 4 during the survey and testing phase of data recovery. The activity area is located on at the base of the small rocky ridge on a slope of approximately 3° in the south–center of the sample unit (Figure 11). Both juniper and pinyon are found within this area.

Shatter. Shatter at Activity Area 4 consisted of 15 pieces of varyiously colored silicified volcanic. On the surface, 5 pieces of white silicified volcanic shatter were recovered of which 2 were size–grade 4, 2 were size–grade 5, and 1 was size–grade 6. In the subsurface, 10 pieces of silicified volcanic shatter were recovered. Of these, 5 were white silicified volcanic size–grade seven, 1 was white silicified volcanic size–grade 8, 3 were gray silicified volcanic size–grade 6, and 1 was pink silicified volcanic size–grade 5.

Ceramics. On the surface of Activity Area 4, 8 brownware pottery sherds were recovered (4 rim and 4 body sherds). All of the sherds were from a conical jar made using coil and scrape manufacture and grass smoothing. In the subsurface, 3 rim and 3 body sherds of the same pottery type, vessel type, and manufacture were found. Dates generally associated with the brownware ceramics range from A.D. 650 to contact with Europeans.

Discussion

The analysis of artifacts recovered at Activity Area 4 indicate that this was the location of a single pot drop. All of the pottery was of the same type and probably of the same conical jar. In addition, three sherds of the same pottery and vessel type were recovered adjacent to this test unit during surface collection and are argued to be associated with this activity area rather than part of the toolstone source area. The shatter recovered indicates that lithic reduction activities were taking place in this area; however, it is not restricted to just this activity area. Indeed, most of the southern portion of the sample unit contains varying amounts of the silicified volcanic shatter and this occurrence will be discussed next as a part of the toolstone source area. A chi–square test for artifacts indicates no significant difference between the surface and subsurface (Table 16).

Table 15. Artifacts recovered at Activity Area 4, site 26NY1408.

	Surface	Subsurface	Total
Shatter	5	10	15
Ceramics	8	6	14
Total	13	16	29

Table 16. Chi-square for surface and subsurface artifacts at Activity Area 4.

Frequency Expected Percent Row Pct Col Pct	Surface	Subsurface	Total
Ceramics	8 6.2759 27.59 57.14 61.54	6 7.7241 20.69 42.86 37.50	14 48.28
Shatter	5 6.7241 7.24 33.33 38.46	10 8.2759 34.48 66.67 62.50	15 51.72
Total	13 44.83	16 55.17	29 100.00

Statistic	DF	Value	Probability
Chi-Square	1	1.660	0.198
Likelihood Ratio Chi-Square	1	1.675	0.196
Mantel-Haenszel Chi-Square	1	1.603	0.206
Phi Coefficient		0.239	
Contingency Coefficient		0.233	
Cramer's V		0.239	

Toolstone source area at site 26NY1408

Most of the material recovered at the toolstone source area at site 26NY1408 is a silicified volcanic that varies in color and texture. The silicified volcanic is exposed at several locations across the site in the form of cobbles and tabular slabs. Associated with these exposures are various amounts of cores, lithic tools, lithic debitage, groundstone and bone (Table 17). As shown in Figure 11, the toolstone source area encompasses the entire site less the activity areas and rockshelter. As such, counts do not reflect the artifacts recovered in the activity areas discussed above.

Cores. A total of 209 cores were found during surface collection at the toolstone source area at site 26NY1408 (Table 18), of which 155 were taken to the DRI laboratory in Las Vegas for further analysis. Because of their size, the remaining 54 cores were analyzed and left in the field. These cores were large blocks of the silicified volcanic (up to one meter) which were reduced by block on block technique. This technique involves the striking of a smaller piece of material against a larger one. The procedure allows for the testing of the material quality and produces more manageable units. No platform preparation was noted on the large blocks and random flake removal scars were observed in selected areas on the cores. Although some of these large blocks possess more than one flake scar, the flake scars represent testing to determine the quality of material in different areas of the block and therefore all were considered assayed. Assayed cores suggest that the toolstone was tested for its flaking potential and subsequently discarded or, as at this site, left in situ. The most common core found at the toolstone source area was the assayed type with 70 percent (n=146). The remaining cores are unidirectional (9 percent; n=18), bidirectional (6 percent; n=13), multidirectional (14 percent; n=30), and bifacial (1 percent; n=2).

Table 17. Artifacts recovered at the toolstone source area, site 26NY1408.

Artifact Type	Total
Cores	209
Unifaces	2
Bifaces	43
Biface Knife	1
Drill	1
Projectile Points	41
Utilized Flakes	21
Debitage	1,351
Shatter	79,694
Groundstone	7
Bone	18
Total	81,388

Table 18. Cores recovered at site 26NY1408.

Material Type	Size–Grade	Color	Core Type	Number
Silicified Volcanic	1	Translucent	Multidirectional	1
Silicified Volcanic	1	White	Assayed	5
Silicified Volcanic	2	Translucent	Assayed	2
Silicified Volcanic	2	Translucent	Bidirectional	2
Silicified Volcanic	2	Translucent	Multidirectional	1
Silicified Volcanic	2	White	Assayed	25
Silicified Volcanic	2	White	Multidirectional	1
Silicified Volcanic	2	White	Unidirectional	4
Silicified Volcanic	2	White/Purple	Multidirectional	1
Silicified Volcanic	2	Yellow	Assayed	1
Silicified Volcanic	2	Yellow	Bidirectional	2
Silicified Volcanic	2	Yellow	Multidirectional	2
Welded Tuff	2	White	Assayed	3
Silicified Volcanic	3	Translucent	Assayed	10
Silicified Volcanic	3	Translucent	Bidirectional	2
Silicified Volcanic	3	Translucent	Multidirectional	5

Continued

Table 18. Continued.

Material Type	Size–Grade	Color	Core Type	Number
Silicified Volcanic	3	Translucent	Unidirectional	1
Silicified Volcanic	3	Translucent/Purple	Assayed	1
Silicified Volcanic	3	Gray	Assayed	4
Silicified Volcanic	3	Gray	Bidirectional	2
Silicified Volcanic	3	Gray	Multidirectional	2
Silicified Volcanic	3	Gray	Unidirectional	2
Silicified Volcanic	3	White	Assayed	47
Silicified Volcanic	3	White	Bidirectional	1
Silicified Volcanic	3	White	Multidirectional	8
Silicified Volcanic	3	White	Unidirectional	4
Silicified Volcanic	3	Yellow	Assayed	21
Silicified Volcanic	3	Yellow	Bidirectional	3
Silicified Volcanic	3	Yellow	Multidirectional	3
Silicified Volcanic	3	Yellow	Unidirectional	4
Welded Tuff	3	White	Assayed	1
Welded Tuff	3	White	Multidirectional	2
Welded Tuff	3	Yellow	Assayed	1
Welded Tuff	3	Yellow/Red	Assayed	1
Silicified Volcanic	4	Buff	Bifacial	1
Silicified Volcanic	4	Gray/Purple	Multidirectional	1
Silicified Volcanic	4	Purple	Assayed	1
Silicified Volcanic	4	White	Assayed	17
Silicified Volcanic	4	White/Brown	Bifacial	1
Silicified Volcanic	4	Yellow	Assayed	2
Silicified Volcanic	4	Yellow	Bidirectional	1
Silicified Volcanic	4	Yellow	Multidirectional	1
Silicified Volcanic	4	Yellow	Unidirectional	1
Silicified Volcanic	5	Translucent	Assayed	1
Silicified Volcanic	5	Translucent	Unidirectional	1
Silicified Volcanic	5	White	Assayed	2
Silicified Volcanic	5	White	Multidirectional	1
Silicified Volcanic	5	White	Unidirectional	1
Silicified Volcanic	5	Yellow	Assayed	1
Silicified Volcanic	5	Yellow	Multidirectional	1
Total				209

Material types for the cores are welded tuff (2 percent; n=5) and silicified volcanic (98 percent; n=204). The size of a core depends partly on the availability of raw material. At 26NY1408, the silicified volcanic for core production included slabs up to 1 m in length. At this site, core sizes are size–grade 1 (3 percent; n=6), size–grade 2 (21 percent; n=44), size–grade 3 (60 percent; n=125), size–grade 4 (12 percent; n=26), and size–grade 5 (4 percent; n=8). These data indicate that cores of size–grade 3 (2–4 in) were most abundant, possibly because of their manageable size.

Unifaces. Two uniface scrapers were found at the toolstone source area at site 26NY1408. One is a white silicified volcanic uniface scraper that measures 75 x 59 x 50.5 mm (2.9 x 2.3 x 2 in) and weighs 193.2 g. The second is a white/purple silicified volcanic uniface scraper that measures 55 x 41.4 x 22.6 mm (2.2 x 1.6 x 0.89 in) and weighs 41.8 g. Both scrapers were complete and constructed from cobbles.

Bifaces. The analysis of bifaces (Table 19) recovered at the toolstone source area indicates that all stages of production were undertaken. This is evident by the presence of 53 bifaces and the fracture types noted during analysis. Manufacturing fractures encompass 74 percent (n=39) of the biface assemblage. The remaining fracture types are internal flaws (13 percent; n=7) and indeterminate (4 percent; n=2). Only 9 percent (n=5) of the bifaces were complete, indicating normal discard or loss.

Table19. Bifaces recovered at the toolstone source area, site 26NY1408

Material	Color	Type	Segment	Cortex	Alteration	Fracture	Total
Chert	Red/White	I	Fragment	>0to25%	Heat Treated	Thermal/Internal Flaw	1
Silicified Volcanic	White	I	Fragment	>25–75%	Heat Treated	Hinge	1
Chert	Brown	II	Fragment	None	None	Snap	1
Chert	Multicolored	II	Complete	>0–25%	None	None	1
Chert	Red/Brown	II	Fragment	None	None	Internal Flaw	1
Chert	Yellow/Brown	II	Complete	None	None	None	1
Chert	Red/Brown	II	Fragment	None	None	Internal Flaw	1
Chert	Red/Brown	II	Fragment	None	None	Snap	1
Silicified Volcanic	Translucent	II	Lateral	None	None	Overshot	1
Tachylite	Black	II	Fragment	>0–25%	None	Snap/Internal Flaw	1
Chert	White/Orange	III	Complete	None	None	None	1
Chert	White/Red	III	Distal	None	None	Perverse	1
Chert	White/Red	III	Proximal	None	Heat Treated	Snap	1
Chert	White/Red	III	Distal	None	None	Perverse	1
Chert	Pink/Red	III	Distal	None	None	Snap/Internal Flaw	1
Chert	Pink	III	Proximal	None	None	Internal Flaw	1
Jasper	Yellow/Brown	III	Complete	None	None	None	1
Jasper	Brown	III	Distal	None	None	Snap	1
Jasper	Brown	III	Proximal	None	None	Snap/Internal Flaw	1
Obsidian	Black	III	Lateral	None	None	Snap	1
Obsidian	Black	III	Proximal	None	None	Internal Flaw	1
Obsidian	Black	III	Lateral	None	None	Excessive Force	1
Obsidian	Black	III	Distal	None	None	Perverse	1
Obsidian	Black	III	Lateral	None	None	Snap/Internal Flaw	1
Welded Tuff	Gray	III	Distal	None	None	Snap	1
Silicified Volcanic	Translucent	III	Proximal	>0–25%	None	Internal Flaw	1
Silicified Volcanic	Translucent	III	Lateral	None	None	Snap/Perverse	1
Silicified Volcanic	White	III	Distal	>25–75%	None	Internal Flaw	1
Silicified Volcanic	White	III	Medial	None	None	Snap	1
Silicified Volcanic	White	III	Distal	None	None	Snap/Internal Flaw	1
Silicified Volcanic	White	III	Lateral	None	Heat Treated	Overshot	1
Chert	Purple/Green	IV	Medial	None	None	Snap	1
Chert	Buff	IV	Distal	None	None	Snap	1
Chert	Pink	IV	Distal	None	None	Snap	1
Jasper	Yellow/Red	IV	Distal	None	None	Indeterminate	1
Jasper	Brown	IV	Lateral	None	None	Indeterminate	1
Obsidian	Black	IV	Proximal	None	None	Snap	1
Obsidian	Black	IV	Lateral	None	None	Overshot	1
Obsidian	Black	IV	Proximal	None	None	Snap	1
Obsidian	Black	IV	Complete	None	None	None	1
Obsidian	Black	IV	Distal	None	None	Hinge	1
Obsidian	Black	IV	Distal	None	None	Snap	1

Continued

Table19. Continued.

Material	Color	Type	Segment	Cortex	Alteration	Fracture	Total
Obsidian	Black	IV	Proximal	None	None	Snap	1
Obsidian	Black	IV	Distal	None	None	Snap	1
Obsidian	Black	IV	Medial	None	None	Hinge	1
Silicified Volcanic	White	IV	Distal	None	Heat Treated	Snap	1
Silicified Volcanic	White	IV	Medial	>0–25%	None	Snap	1
Silicified Volcanic	White	IV	Medial	None	None	Snap/Internal Flaw	1
Silicified Volcanic	White	IV	Distal	None	None	Snap	1
Silicified Volcanic	White	IV	Distal	None	Heat Treated	Snap/Internal Flaw	1
Silicified Volcanic	White	IV	Distal	None	Heat Treated	Thermal	1
Silicified Volcanic	White	IV	Lateral	None	None	Snap	1
Silicified Volcanic	White	IV	Proximal	None	None	Internal Flaw	1
Total							53

Of the biface types recovered in this area 4 percent (n=2) are Type I, 15 percent (n=8) are Type II, 40 percent (n=21) are Type III, and 41 percent (n=22) are Type IV. This distribution suggests that late stage reduction was the main focus of biface production. Material types for the bifaces are silicified volcanic (30 percent; n=16), chert (30 percent; n=16), obsidian (26 percent; n=14), jasper (10 percent; n=5), tachylite (2 percent; n=1), and welded tuff (2 percent; n=1).

Biface knife. One white silicified volcanic proximal knife fragment was recovered at the toolstone source area. The fragment measures 50.5 x 35.8 x 10.8 mm (2 x 1.4 x 0.4 in) and has a snap fracture. Snap fractures can be the result of breakage during manufacture; however, use breakage may also be indicated if uneven pressure was applied to the knife during use.

Projectile points. Forty–one projectile points representing 11 different types (Table 20) were recovered during surface collection at the toolstone source area at site 26NY1408. Fifteen of the projectile points were complete and are assumed to have been lost or discarded during normal activities of the inhabitants of the area. Manufacturing breakage is represented by 81 percent (n=21) of the broken projectile points. Eleven percent (n=3) of the broken projectile points represent use related breakage in the form of impact fractures. The remaining 8 percent (n=2) of the projectile points had fractures of an indeterminate type; however, rejuvenation efforts on two of these points had obscured the original breakage.

Dates associated with the different projectile point types range from approximately 10,000 B.C. to A.D. 1300; however, the majority of projectile points date to the Middle to Late Archaic periods (ca. 2050 B.C. to A.D. 1250). The favored material for projectile points at the toolstone source area is obsidian, with 44 percent (n=18) of the projectile point assemblage. Projectile points made from the silicified volcanic represent 34 percent (n=14), 5 percent (n=2) are tachylite, 5 percent (n=2) are chert, 5 percent (n=2) are agate, 5 percent (n=2) are basalt, and 2 percent (n=1) are chalcedony. There is a preference for obsidian noted in the total projectile point assemblage and by individual typologies except for the Elko points. Forty percent of the Elko points (n=6) are silicified volcanic and 33 percent (n=5) are obsidian.

Drill. One white silicified volcanic drill proximal fragment was found at the toolstone source area at site 26NY1408. The fragment measures 20.3 x 17.2 x 3 mm (0.8 x 0.7 x 0.1 in) weighs 0.94 g, and has a snap fracture.

Utilized flakes. Twenty utilized flakes of variously colored silicified volcanic and one of brown welded tuff (Table 21) were found at the site. Utilized flakes exhibit alterations or edge damage, usually very small flake removals or edge dulling and rounding, that is the direct result of use. These flakes can be the result of intentional manufacturing or the by-products of other lithic reduction activities such as core reduction or biface thinning.

Debitage. As discussed in the Material Analysis section (Section 7), lithic shatter at the toolstone source area was extremely abundant. Because of a limited time schedule, a strategy was devised for the collection of a representative sample of the material in this area. This sampling included the total collection of 60 4–x–4 m units in the densest exposure of the toolstone source area. The 4–x–4 m units, located in the northeast corner of the 10–x–10 m units, were totally collected and all cultural material, excluding shatter, was collected in the remainder of the 10–x–10 m unit. For the remaining 1374 10–x–10 m units, total collection was undertaken.

Table 20. Projectile points recovered at the toolstone source area, site 26NY1408.

Type	Material	Color	Segment	Fracture	Associated Dates
Silver Lake	Silicified Volcanic	White	Medial	Indeterminate	10,000 – 5,000 B.C.
Humboldt A Large	Obsidian	Black	Complete	None	3000 B.C. – A.D. 700
Humboldt B Small	Obsidian	Black	Proximal	Indeterminate	3000 B.C. – A.D. 700
Humboldt Series	Basalt	Black	Complete	None	3000 B.C. – A.D. 700
Humboldt Series	Obsidian	Black	Complete	None	3000 B.C. – A.D. 700
Humboldt Series	Obsidian	Black	Proximal	Impact	3000 B.C. – A.D. 700
Elko Eared	Basalt	Black	Complete	None	1300 B.C. – A.D. 700
Elko Eared	Silicified Volcanic	White	Proximal	Snap	1300 B.C. – A.D. 700
Elko Eared	Silicified Volcanic	Buff	Proximal	Snap	1300 B.C. – A.D. 700
Elko CN	Agate	Multicolored	Proximal	Impact	1300 B.C. – A.D. 700
Elko CN	Chalcedony	Orange	Complete	None	1300 B.C. – A.D. 700
Elko CN	Obsidian	Black	Proximal	Internal Flaw	1300 B.C. – A.D. 700
Elko CN	Obsidian	Black	Complete	None	1300 B.C. – A.D. 700
Elko CN	Silicified Volcanic	White	Proximal	Thermal	1300 B.C. – A.D. 700
Elko CN	Silicified Volcanic	White/Orange	Proximal	Snap	1300 B.C. – A.D. 700
Elko CN	Silicified Volcanic	Orange	Proximal	Snap	1300 B.C. – A.D. 700
Elko CN	Tachylite	Black	Proximal	Hinge	1300 B.C. – A.D. 700
Elko Series	Obsidian	Black	Complete	None	1300 B.C. – A.D. 700
Elko Series	Obsidian	Black	Proximal	Internal Flaw	1300 B.C. – A.D. 700
Elko Series	Silicified Volcanic	White	Distal	Impact	1300 B.C. – A.D. 700
Elko SN	Obsidian	Black	Complete	None	1300 B.C. – A.D. 700
Eastgate	Silicified Volcanic	White	Lateral	Thermal	A.D. 700 – 1300
Eastgate	Silicified Volcanic	Brown	Proximal	Snap/Internal Flaw	A.D. 700 – 1300
Rose Spring CN	Agate	Translucent/Orange	Complete	None	A.D. 700 – 1300
Rose Spring CN	Chert	Red/Brown	Proximal	Snap/Thermal	A.D. 700 – 1300
Rose Spring CN	Obsidian	Black	Complete	None	A.D. 700 – 1300
Rose Spring CN	Obsidian	Black	Complete	None	A.D. 700 – 1300
Rose Spring CN	Obsidian	Black	Proximal	Snap	A.D. 700 – 1300
Rose Spring CN	Obsidian	Black	Proximal	Snap	A.D. 700 – 1300
Rose Spring CN	Silicified Volcanic	White	Proximal	Snap	A.D. 700 – 1300

Continued

Table 20. Continued.

Type	Material	Color	Segment	Fracture	Associated Dates
Rose Spring CN	Silicified Volcanic	Buff	Proximal	Snap	A.D. 700 – 1300
Large SN	Obsidian	Black	Complete	None	Pre–A.D. 1300
Large SN	Obsidian	Black	Complete	None	Pre–A.D. 1300
Large SN	Tachylite	Black	Complete	None	Pre–A.D. 1300
Indeterminate	Chert	Translucent/Brown	Distal	Thermal	–
Indeterminate	Obsidian	Black	Medial	Snap/Internal Flaw	–
Indeterminate	Obsidian	Black	Distal	Snap	–
Indeterminate	Obsidian	Black	Distal	Hinge	–
Indeterminate	Silicified Volcanic	White	Distal	Snap	–
Indeterminate	Silicified Volcanic	White	Distal	Thermal	–
Indeterminate	Silicified Volcanic	Buff	Distal	Snap/Thermal	–
Total					41

CN = Corner–notched, SN = Side–notched

Table 21. Utilized flakes recovered at toostone source area, site 26NY1408

Material	Color	Type	Segment	Blank Type	Platform	Ateration
Chert	Red	Simple Modified	Complete	Shatter	Indeterminate	Heat Treated
Silicified Volcanic	White	Complex	Complete	Core Reduction Flake	Single–faceted	None
Silicified Volcanic	White	Simple Modified	Complete	Decortication Flake	Single–faceted	None
Silicified Volcanic	White	Simple Modified	Complete	Decortication Flake	Single–faceted	None
Silicified Volcanic	White	Simple Modified	Complete	Decortication Flake	Cortex–Faceted	None
Silicified Volcanic	White	Simple Modified	Complete	Core Reduction Flake	Single–faceted	None
Silicified Volcanic	White	Simple Modified	Distal	Core Reduction Flake	Indeterminate	None
Silicified Volcanic	White	Simple Modified	Complete	Core Reduction Flake	Single–faceted	None
Silicified Volcanic	Translucent	Simple Modified	Complete	Decortication Flake	Single–faceted	None
Silicified Volcanic	White	Simple Modified	Proximal	Core Reduction Flake	Cortex–Faceted	None
Silicified Volcanic	Orange	Simple Modified	Complete	Shatter	Indeterminate	Heat Treated
Silicified Volcanic	Buff	Simple Modified	Distal	Core Reduction Flake	Indeterminate	None
Silicified Volcanic	White	Simple Modified	Complete	Decortication Flake	Single–faceted	None
Silicified Volcanic	White	Simple Modified	Complete	Shatter	Indeterminate	None
Silicified Volcanic	Buff	Simple Modified	Distal	Decortication Flake	Indeterminate	None
Silicified Volcanic	White	Simple Modified	Complete	Shatter	Indeterminate	None
Silicified Volcanic	White	Simple Modified	Complete	Core Reduction Flake	Single–faceted	None
Silicified Volcanic	White	Simple Modified	Medial	Core Reduction Flake	Indeterminate	None
Silicified Volcanic	White	Simple Utilized	Complete	Shatter	Indeterminate	Heat Treated
Silicified Volcanic	White	Simple Utilized	Complete	Shatter	Indeterminate	None
Welded Tuff	Brown	Simple Modified	Complete	Shatter	Indeterminate	Heat Treated
Total						21

A total of 81,045 debitage flakes and pieces of lithic shatter were recovered during the surface collection. The amount of time necessary to do complete analysis of this material in the laboratory was prohibitive; therefore, a sample of the total debitage collection (less shatter) was removed for high–level analysis with low–level analysis performed on the remainder of the debitage. For high–level debitage analysis, 16 of the 60

4-x-4-m units were selected to represent a cross- section, based on topography, of the toolstone source area. High-level analysis included categories of size-grade, material type, material color, flake type, flake segment, platform type, amount of cortex, and alterations. Low-level analysis included categories of size-grade, material type, and material color. For the shatter, only size-grade and material type were recorded.

The high-level analysis (Appendix B, Table 2) of 459 debitage flakes detected decortication flakes (17 percent; n=78), core reduction flakes (42 percent; n=194), biface thinning flakes (20 percent; n=93), and pressure or platform preparation flakes (21 percent; n=94). Platform types included collapsed (52 percent; n=237), single-faceted (28 percent; n=130), double-faceted (2 percent; n=9), multifaceted (3 percent; n=14), cortex (2 percent; n=10), cortex-faceted (2 percent; n=7), and indeterminate (11 percent; n=52). All of the material analyzed was silicified volcanic.

The low-level analysis (Appendix B, Table 3) was conducted on 892 flakes of which 34 percent (n=303) are obsidian, 40 percent (n=359) are silicified volcanic, 24 percent (n=214 are welded tuff, and the remaining 2 percent are chert (n=7), basalt (n=4), granite (n=1), limestone (n=3), and tachylite (n=1). Low-level analysis of the shatter detected 79,694 pieces of silicified volcanic. Size-grading of the shatter showed that 4 percent (n=3,130) are size-grade 4, 8 percent (n=6,251) are size-grade 5, 20 percent (n=15,919) are size-grade 6, 49 percent (n=39,068) are size-grade 7, 18 percent (n=14,459) are size-grade 8, and the remaining 1 percent are size-grade 1 (n=11), size-grade 2 (n=130), size-grade 3 (n=718), and size-grade 9 (n=8).

Groundstone. Seven groundstone fragments, three from the same metate and two from a groundstone of an indeterminate type, were found at the toolstone source area. The three fragments are a fine-grained buff colored welded tuff and form part of a uniface metate slab that is plano-concave in cross-section. The remaining two fragments are one fine-grained brown tuff uniface fragment that is plano-plano in cross-section and one fine-grained pink tuff uniface fragment that is plano-convex in cross-section. Minimal grinding was found on the surface of the metate fragments. Metates are indicative of the processing of subsistence resources for the inhabitants of the area. The minimal grinding of the metate fragments may indicate a limited duration of stay in the area.

Bone. Bone found at the toolstone source area at site 26NY1408 includes 2 black-tailed jackrabbit bones, 10 artiodactyl bones, and 7 bones from unidentified species. Of these bones, 15 were long bones (e.g., femur, tibia), 2 were foot bones, and 1 was a mandible fragment. All of the recovered bones from this site appear to be from recent coyote or hawk kills.

Discussion

From the analysis of the material described above, the toolstone source area at 26NY1408 was utilized for three different activities. Extraction of lithic toolstone from the exposure of silicified volcanic appears to have been the major activity. Debitage assemblages associated with toolstone source areas are characterized by high frequencies of cores, decortication flakes, core reduction flakes, and shatter. The debitage recovered at site 26NY1408 supports this assertion. Although the acquisition of the silicified volcanic was an important activity at this site, the manufacture of projectile points and bifaces was also of significance. Manufacturing breakage was represented by 81 percent of the projectile points and 74 percent of the bifaces found at the site. Finally, groundstone found at three areas within the site indicate a longer habitation of the area, possibly temporary camps. Dates associated with the projectile points indicates that the site was occupied between 10,000 B.C. to A.D. 1250, and pottery reflects occupation possibly into the historic period.

Seventeen obsidian samples from site 26NY1408 were sent to John Ericson for sourcing and hydration analysis. One piece was sourced to the Garfield Hills area approximately 140 km (87 mi) northwest of SU19–25, and ten pieces were sourced to Mt. Hicks approximately 160 km (100 mi) northwest of SU19–25. The remaining six samples could not be identified as originating from a known source; however, these sample could be grouped into two indeterminate groups, designated sources A and B.

Fifteen additional obsidian samples from site 26NY1408 were sent to Richard Hughes for sourcing. Seven pieces were sourced to Split Ridge which is approximately 1.5 mi southeast of SU19–25. Four pieces were sourced to Obsidian Butte which is approximately 2.5 miles west of Su19–25. The remaining four pieces represent the same chemical type but no source has been identified at this time.

A flotation sample was obtained from grid unit 440N/590E which was in association with groundstone fragments. It is being processed at this time. It was taken to assess the type and amount of pollen and microbotanical remains at the site. However, it is not expected that this single sample can characterize the entire site for all periods of occupation.

Site 26NY7847

Site 26NY7847 is situated on the top of a north–trending ridge that slopes gently to the east and terminates abruptly west and is approximately 80 x 30 m (260 x 100 ft)(Figure 11). This area is dominated by stands of juniper; however, individual pinyon trees occur within the juniper (Figure 15). Site 26NY7847 consists of four features that were excavated: two rock and brush structures and two rock caches. A total of 83 1 x 1 m units (893 ft^2) were excavated (Figure 16). Depth of the excavations

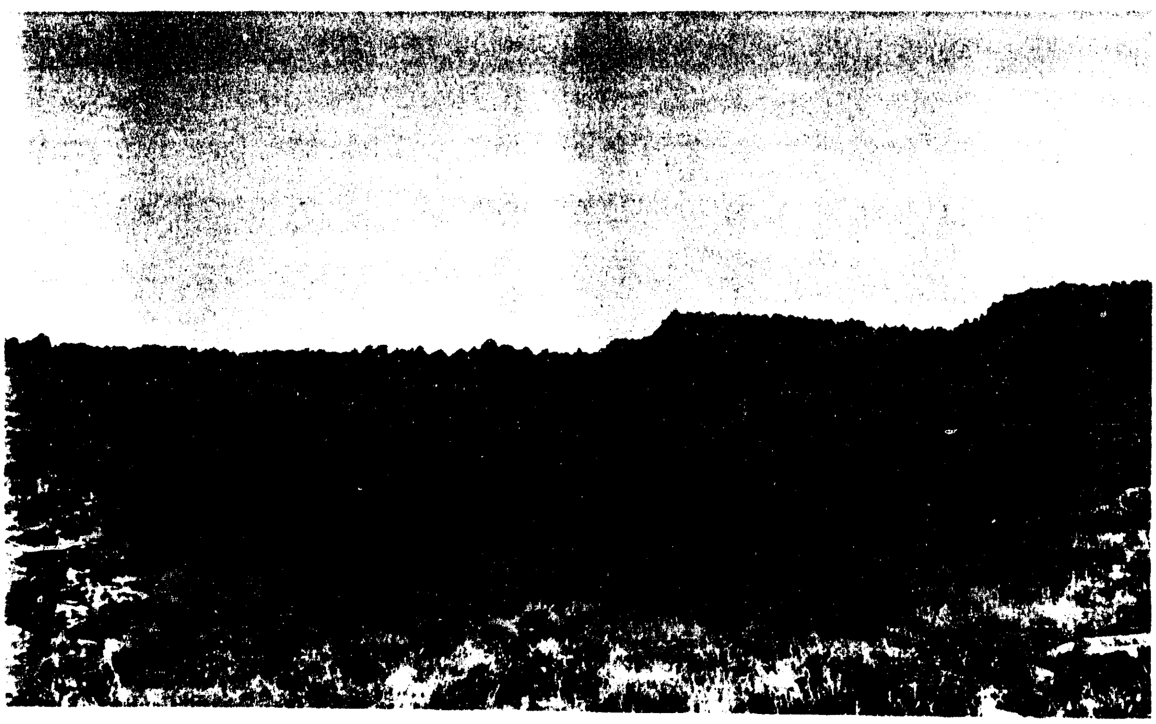

Figure 15. Area view of site 26NY7847.

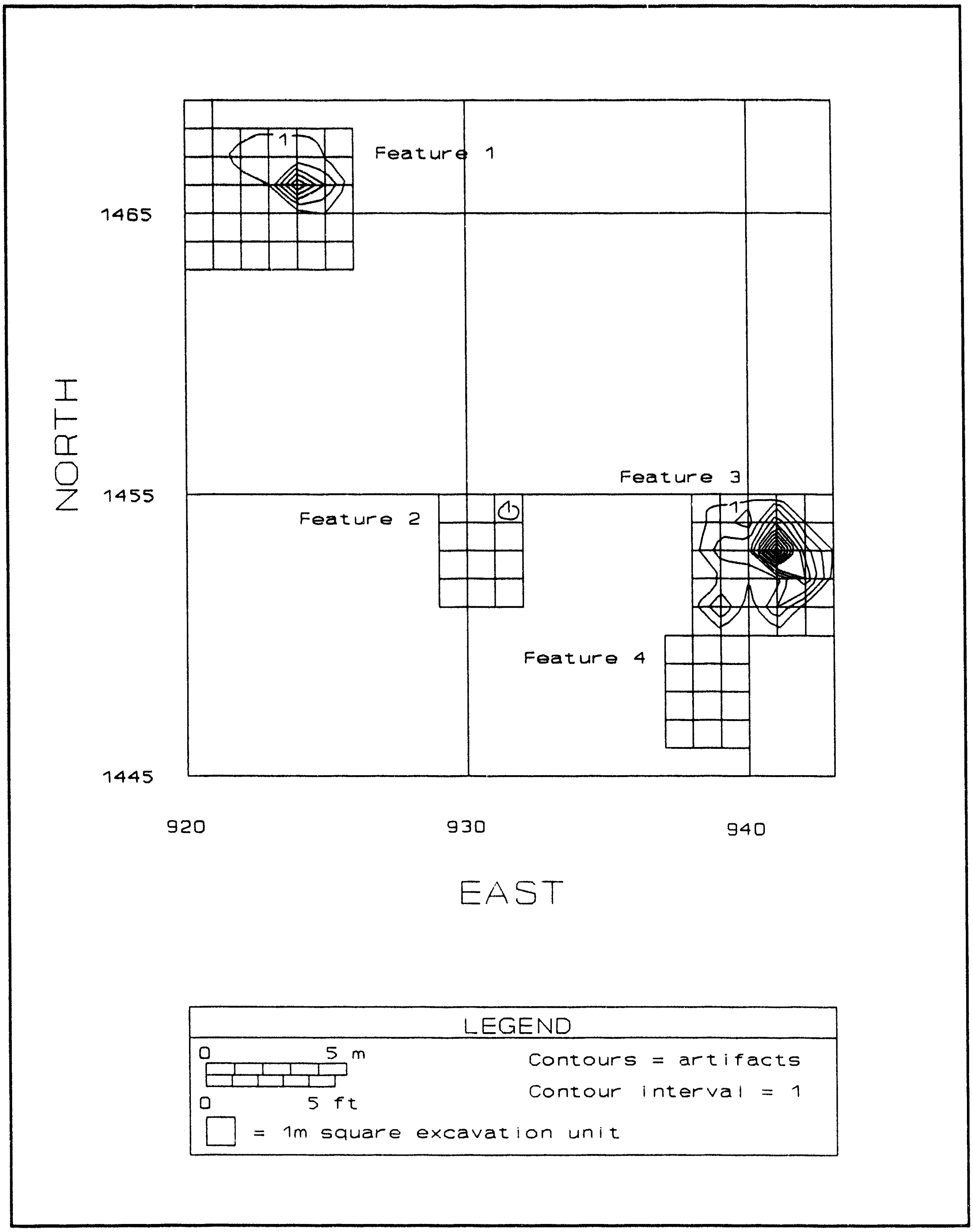

Figure 16. Artifact densities in excavated units at site 26NY7847.

varied due to bedrock that was encountered at the surface and at a maximum depth of 10 cm.

A total of 106 artifacts (Table 22) were recovered during the excavation of features 1, 2, 3, and 4, producing an artifact density of 1 per 0.8 m^2 (8.6 ft^2) of which 80 percent is debitage. Attributes of debitage and non–debitage artifacts are given in Tables 23 and 24, respectively. Excavations at feature 4, a suspected rock cache, yielded no artifacts. However, one biface knife was found as an isolate on the surface approximately 33 m (108 ft) south and 26 m (85 ft) east of feature 4.

Table 22. Artifacts recovered at site 26NY7847.

		Subsurface				
	Surface	Feature 1	Feature 2	Feature 3	Feature 4	Total
Core	0	1	0	0	0	1
Uniface	0	0	2	0	0	2
Biface	0	0	3	0	0	3
Biface Knife	1	0	0	0	0	1
Projectile Point	0	1	1	0	0	2
Utilized Flake	0	0	1	0	0	1
Debitage	0	21	63	1	0	85
Hammerstone	0	0	1	0	0	1
Ornament	0	0	1	0	0	1
Fire Affected Rock	0	5	0	0	0	5
Bone	0	1	3	0	0	4
Total	1	29	75	1	0	106

Table 23. Attributes of debitage recovered at site 26NY7847.

Material	Type	Platform	Cortex	Alteration	Total
Chert	Core Reduction Flake	Collapsed	>25 – 75%	Heat Treated	1
Chert	Pressure Flake	Multifaceted	None	None	1
Obsidian	Pressure Flake	Single–faceted	None	None	1
Obsidian	Pressure Flake	Double–faceted	None	None	1
Obsidian	Pressure Flake	Multifaceted	None	None	7
Obsidian	Pressure Flake	Indeterminate	None	None	1
Obsidian	Pressure Flake	Collapsed	None	None	2
Silicified Volcanic	Core Reduction Flake	Cortex	>0 – 25%	None	2
Silicified Volcanic	Core Reduction Flake	Double–faceted	None	None	2
Silicified Volcanic	Core Reduction Flake	Single–faceted	None	None	3
Silicified Volcanic	Biface Thinning Flake	Single–faceted	None	None	2
Silicified Volcanic	Biface Thinning Flake	Double–faceted	None	None	1
Silicified Volcanic	Biface Thinning Flake	Multifaceted	None	None	2
Silicified Volcanic	Pressure Flake	Cortex	>0 – 25%	None	1
Silicified Volcanic	Pressure Flake	Cortex–Facet	>0 – 25%	None	2
Silicified Volcanic	Pressure Flake	Single–faceted	None	Heat Treated	2
Silicified Volcanic	Pressure Flake	Single–faceted	None	None	6

Continued

Table 23. Continued.

Material	Type	Platform	Cortex	Alteration	Total
Silicified Volcanic	Pressure Flake	Single-faceted	>0 – 25%	None	1
Silicified Volcanic	Pressure Flake	Double-faceted	None	None	3
Silicified Volcanic	Pressure Flake	Multifaceted	None	Heat Treated	1
Silicified Volcanic	Pressure Flake	Multifaceted	None	None	12
Silicified Volcanic	Pressure Flake	Collapsed	None	None	7
Silicified Volcanic	Pressure Flake	Indeterminate	None	None	6
Silicified Volcanic	Indeterminate Flake	Indeterminate	None	None	6
Silicified Volcanic	Indeterminate Flake	Indeterminate	None	Heat Treated	1
Silicified Volcanic	Block Shatter	–	–	–	7
Silicified Volcanic	Thermal Shatter	–	–	–	1
Welded Tuff	Core Reduction Flake	Multifaceted	None	Heat Treated	1
Welded Tuff	Core Reduction Flake	Indeterminate	None	Heat Treated	1
Welded Tuff	Core Reduction Flake	Indeterminate	>0 – 25%	Heat Treated	1
Total					85

Table 24. Attributes of non-debitage artifacts recovered at site 26NY7847.

Artifact	Material	Type	Platform/ Termination	Segment	Cortex	Alteration	Total
Core	Silicified Volcanic	Assayed	Unidirectional	Complete	>0 to 25%	None	1
Uniface	Jasper	Scraper	Snap/Thermal	Lateral	None	Heat Treated	1
Uniface	Jasper	Scraper	Snap/Thermal	Distal	None	Heat Treated	1
Biface	Obsidian	IV	–	Lateral	None	None	1
Biface	Silicified Volcanic	II	–	Indeterminate	None	Heat Treated	1
Biface	Obsidian	III	–	Medial	None	None	1
Biface Knife	Silicified Volcanic	–	–	Complete	None	Heat Treated	1
Projectile Point	Obsidian	–	–	Distal	None	None	1
Projectile Point	Obsidian	–	–	Lateral	None	None	1
Utilized Flake	Obsidian	Simple	–	Lateral	>75%	None	1
Hammerstone	Silicified Volcanic	–	Battered	Fragment	>0 to 25%	None	1
Ornament	Slate	Ground	–	Fragment	None	Incised	1
Fire Affected Rock	Welded Tuff	–	–	Fragment	–	Heat Treated	5
Bone	–	–	–	Fragment	–	–	4
Total							21

Feature 1

Feature 1 is the northernmost rock and brush structure at site 26NY7847 (Figures 17 and 18) and measures approximately 4.5 x 3.75 m (15 x 12 ft). Bedrock was within 5 cm of the surface on the north and west side of this triangular structure. Deposition on the south and west side of the structure consisted mainly of duff from the two living trees that anchor the structure, with 10 cm or less of deposition on the east side of the structure. Large welded tuff boulders, up to 50 cm in diameter, were stacked against the dead tree branches between the living trees on the west side of the structure. The ends of most of the branches were fragmentary, as if they were broken from the parent tree, with none of the branches exhibiting axe cuts. The west side of the structure was supported by two living trees

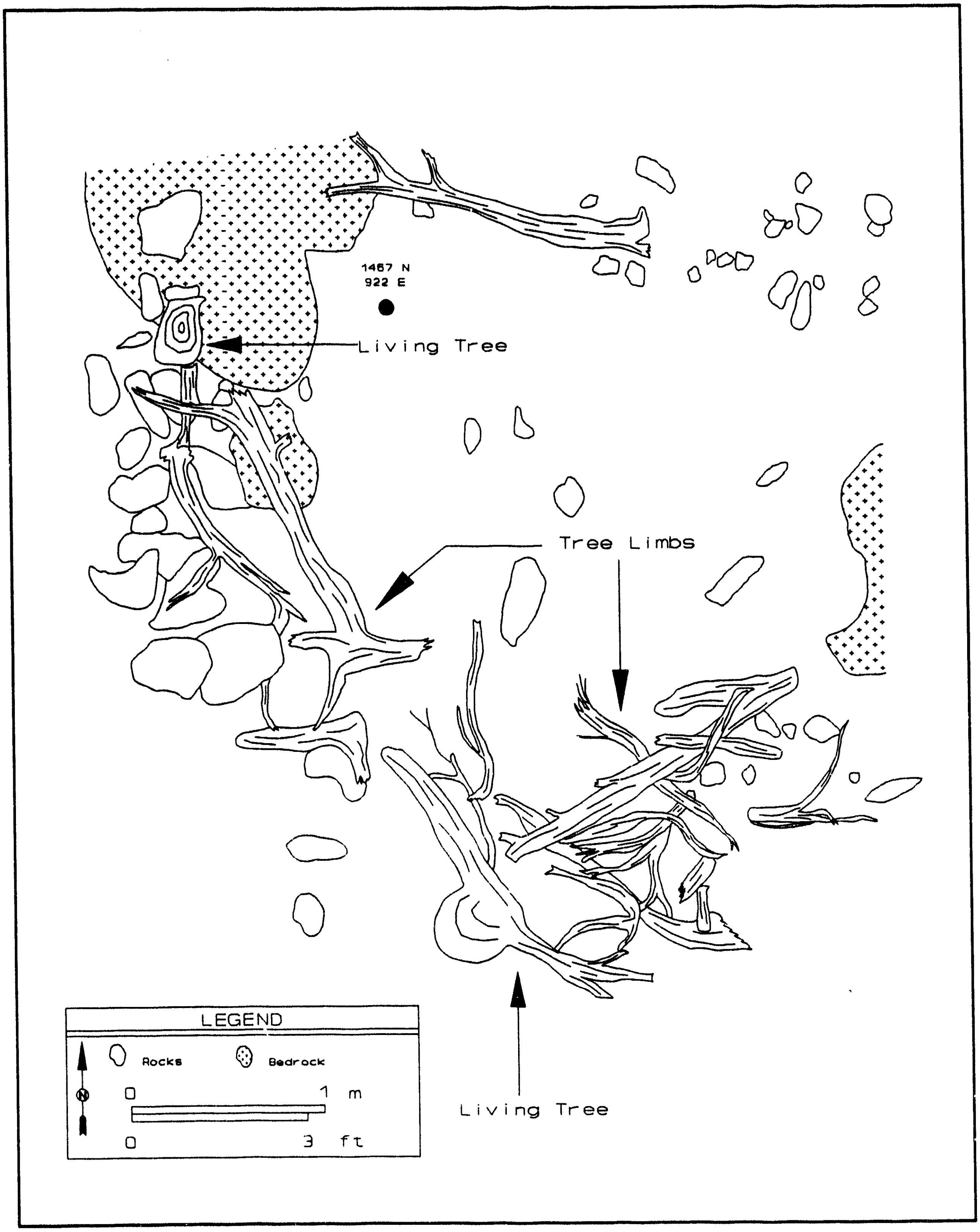

Figure 17. Feature 1, rock and brush structure at site 26NY7847.

Figure 18. Feature 1, rock and brush structure at site 26NY7847.

while the south side was s by one living tree and a forked branch. the wood used in construction of the structures and the supporting trees is juniper. Excavation of 31 1–x–1–m (333 ft^2) units produced 32 artifacts. This provides an artifact density of 1 per 1 m^2 (10.8 ft^2). No artifacts were recovered on the surface at feature 1. The following information was derived from the analysis of artifacts recovered at this feature.

Core. One white silicified volcanic assayed core was recovered at feature 1. It measures 129 x 93 x 76 mm (5 x 3.6 x 2.9 in) and cortex covers up to 25 percent of the surface. The core weighed 827 g and was constructed from a cobble.

Projectile point. One black obsidian projectile point fragment was recovered. It is a distal section of an unidentified projectile point that measures 13 x 9 x 3 mm (0.5 x 0.4 x 0.1 in) and has a snap fracture.

Debitage. The debitage at feature 1 includes a core reduction flake (n=1), pressure flakes (n=14), indeterminate flakes (n=2), and shatter (n=4), all of white silicified volcanic. Only two of the debitage flakes have surface cortex. Of the 15 flakes with platforms, 4 are single–faceted, 3 are double–faceted, 3 are multiple faceted, 2 are collapsed, 1 is indeterminate, and 2 contain cortex. Size–grading of the debitage produced 1 size 6, 6 size 7, and 14 size 8 lithic artifacts. This debitage indicates late stage reduction activities related to the production or maintenance of biface tools.

Fire–affected rock. Five pieces of brown welded tuff fire–affected rock fragments were also found at this feature. Three of the pieces were size–grade 4 and two were size–grade 5.

Bone. One small bone fragment, possibly rabbit, was found at feature 1. Due to the condition of the bone, no sun bleaching and tendons still attached, it was determined that this occurrence was possibly due to a recent coyote or hawk kill.

Feature 2

Feature 2 is situated on the east edge of site 26NY7847 (Figures 19 and 20) and measures approximately 3.5 x 5 m (11 x 16 ft). This feature, while similar to feature 1, is unlike it in several respects. First, feature 2 is "V" shaped, not triangular and second, deposition is consistent across the feature with approximately 10 cm of sediment and duff covering the bedrock under the structure. Additionally, this structure is anchored by only one living tree. Both the west and south sides of the structure appear to have been supported by forked branches. The forked branches are noted in Figure 19 lying at the end of the west and south sides of the structure. Also, the tree limbs are more deteriorated, smaller in diameter, and not as well stacked as the ones at the previous feature. No method of acquisition (i.e., cut marks or burning) could be noted because of the deteriorated condition of the branches and only one stump was located near the structures. This stump was highly fragmented as if it were simply broken, however no determination could be made if it was associated with the construction of the structures. Finally, the welded tuff boulders are not as numerous, as large, or stacked as the ones at feature 1. A total of 25 1–x–1–m (269 ft^2) units produced 78 artifacts from feature 2 during excavation. This provides an artifact density of 3.2 per m^2 (10.8 ft^2). No artifacts were recovered on the surface. The following information on these materials was derived from the analysis.

Uniface. Two red/brown jasper uniface scraper fragments were recovered at feature 2. The first is a lateral fragment that measures 16 x 24 x 8 mm (0.6 x 0.9 x 0.3 in) and has a combination snap and thermal fracture. The second fragment measures 12 x 23 x 8 mm (0.5 x 0.9 x 0.3 in) and has a snap fracture. During analysis it was noted that both were fragments of the same tool and could be refitted. Both fragments appear to have been heat–treated which, due to improper heating techniques, probably caused the thermal fracture.

Biface. Three bifaces were recovered at this feature. One is a black obsidian stage IV lateral biface fragment that measures 28 x 14 x 4 mm (1.1 x 0.6 x 0.2 in) and weighs 1.93 g. The biface has a snap fracture caused by an internal flaw. Evidence of reworking was also noted on this biface. The second is a black obsidian stage III biface medial segment that measures 57 x 42 x 13 mm (2.2 x 1.7 x 0.5 in) and weighs 3.17 g with a snap fracture. The third biface is a buff colored silicified volcanic stage II fragment with a snap fracture that measures 8 x 11 x 4 mm (0.3 x 0.5 x 0.2 in) and weighs 0.31 g. Glazing on the surface of the biface indicates that it was heat treated.

Projectile point. One black obsidian projectile point fragment was recovered at feature 2. It is a lateral section of an unidentified type that measures 29 x 22 x 7 mm (1.1 x 0.9 x 0.3 in) and has an impact fracture. Impact fractures are indicative of use breakage.

Utilized flake. One utilized black obsidian lateral flake fragment was found at this feature.

Debitage. The debitage includes 10 core reduction flakes, 4 biface thinning flakes, 40 pressure flakes, 5 indeterminate flakes, and 4 pieces of shatter. Only two of the debitage flakes have surface cortex. Forty–six of the 63

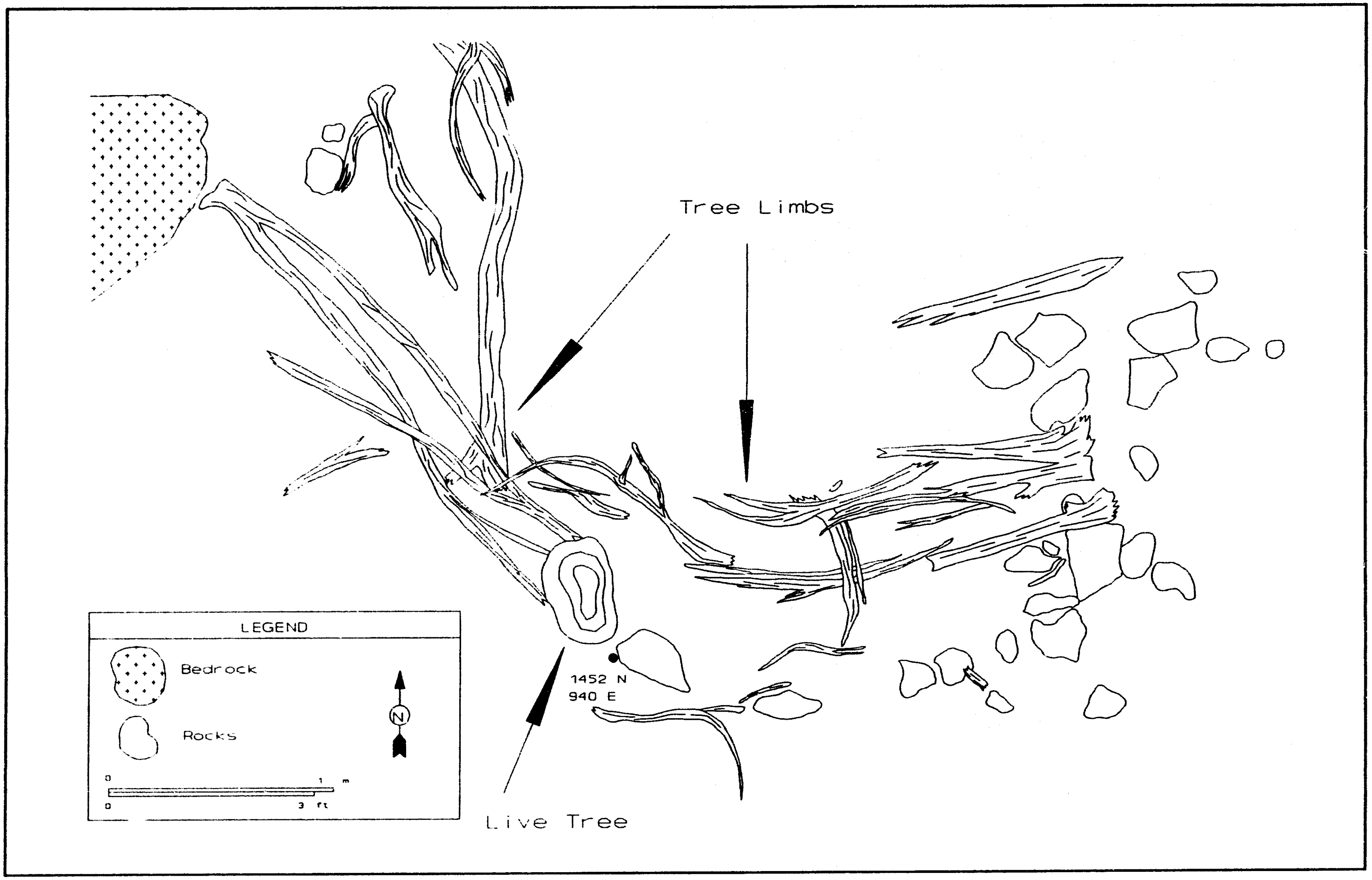

Figure 19. Feature 2, rock and brush structure at site 26NY7847.

Figure 20. Feature 2, rock and brush structure at site 26NY7847.

(73 percent) pieces of debitage retained a platform remnant. Of these, 3 were covered with cortex, 8 were collapsed, 21 were multi–faceted, 4 were double–faceted, 10 were single–faceted, and 13 were indeterminate. Size–grading of the debitage produced 1 size–grade 5, 6 size–grade 6, 17 size–grade 7, and 39 size–grade 8 lithic artifacts. This debitage indicates late stage reduction activities related to the production or maintenance of biface tools.

Hammerstone. One white silicified volcanic hammerstone fragment measuring 43 x 22 x 12 mm (1.6 x 0.9 x 0.5 in) was recovered at this feature. Approximately 25 percent of the surface of this tool was covered with cortex.

Ornament. One gray fine–grained slate pendant fragment was found at feature 2. The slate was ground and then incised with small lines along its length (Figure 21).

Bone. Three bone fragments, possibly rabbit, were found at feature 2. The fragments were deposited from a recent occurrence, possibly a coyote or hawk kill. This determination was due to the condition of the bone, which was partially sun bleached with tendon and skin still attached to the bone.

Feature 3

Feature 3 is a small rock cache on the west margin of site 26NY7847 (Figures 22 and 23) that measures approximately 2.25 x 3 m (7 x10 ft). The cache consists of rhyolite tuff cobbles of varying size stacked against the roots and trunk of a juniper tree. Bedrock was within 3 cm of the surface and was exposed at the surface on the north and south sides of the cache. Excavation of 12 1–x–1–m units (129 ft^2) produced only one piece of white silicified volcanic debitage. However, approximately 100 pinyon nut shells were recovered from the

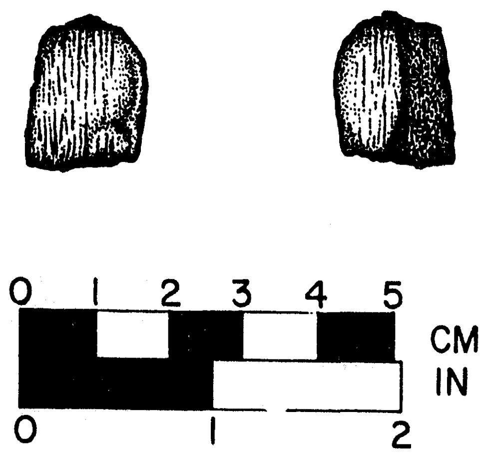

Figure 21. Slate ornament found at feature 2, site 26NY7847.

cache. All had small holes as if they had been eaten by rodents, but when compared to other caches, it appears that the nuts were stored by the inhabitants of the area and left in that cache and never recovered. Unfortunately, no samples were collected because they were thought to be deposited by rodents. This is a covered cache, not the typical rock rings used for pinyon nut caching on the mesas. Typical rock ring caches usually range from 1 to 7 m in diameter (Pippin 1986a) and are not covered..

Debitage. One white silicified volcanic biface thinning flake with a double–faceted platform remnant was found at feature 3.

Feature 4

Feature 4 (Figures 24 and 25) is located on the southeast corner of site 26NY7847 and measures approximately 2 x 2.5 m (6.5 x 8 ft). It was originally thought to be a rock cache similar to feature 3, but the excavation of 15 1–x–1–m units (161.5 ft^2) produced no artifacts or pinyon nuts. The welded tuff cobbles at this feature were not stacked as in feature 3, but scattered under the nearby juniper tree.

Biface knife

A white silicified volcanic biface knife (Figure 26) was recovered as an isolate on the surface approximately 33 m (108 ft) south and 26 m (85 ft) east of feature 4. It measures 112.35 x 35.2 x 6.13 mm (4.4 x 1.4 x 0.2 in) and appears to have been heat–treated. Microscopic examination of the knife produced evidence of hafting at the proximal end. Edge rounding along the use edges is consistent

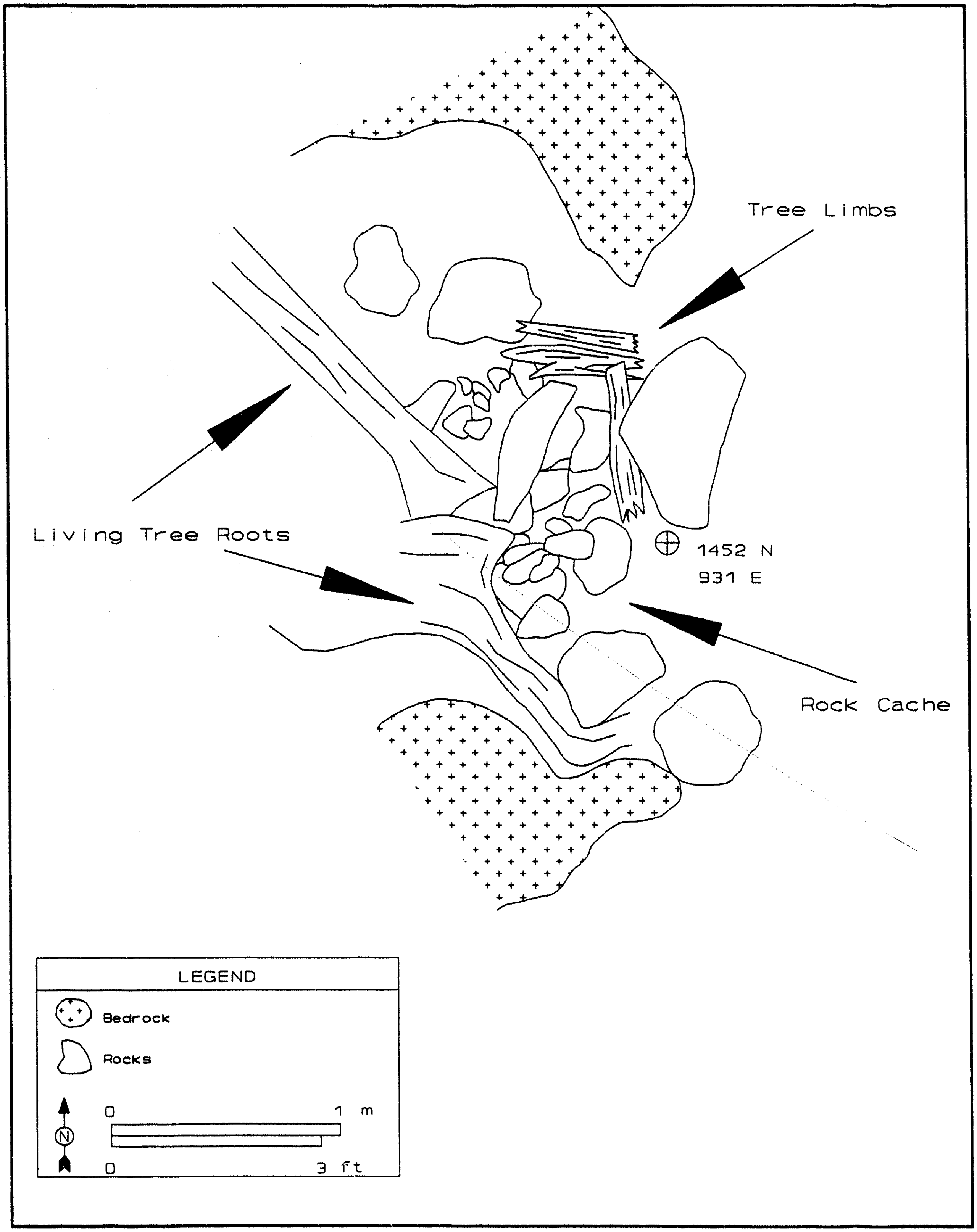

Figure 22. Feature 3, rock cache at site 26NY7847.

Figure 23. Feature 3, rock cache at site 26NY7847.

with cutting or scraping of soft materials, possibly animal hide.

Discussion

The two rock and brush structures found at site 26NY7847 are similar to windbreak structures found on Pahute Mesa in South Silent Canyon reported by Pippin (1984b, 1986a, 1992) and structures recorded by Henton (1983) and Lockett (1985). These windbreaks are seldom found as isolates but are usually found in groups of two or more. Most commonly, they consist of a single horizontal beam supported between a living tree and a forked–stick post. A pile of two to five rocks supports the post and other rocks are placed along the base of the windbreak apparently to anchor the branch or shrub covering to the surface (Pippin 1986a).

Features 1 and 2 at site 26NY7847 are almost identical in construction to the windbreak structures described in South Silent Canyon. At feature 1, two living trees were used to support the west side of the structure and one living tree and one forked branch were used to support the south side (Figure 17). At feature 2, forked branches, probably used for the end supports, are at the end of the tree limbs on both the west and south sides of the structure (Figure 19). At both features, rocks were found that would have provided support for the forked branches and anchored the branch or shrub covering to the surface.

However, significant differences exist between the windbreak structures at 26NY7847 and the previously investigated ones at South Silent Canyon on Pahute Mesa.

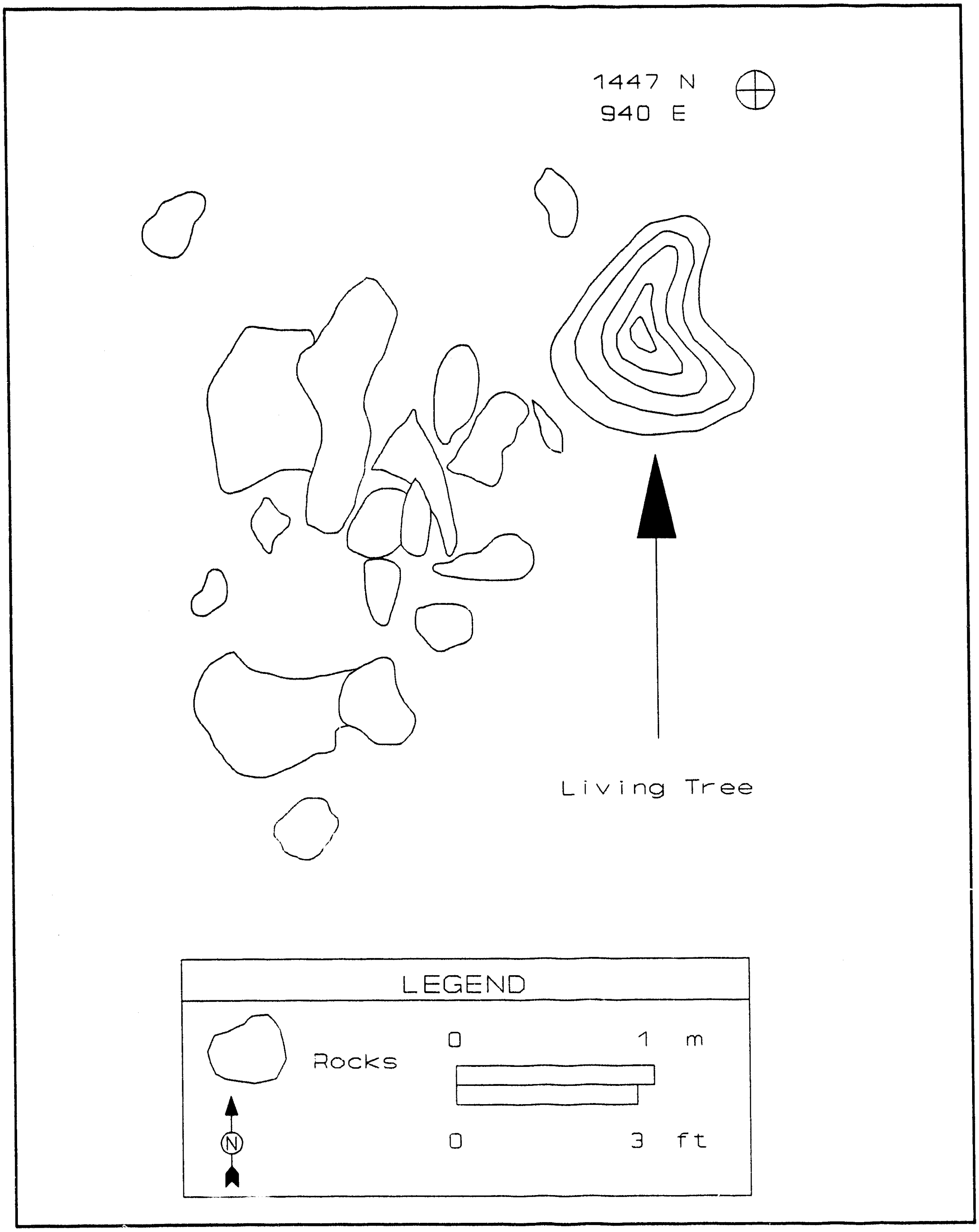

Figure 24. Feature 4, rock cache at site 26NY7847.

Figure 25. Feature 4, suspected rock cache at site 26NY7847.

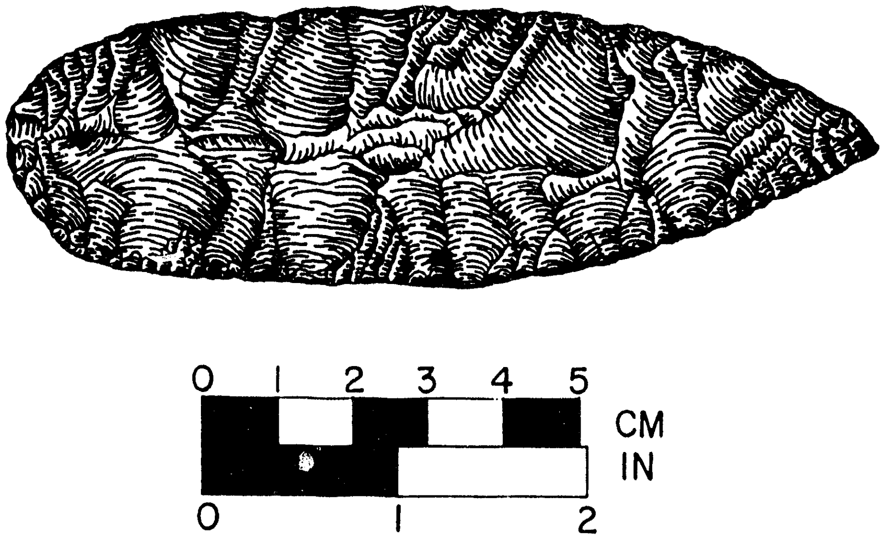

Figure 26. Biface knife recovered at site 26NY7847.

First, site 26NY7847 is further north than the previously recorded sites with windbreaks. Although more such structures may exist on the NTS, site 26NY7847 has extended the spatial distribution for windbreak structures on Pahute Mesa.

At the South Silent Canyon windbreaks, aboriginal artifacts included millingstones, manos, a brownware bowl, brownware pottery sherds, burned deer bone, and a few pieces of debitage. Only a few biface thinning flakes and core reduction flakes were recovered at these structures. The presence of the millingstones indicates that the processing of food products (possibly pinyon nuts) was an activity at these sites. At site 26NY7847, no millingstones or manos were found. Also, 80 percent of the cultural material recovered at this site was debitage related to late stage biface maintenance. This assemblage is unlike the lithic assemblage at the South Silent Canyon structures.

Dense growths of pinyon trees surrounding the South Silent Canyon structures coupled with the millingstones recovered during excavation have led Pippin (1986a) to argue that the structures were utilized for the acquisition of pinyon nuts. At site 26NY7847, only isolated pinyon trees are found within the dominant juniper stands. Although pinyon nuts were recovered in one rock cache at the site, these were probably for consumption by an individual or small group. Pinyon nut caching on Pahute Mesa is generally associated with large rock rings which range from 1 to 7m in diameter (Pippin 1986a).

Finally, Pippin (1986a) has hypothesized that the South Silent Canyon structures reflect a period immediately before or following the aboriginal contact with Euroamericans. Mobilities and population densities were considered greater at this time than during later historic periods. This hypothesis is based on the observation that the South Silent Canyon windbreaks rarely occurred in isolation and contrasted in architecture with the seemingly more permanent conical wooden lodges listed by Driver (1961) as the traditional house form in the Great Basin. Production costs for the windbreaks was also less than for the conical lodges, which implies temporary occupation of the structures. Also, historic artifacts were found at the South Silent Canyon windbreaks, including strips of cut tin which displayed crimped and soldered seams, a sharpened metal knife, and historic ceramics. At the rock and brush structures and caches at site 26NY7847, no historic material was found. The lack of historic artifacts suggests that the two windbreak structures at 26NY7847 were occupied during prehistoric times.

Indeed, at site 26NY7847, two samples of wood from both feature 1 and 2 were removed for radiocarbon dating. The pieces of wood were taken from different areas on the structure in order to obtain two distinct samples from different limbs. They were then sent to Beta Analytic, Inc., for radiocarbon analysis. The analysis proceeded after the samples were checked for foreign contaminants and after an acid and alkali wash to remove carbonates and humic acids which could compromise the results of the analysis. When these results were received at DRI, they were corrected using the University of Washington Quaternary Isotope Lab Radiocarbon Calibration Program (Stuiver and Reimer 1993).

The first sample for feature 1 produced a date of A.D. 1640. The first sample for feature 1, Beta–62387, produced a date of A.D. 1640 at two Sigma (C–14 age 530 +/– 50 B.P. and a C–13 adjusted age of 590 +/– 50 B.P.). However, only a range of dates could be assigned to the second sample at two Sigma (Beta–62386, C–14 age 140 +/– 50 B.P. and a C–14 adjusted age of 190 +/– 50 B.P.).

These dates included A.D. 1670, 1780, 1800, 1940, and 1950. There is a 57 percent probability, at 2 sigma, that the date is between A.D. 1800 and A.D. 1950. Corrected dates for feature 1 are somewhat confusing when examined alone, but two explanations can be proposed. One is the "old wood" problem (Carmichael 1981) in which the wood obtained for construction had been felled by natural processes or may have been previously used in other structures. The second is that the structure was first constructed about A.D. 1640, then at any of the later dates presented above, the structure was reused. During the subsequent occupation(s), repair of the structure was needed and newer materials were used, which produced the discrepancy in dating.

Two samples of wood recovered at feature 2 were also dated. The first sample produced a range of dates including A.D. 1330, 1340, and 1390 at two Sigma (Beta-62384, C-14 age 530 +/- 530 +/- 50 B.P. and a C-13 adjusted age of 590 +/- 50 B.P.). The second sample produced a date of A.D. 1410 at two Sigma (Beta-62385, C-14 age 490 +/- 50 B.P. and a C-13 adjusted age of 540 +/- 50 B.P.). These dates, combined with the lack of historic artifacts, indicate that the structures at 26NY7847 differ significantly from the South Silent Canyon structures in their temporal associations, i.e., occupation was during prehistoric times for at least one and probably both, though feature 1 was likely reused during historic times.

Associated with the windbreak structures are two rock caches. Feature 3 contained approximately 100 pinyon nuts that could have been cached by the inhabitants of the windbreak structures. However, small twigs and rat droppings were also found in the cache and all the nuts had been eaten by some unidentified animal and only the hulls remained. Thus, it appears that this cache was utilized by the inhabitants of the windbreaks for the temporary storage and use of pinyon nuts and then abandoned but not emptied. Feature 4 contained no cultural material; however, indications are that it was also a food cache similar to feature 3 that was emptied, abandoned, and the rocks scattered due to normal site formation processes.

The occurrence of various material types has long been assumed to indicate differing requirements for tool manufacture and usage. The assumption depends upon technological processes and resource availability that may change through time. At 26NY7847, the occurrence of the silicified volcanic biface knife, obsidian projectile points, and jasper uniface scraper supports the above assumption. Two requirements for tools are durability and sharpness. The white silicified volcanic and the yellow/brown jasper found at this site are more durable than the glassy obsidian. Tools such as the white silicified biface knife and the yellow/brown jasper uniface scraper need a sharp edge, but the durability of that edge may be of fundamental concern to the user. Low maintenance on tools that experience harsh usage is an advantage to the user. Although obsidian supports a sharper edge, it requires frequent maintenance to sustain that edge. Conversely, tools such as projectile points experience light or intermittent use and can be maintained periodically as use dictates. Projectile points require the ability to penetrate which is facilitated by a sharp point and edge, which obsidian provides. The two projectile point fragments recovered at this site were obsidian.

Most of the debitage at the site is white silicified volcanic late stage debitage. The proximity of this site to the toolstone source area at site 26NY1408 would indicate that the material is of local origin. Culturally modified material recovered at the site indicates that the area was utilized for maintenance of lithic tools. The large number of pressure flakes indicates finishing or resharpening of biface tools, while discarded projectile point fragments at the structures indicate rehafting of equipment associated with hunting activities. This evidence suggests that the maintenance and refitting of projectile points during hunting activities was a major activity at the site. Edge wear on the biface knife indicates that processing of some soft material, possibly animal skin, was taking place at the site.

Three samples of obsidian from the site were sent to John Ericson for hydration and sourcing analysis. Even though hydration analysis was performed on two of the samples, the exact meaning of the data is not yet understood. This is because no hydration rates for this area of the NTS are available to compare against. Sourcing of the obsidian by Ericson produced similar results for this site. No source–match could be obtained from his data base although all samples were from different sources. The sample from feature 1 was from Source B and the two samples found at feature 2 was from source A. These arbitrary source designations are the same as the ones used for site 26NY1408.

Two samples of obsidian from site 26NY7847 was sent to Richard Hughes for sourcing. These samples were identified as originating from Split Ridge which is approximately 1.5 mi southeast of the site and Obsidion Butte which is approximately 2.5 mi west of the site. The discrepancy in sourcing is attributed to a limited data base used by Ericson in his analysis. Samples from Obsidian Butte and Split Ridge will be added to his sourcing data to eliminate this problem for furture research.

The structures at site 26NY7847 are strategically located to provide a view of the north/south trending valley and east, sloping ridge to the east and the drainage to the west. Location of the structures would provide excellent concealment for the monitoring of game animals if the intercept strategy of hunting was utilized. Therefore, the evidence suggests that site 26NY7847 is a temporary camp site used for activities related to the hunting or monitoring of game animals.

11. REVIEW OF RESEARCH QUESTIONS

Archaeological studies were initiated at SU19–25 to retrieve information concerning the settlement and subsistence patterns followed by the aboriginal hunters and gatherers who utilized the area. The 64–hectare sample unit is located in a sparse to moderately dense pinyon–juniper woodland. One east–west ridge crosses the southern portion of the sample unit and is the source of the silicified volcanic toolstone. Artifacts recovered appear to reflect specialized activity areas that focused on the exploitation of lithic resources. Temporally diagnostic artifacts found at SU19–25 indicate periodic use from 10,000 B.C. to historic times. This information provides the basis for discussing specific questions from the research design.

What are the spatial relationships of cultural remains to each other and to available natural resources ?

The sites described in this report were originally defined from information gathered on survey and not by artifact patterning. Sites defined by this method usually reflect only high density areas. When the artifact density patterns are used to define site boundaries, there is a difference which reflects the more ambiguous cultural remains. Artifact patterning was used to define the spatial relationship of the artifacts and assemblages in the following discussion. Even though the definition of debitage presented earlier in this report includes shatter as one of its components, for the following section, shatter and debitage will be discussed as separate entities because of the variation in patterning between them.

The two rock and brush structures found at site 26NY7847 are similar to windbreak structures found on Pahute Mesa in South Silent Canyon reported by Pippin (1984b; 1986a; 1992) and structures recorded by Henton (1983) and Lockett (1985). However, a significant spatial difference exists between these structures. The structures at site 26NY7847 are approximately 5 km (3 mi) further north of the previously recorded ones on Pahute Mesa. Additionally, the structures appear to predate the South Silent Canyon structures, although one of the structures was reused during the Historic Period.

Generally, the distribution of artifacts at site 26NY1408 corresponds to the patterning of shatter. However, this patterning may be misleading. When shatter (Figure 27) is removed from the data base and the remaining debitage is used as the limiting factor, a slightly different pattern is noted (Figure 28). The discrepancies between the patterns may be explained by site formation processes taking place at the toolstone source area. The exposure of the silicified volcanic is approximately 3 m (10 ft) above the surrounding site area. Erosion may have transported the shatter farther away from the toolstone exposure because of its smaller size, thus creating its extended limits. Also, other site formation processes, such as grass fires, may have affected much of the material at the site. Artifacts deposited across the site may have been burned in situ, thus causing an increase in the amount of shatter in certain areas.

The patterning of cores corresponds with the patterning of debitage (Figure 29). Also, most of the cores recovered were found at or close to exposures of the silicified volcanic. Thus, the patterning of cores corresponds to the patterning of available toolstone exposed at site 26NY1408.

The patterning of bifaces corresponds with that of debitage (Figure 30). Bifaces were located in concentration areas where lithic reduction activities were being performed. For

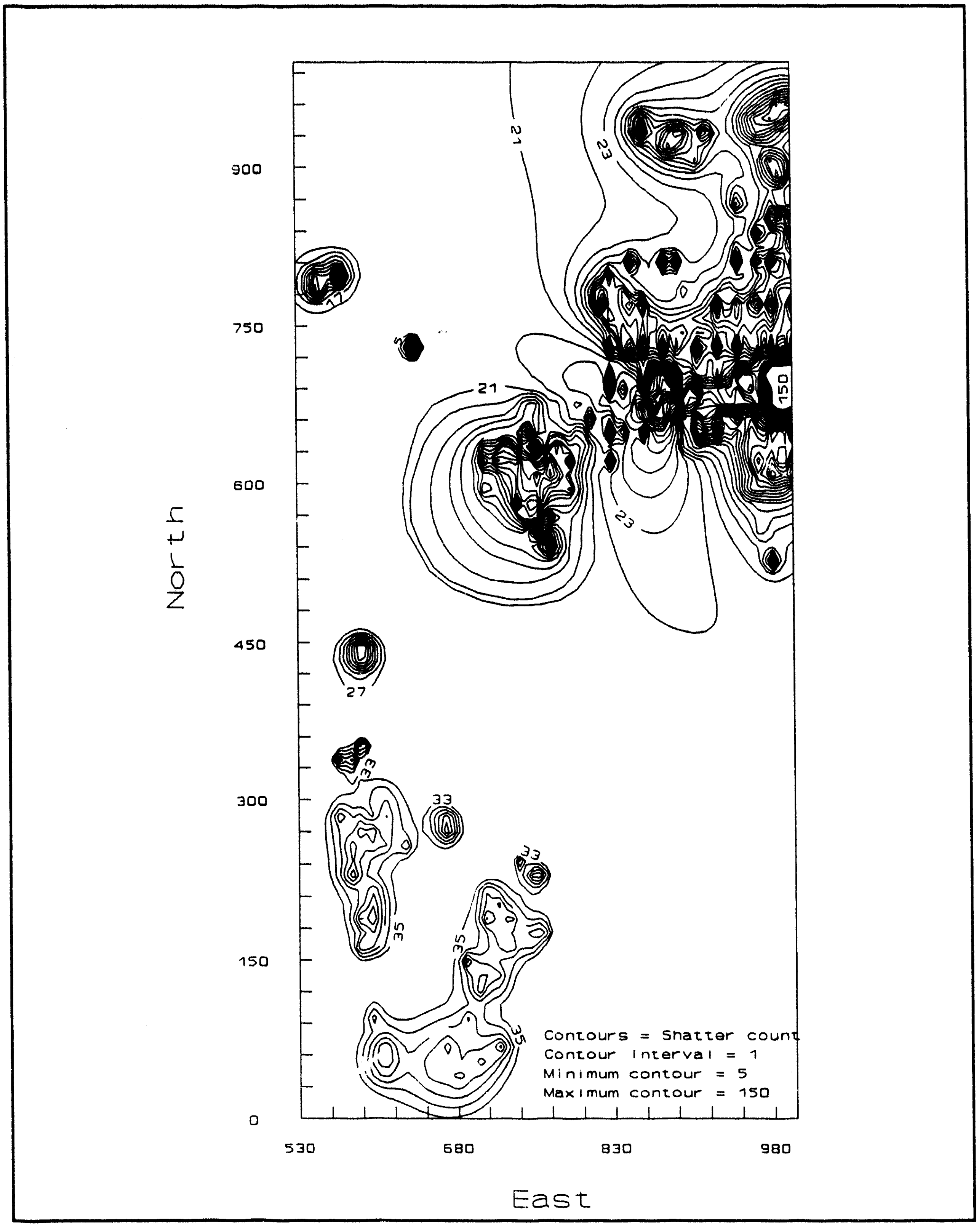

Figure 27. Distribution of debitage (including shatter) at site 26NY1408.

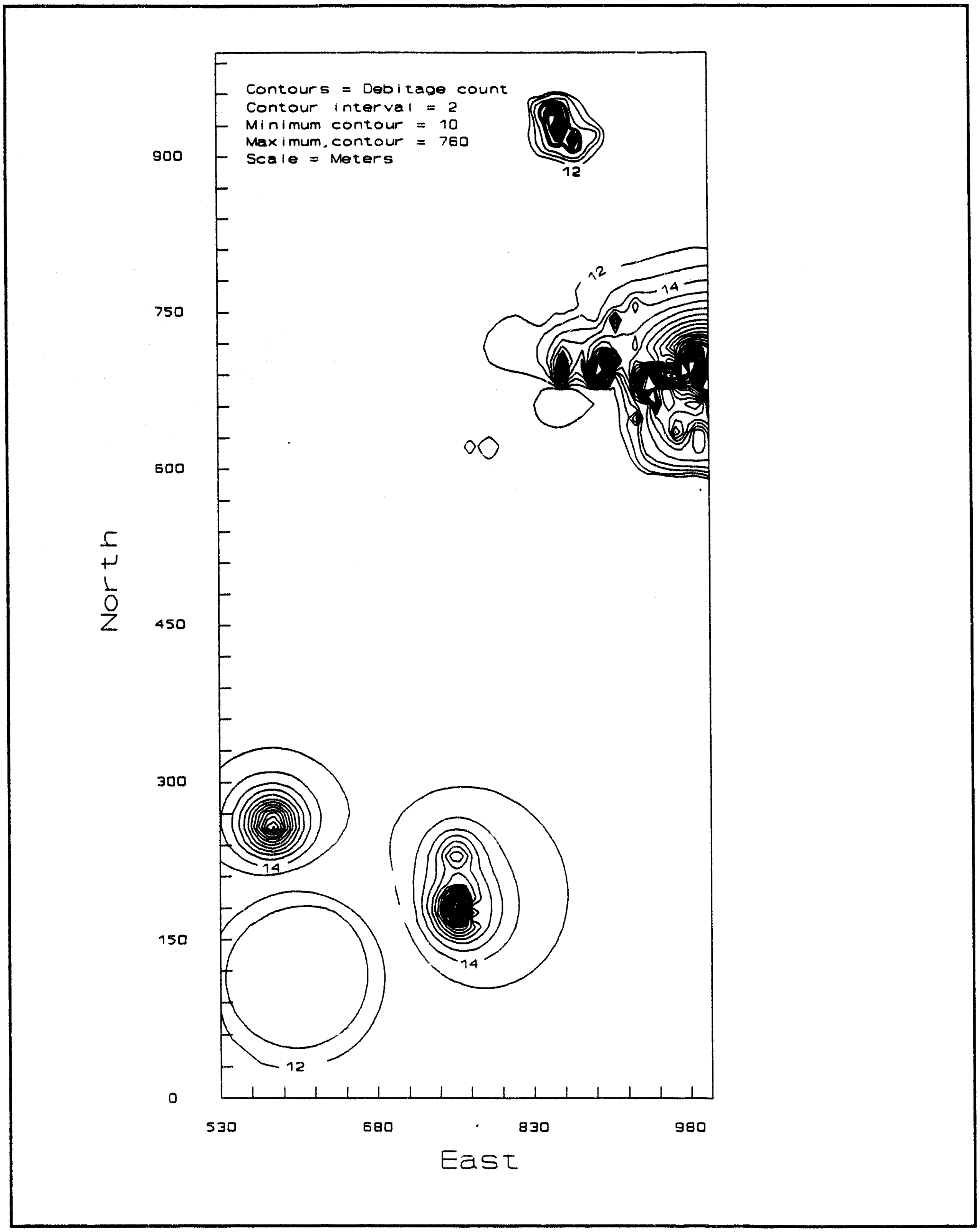

Figure 28. Distribution of debitage (less shatter) at site 26NY1408.

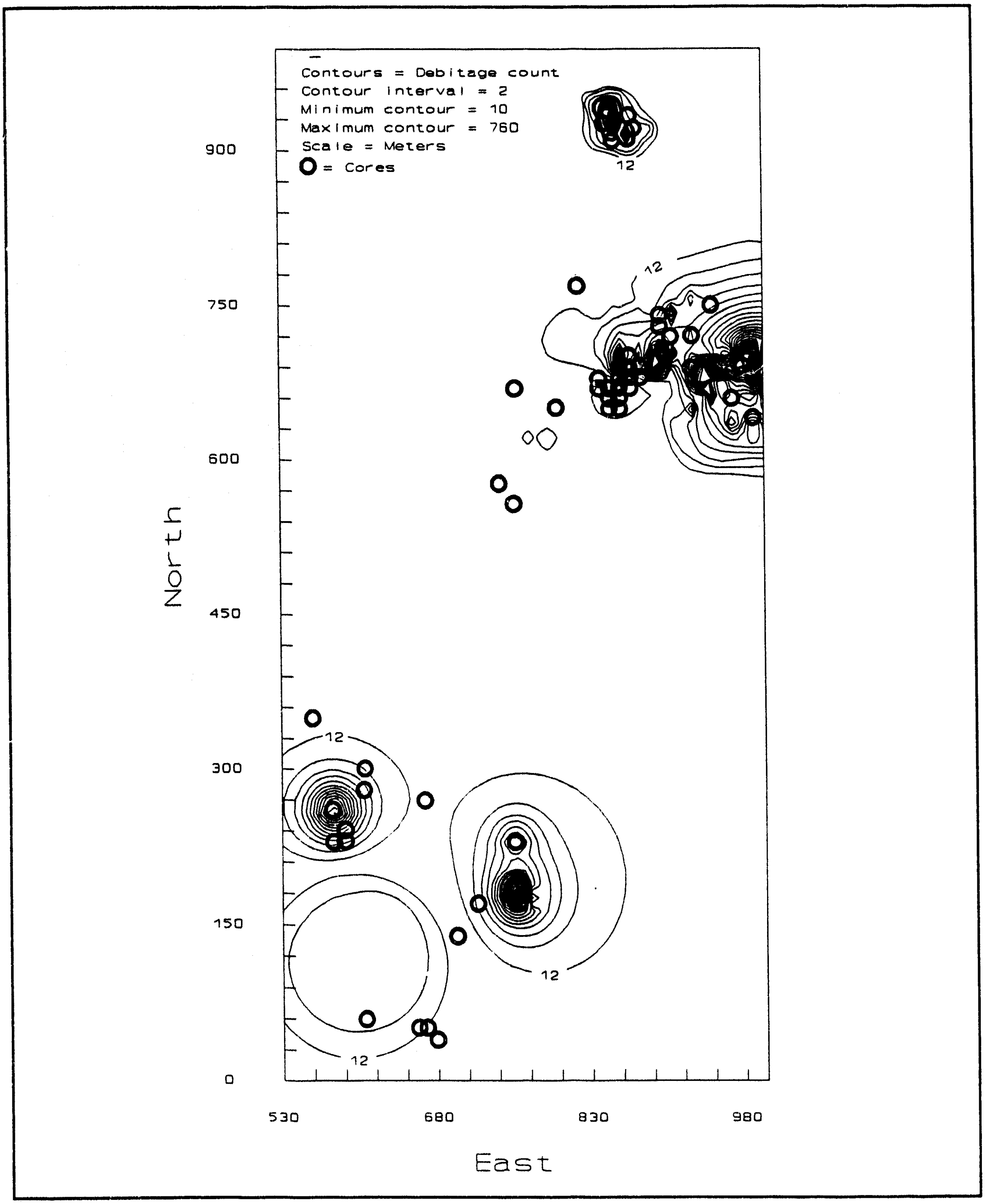

Figure 29. Distribution of cores within debitage (less shatter) at the toolstone source area, site 26NY1408.

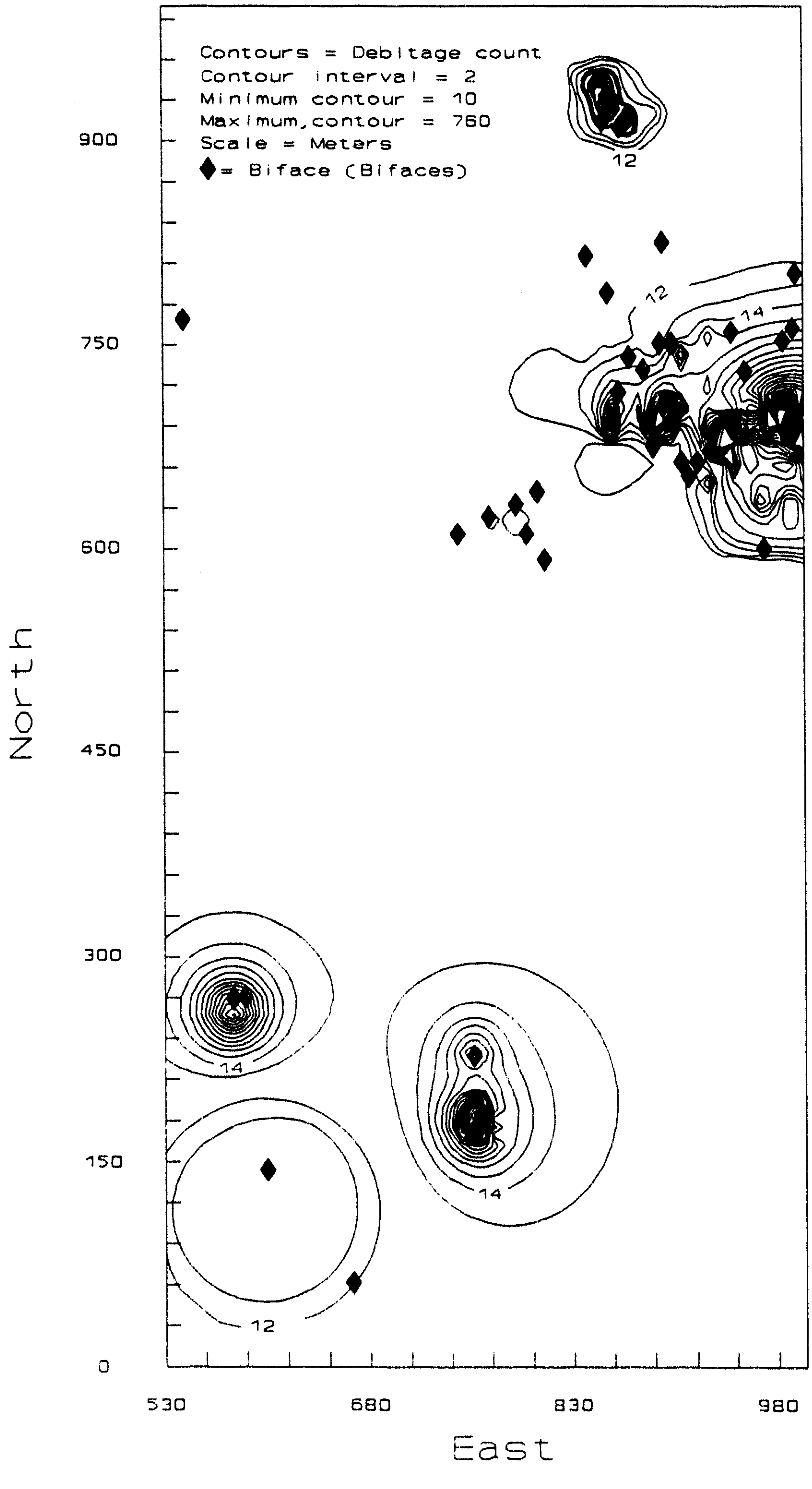

Figure 30. Distribution of bifaces within debitage (less shatter) at the toolstone source area, site 26NY1408.

example, stage I and II bifaces were most commonly associated with debitage related to early stage biface reduction and stage III and IV bifaces were associated with concentrations of late stage debitage. However, a few bifaces were found outside of their associated flake scatters. These bifaces probably reflect localities of biface use rather than manufacture. This pattern has been noted in sample units previously investigated on Pahute and Rainier mesas (Jones 1992b; Pippin, Reno, and Henton 1992).

The patterning of projectile points reflects two processes: manufacture and use (Figure 30). Many of the projectile points were broken during manufacture and most of these were found within areas of biface production. Some of the points were found outside the debitage concentrations and probably reflect areas of use. These projectile points may be related to hunting activities during different occupations of the area.

Pottery, which was only recovered in three activity areas, appears to represent temporary camps. Due to the fact that different types of pottery are associated with the sites, cultural variation is suggested and may reflect intensive short–term use of the site by different groups or a changing pattern of trade within the same group which occupied the area over an extended period of time.

Given the site's location, it was expected that brownware sherds would dominate the ceramic assemblage. This was definitely not the case. Of the seven vessels represented, only one could be classified as Intermountain Brownware. The other six vessels were of non–local origin: 4 Anasazi, 1 Fremont, and 1 unidentified grayware. Since the mesas are approximately 100 km (60 miles) from the Anasazi and Fremont areas, it is unlikely that these ceramics reflect the actual presence of these groups on Pahute Mesa. In a paper by Lyneis (1990), she summarizes Lightfoot who gives a maximum range of 50 miles for resource acquisition of the Anasazi. Pahute Mesa would be outside the expected resource procurement zone for the Anasazi. A more plausible explanation suggests the occurrence of some type of economic interaction between the Great Basin hunter–gatherers and these horticultural groups. Some kind of relationship clearly existed by at least A.D. 1050, but the nature and intensity of the interaction is not well understood. However, Fremont occupation of the area can not be dismissed. According to Kodack (1993), Fremont groups may have traveled extended distances which could place them on Pahute Mesa.

What are the sources of raw materials used in artifacts and features found at the cultural resources?

The most prevalent lithic material found at SU19–25 was the silicified volcanic, with obsidian second. At site 26NY1408, this pattern was noted not only for the debitage found at the site, but also for projectile points and drills. However, for bifaces, chert was the favored material, silicified volcanic was second, and obsidian was third. At site 26NY7847, obsidian was the favored material for both bifaces and projectile points and silicified volcanic was second.

Seventeen obsidian samples were sent to John Ericson for sourcing and hydration. One sample was sourced to the Garfield Hills area approximately 140 km (87 miles) northwest of SU19–25. Ten of the samples originated from Mt. Hicks, approximately 160 km (100 miles) northwest of SU19–25. The remaining six samples could not be identified as originating from a known source; however, these could be grouped into two indeterminate groups designated source A and B. The presence of obsidian from the two known sources may indicate either an economic

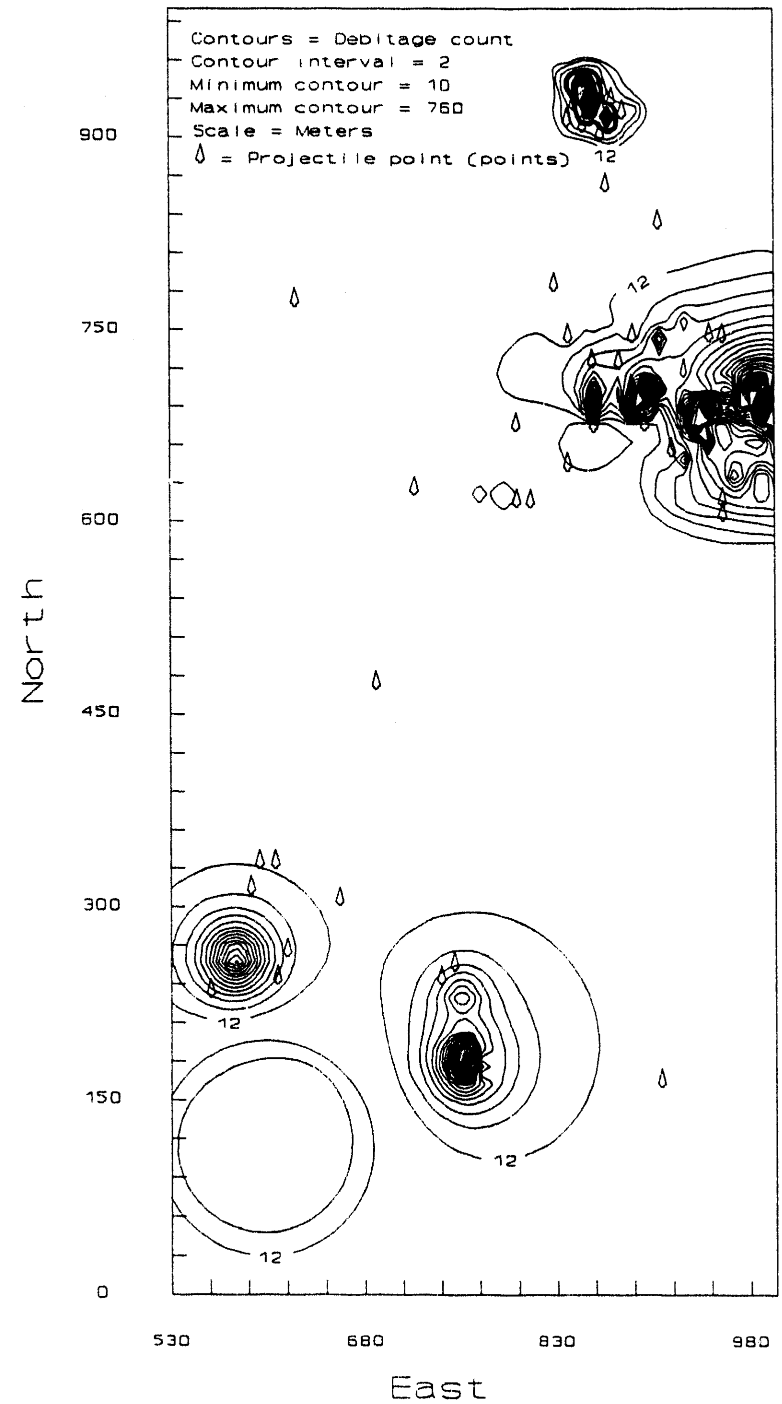

Figure 31. Distribution of projectile points within debitage (less shatter) at the toolstone source area, site 26NY1408.

interaction (trade) between the inhabitants of this area and groups who exploited other areas of Nevada or direct access by the inhabitants of the area. Fifteen samples sent to Richard Hughes produced results indicating that some of the obsidian is from local sources. Four pieces were sourced to Split Ridge which is approximately 1.5 mi southeast of SU19–25. Four pieces were sourced to Obsidian Butte which is approximately 2.5 miles west of SU19–25. The remaining four pieces represent the same chemical type of the previous sources but no parent source for this type have been identified at this time.

The discrepancy in sourcing may be a result of different databases for obsidian comparison utilized by the indiviudual researches. Indeed, Ericson indicated that his database for southern Nevada may be incomplete. To help clarify this problem, the previously sourced samples were reversed and re-submitted to the laboratories for confirmation of source and the results indicate that this was the problem. However, another explanation for the diversity of obsidian found at SU19–25 must be examined. Because of the mobility of hunter/gather groups, a variety of obsidian sources may have been visited during their resourse utilization patterns. Acquisition of obsidian from the varied sources and later disposal of the material at SU10–25 would also produce the diversity of obsidian noted in the artifact assemblage.

Groundstone at SU19–25 was predominantly welded tuff of various colors. Even though there was no source for this material located at the sample unit, it is easily recovered in many locations on Pahute Mesa in the form of cobbles and slabs. These are usually found at rocky outcrops and on colluvial slopes of the rocky ridges in the area.

All of the Brownware ceramic fragments are tempered with a medium coarse sand with large angular to sub–angular quartz grains. Mica (biotite) is also present in substantial amounts but it appears to be a natural constituent of the clay rather than a purposeful additive. This type of temper is common on Pahute and Rainier mesas, and in the Yucca Mountain area (Lockett and Pippin 1990).

Two sherds were recovered of North Creek Gray pottery, which was produced by the Virgin Anasazi in the Virgin River drainage area in west and west–central Utah and extreme eastern Nevada. Ninety–nine sherds from a broken Shivwits Plain vessel were found at 26NY1408. Shivwits Plain, a recently identified variety of grayware, is very distinctive because of its dark paste and crushed sherd temper. Based on the pottery's material constituents and its distribution frequency, Lyneis (1992:46) suggests that Shivwits Plain ceramics were produced on the Shivwits and Uinkaret Plateaus. Three sherds have been tentatively identified as Snake Valley Gray, a Fremont pottery type (Madsen 1977). The core area for Snake Valley Gray centers around the Parowan Valley in Utah but distribution for this type extends throughout much of western Utah and well into east–central Nevada.

The two red–ware sherds recovered fit together to form part of a shallow black–on–red bowl. These sherds do not fit into Colton's (1952:87–95) description of either San Juan Red Ware or Tsegi Orange Ware. Some researchers (Lyneis 1992; Thompson 1986) believe this "sand–tempered red ware" belongs to a distinct but as yet not formally described type. Anasazi in origin, this variety may have been manufactured on the Colorado Plateau somewhere east of Kanab but north and west of the Colorado River (Lyneis 1992:71). A single grayware sherd could not be confidently classified into the existing typology. While it shares temper and finish characteristics consistent with Tusayan Grayware, its surface color falls outside the normal range for any of the types.

Procurement of lithic resources at SU19–25 included the use of readily available materials and transport of this material, probably in the form of cores and manufactured tools, to locations outside of the sample unit. Also, the documentation of exotic materials at these sites indicates importation of materials from outside the sample unit. Some significance must have existed in the use of these materials because of the extra energy expended for their transport to a location with an available toolstone source. Based on the analysis of pottery found at the sample unit, this transport may have been in conjunction some type of economic interaction between the Great Basin hunter–gatherers and the pottery–producing horticultural groups of the Colorado and Virgin rivers.

What behavioral information (e.g., methods of tool manufacture, changes in lithic technology, economy of resource use, and nature of associated activities) is represented by the lithic refuse at lithic scatters?

Lithic technology at SU19–25 was reflected in both the debitage and artifacts. At site 26NY7847, lithic technology was represented by a predominance of late stage reduction flakes, specifically pressure flakes. This, along with the biface types recovered at the site, indicates that finish or retouch of biface tools was probably the primary lithic reduction activity undertaken at the site. This was probably related to resharpening of projectile points or bifaces utilized during hunting activities.

Artifacts that are expected to be found at toolstone source areas include debitage and tools of manufacture; however, curated tools may not be expected at such locations (Gramly 1980). At site 26NY1408, the manufacture of tools was integrated with the extraction of the lithic toolstone. Both bifaces and projectile points were found along with the expected artifact assemblage. This is not unusual in the Great Basin and has been recorded by other authors (Livingston and Pierce 1988). The recovery of the finished tools indicates that the site was a workshop for their production.

The most prevalent artifact class at site 26NY1408 is shatter with over 79,000 pieces recovered. Since the site is a toolstone source area, large numbers of cores would be expected to be found at the site, and over 200 were recovered. From the analysis of the cores, it has been determined that lithic reduction activities began with a simple expedient method of extraction, block on block. The cobbles of silicified volcanic were struck against each other with little or no platform preparation undertaken at this stage of reduction. This is evident in the large number of crushed and missing platform remnants on the cores and early stage reduction flakes. This pattern could also be produced when the knapper was testing large blocks and cobbles of the toolstone for its quality. The finer–grained more amorphous material is usually found in the center of the cobbles and slabs of silicified volcanic. Therefore, this behavior not only saved time in reduction but also provided for quality control of the material extracted.

There is a preference of exotic materials for some tools at site 26NY1408. Chert from a nonlocal source was the preferred material for bifaces found at the site, which may represent a change in resource utilization or a change in the pattern of mobility. A change in the pattern of resource acquisition would result in the opportunity to locate new lithic material sources and the loss of previously used ones.

Projectile points provide a slightly different pattern than do the bifaces. There is a variation noted in the use of the silicified volcanic for different projectile point types which relates to an increased use of this toolstone through time. Obsidian was the preferred material for the Humboldt points which date to as early as 4500 B.P. or the beginning of the Middle Archaic (ca. 4000 to 1500 B.P). An increase in the use of the silicified volcanic is noted for the Elko points which appear slightly later in the Middle Archaic. This change in the toolstone for projectile points also corresponds to the major shift in settlement and subsistence patterns discussed earlier. This shift included the increased use of the highland areas, such as SU19–25, with hunting continuing as the major focus of subsistence activities. Finally, a preference for silicified volcanic for the later Eastgate and Rose Spring projectile points is noted which corresponds to the Late Archaic in the Great Basin (ca. 1500 to 700 B.P.). The Late Archaic, as discussed previously, corresponds with the introduction of the bow and arrow in the Great Basin. According to Lyneis (1982) the Late Archaic was a period of expansion into the woodland sites above 1,829 m (6,000 ft) in which SU19–25 is located.

What strategies of subsistence resource utilization are represented in the archaeological record and how has this resource utilization changed through time and affected settlement patterns?

Site 26NY1408 was utilized for the extraction of the silicified volcanic exposed at several areas across the site. The use of the area for the production of bifaces and projectile points has also been noted in previous discussions. This is the only documented source for toolstone on the mesas except for a small outcrop at site 26NY3944, 1.6 km west of SU19–25. However, through present research in the area (Drollinger 1993; Holz 1993), a link from this toolstone source area and other sites in the area may be indicated.

Previously it was thought that rock and brush structures on Pahute and Rainier mesas were limited to dense stands of pinyon and utilized during the extraction of the nut crop. The previously discovered structures in South Silent Canyon were associated with such resource availability and with large rock rings thought to be storage centers for the pinyon nuts. At 26NY7847, storage facilities consisted of two small rock caches, probably used for the storage of food products for short–term occupation. No rock rings were found within the sample unit. Also, this site is located in an area that contains only a few pinyon and juniper trees with the area east of the site consisting primarily of sagebrush with no trees.

Indications are that the structures at site 26NY7847 were used for hunting related activities and not the acquisition of pinyon nuts. However, other seasonal plant resources such as lomatiums and lilies may have been the focus of gathering activities at the sample unit but none were noted during the data recovery efforts. The minimal number of pinyon trees, absence of large pinyon nut storage facilities, and the strategic location of the structures support a game related strategy for subsistence resource utilization. Also, edge wear analysis on the biface knife found near the structures indicated the processing of some soft material, possibly an animal hide. Therefore, this site is probably a temporary camp, such as proposed by Binford (1980).

What is the history and what are the processes of hunter and gatherer mobility and demography?

Pippin (1992) has hypothesized that windbreaks found in South Silent Canyon reflect a period immediately before or following the aboriginal contact with Euroamericans. No historic material was found at the two windbreak structures or caches at 26NY7847. Radiocarbon dates associated with feature 1 at 26NY7847 indicate that this structure was originally constructed in A.D. 1650 and then re–occupied and repaired between A.D. 1800 and 1950. This time range would correspond with the previously investigated windbreaks. However, dates of A.D. 1410 and 1430, associated with feature 2, indicate that this structure was constructed during prehistoric times. The dates from the structures at site 26NY7847 differ significantly from the South Silent Canyon structures.

Dates associated with projectile points found at the sample unit indicate that the area has been used, at least intermittently, for the last 12,000 years. However, the majority of projectile points found at the sample unit were Elko or Rose Spring types. Dates associated with these point types indicate a Middle to Late Archaic occupation of the area (4,000 to 700 B.P.).

Native American consultation.

Three Native American monitors, Lee Chavez, Lalovi Miller, and Louie Shoshone, participated in the excavation of site 26NY7847; however, data recovery at site 26NY1408 had concluded before the monitoring program was initiated. Discussions with Chavez and Miller (Shoshone was unavailable for comments) indicated that site 26NY7847 was a temporary camp utilized by a small family group for hunting activities. The use of the structures for pinyon nut gathering was not indicated because of the lack of pinyon trees in the area, small size of the rock caches, and number of projectile points found in the area. According to Miller, the group who built the structures, or related family members, would reuse them and the area in general for resource acquisition. According to both monitors, groundstone was not carried with the foraging groups but was acquired in the immediate area and left for later use. When found at a site, groundstone usually represents a longer use of an area; however, shorter occupations may be indicated by the expedient acquisition and use as suggested above. Manos were usually left with the metates, although some were curated and passed down to younger members of the family. The use of Pahute and Rainier mesas by both the Bishop Paiute–Shoshone and the Moapa Piaute was indicated by Chavez and Miller. Miller recalled that when she was very young, her family gathered pinyon nuts in the Groom Range, which is east of Pahute and Rainier mesas.

12. MANAGEMENT RECOMMENDATIONS

Two sites were investigated during this study of SU19–25 under the LRSP. Data recovery has been completed at all sites within the sample unit. No further investigations of the sample unit are proposed by DRI. With the submission of this report, DOE/NV has met its obligations for SU19–25 according to the LRSP.

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APPENDIX A

The definitions listed below are taken from Pough (1983) and various geological dictionaries. They refer to materials recovered at SU19–25 although some variation may exist between the definition presented below and the actual sample. This is not uncommon because of the variations in lithic materials.

Agate. Agate is a concentric banded and fibrous variety of quartz. The rock forms by precipitation in cavities of any rocks, including lava, but most often in limestone or dolomite. Clusters of crystals or amethysts may develop in the center.

Basalt. Basalt is an extrusive rock mainly composed of calcic plagioclase and pyroxene. Both fine–grained and vesicular varieties are found on the NTS. Vesicular basalt is characterized by the presence of small cavities (vesicles) formed by the expansion of a bubble of gas or steam during the solidification of the rock. Generally dark colored, basalts can range from black to dark gray, dark brown, or dark green.

Chalcedony. Chalcedony is a porous, crystallized variety of quartz. It forms by precipitation, and crystals are arranged in slender fibers in parallel bands. The fibers are invisible to the naked eye. Chalcedony is translucent, almost clear to grayish white, with a waxy lustre. Agate, jasper, and chert are often considered impure forms of chalcedony.

Chert. Chert is a compact siliceous rock formed of chalcedonic or opaline silica of organic or precipitated origin. Cherts most often occur in association with sedimentary rocks, particularly limestones, but can form by precipitation in metamorphic or volcanic rocks. Cherts can be a wide range of colors, depending upon the types and amounts of minerals and impurities. The cherts found in the limestone formations of the Groom Mountain Range east of Pahute Mesa are orange to brown for the Highland quarry and blue and white for the Pogonip quarry (Reno and Pippin 1986:126). A brown and black mottled chert occurs in the Jumbled Hills southeast of the Groom Mountain Range (Brooks et al. 1978).

Diorite. Diorite is an intermediate coarse–grained igneous rock with up to 10% quartz. Also present are plagioclase feldspars and ferromagnesian minerals like pyroxenes and hornblende.

Jasper. Jasper is a massive fine–grained sedimentary variety of quartz with large amounts of admixture, particularly iron oxides. Colors are mostly red, but brown and green varieties are found. Texture is compact or microfibrous with splintery or conchoidal fracture. Lustre is matte when compared to chert. A red to brown jasper is found at the El Dinero quarry in the Groom Mountain Range east of Pahute Mesa (Reno and Pippin 1986:128). A source of red to yellow jasper is known from the Cactus Flat area north of Pahute Mesa (Pippin 1986:137).

Limestone. Limestone is a bedded sedimentary deposit composed mostly of calcium carbonate ($CaCO_3$). Limestone is the solid equivalent of limy mud, calcareous sand, or shell fragments. It commonly ranges from light to dark gray, but can be tinted a variety of other colors.

Obsidian. Obsidian is an extrusive igneous rock, derived from rapidly cooled granitic magma. It is glassy in appearance, high in silica, and an excellent medium for chipped–stone artifacts. Obsidian has a high lustre, and the fracture is conchoidal. Most obsidians are black, but red, green, brown, and combinations of colors are known. Some types are banded. The obsidian in the study area is in the form of small nodules. One source is found along the south base and alluvial fans of Pahute Mesa and along the head of Fortymile Canyon. The nodules have eroded from Pahute Mesa and are part of the alluvium. Amick et al. (1991) have termed the obsidian in this locale as Timber Mountain. According to Hicks (1990:5), the obsidian varies in type and in size. Material types include a nearly opaque black obsidian, a dark gray obsidian with light gray flow lines, and a dark gray obsidian with green flow lines. The size of individual nodules tends to increase with elevation. Some of the larger nodules at the upper reaches of the fans and base of the mesa are around 7 cm, while the ones toward the bottom of the alluvial fans are less than 5 cm. Another obsidian source is at Butte Wash at the north end of Yucca Flat and east of Pahute Mesa (Reno and Pippin 1985:114). This obsidian also occurs in alluvium as small nodules, generally less than 4 cm in size.

Petrified Wood. Petrified wood is organic wood that has been embedded in sediments and converted to stone by the gradual replacement of organic tissues, particle by particle, with corresponding amounts of infiltrating silica matter. The most common silica replacements are quartz, chalcedony, or opal. The cellular pattern of the wood is preserved, and the cell structure exhibits heterogeneous, but patterned, irregularities. Color, texture, and composition vary greatly among different pieces and within a single piece. Generally, the bark and the exterior portion are more coarse–grained, resembling quartzite at times, and the wood pattern is more discernible as compared to the interior. The interior may be more silicified, with less pronounced wood characteristics, and may possess chert– or chalcedony–like qualities and appearances. Fractures in petrified wood tend to be along natural cleavage planes coinciding with the original wood structure. Technologically, flakes removed parallel to the long axis of the wood grain tend to be larger with parallel margins. In contrast, flake removals across the grain are smaller, wider than long, and usually end in abrupt step or hinge terminations. A source of petrified wood is in the Cactus Flat area north of Pahute Mesa (Pippin 1986:137).

Quartz. Quartz refers to the pure crystal form. It is colorless, and transparent to translucent with vitreous lustre. Pure forms of quartz develop in cavities of lava rocks where rapid cooling has occurred. Crystals are usually hexagonal and prismatic, and have the ability to rotate the polarization plane of light as it passes through. The mineral is very hard with no cleavage planes, and fractures chonchoidally.

Quartzite. Quartzite is a metamorphic rock composed primarily of quartz sand whereby the grains have become firmly bonded, or fused, so that fractures are across the grains rather than along the surface of grains as in sandstone. Texture of quartzite is granular or sugary. Distinct quartz grains are visible. Color is variable depending on the original formation.

Silicified Volcanic. Silicified volcanic is a general term for volcanic tuffs which have undergone alteration. The alteration involves hydrothermal replacement of minerals with silicas as a result of contact with hot liquids during volcanic episodes. Phenocrysts are the distinguishing feature and make up 10 to 50 percent of the total mass. Silicified volcanics have a glassy lustre, and texture of some pieces is comparable to chalcedony and some cherts. The rocks have been called chalcedony, silicified tuff, or white welded tuff in previous DRI reports. Color varieties include white, light gray, pink, purple, and a combination of colors. White is the predominant color. The silicified volcanics are common throughout Nye County, and on Pahute Mesa the rock occurs in veins within welded tuff formations. The exposed rocks have been broken from natural processes into irregular cobbles of different sizes. Sizes range from 2 or 3 cm to 50 cm in diameter, with most between 20 and 30 cm. The larger cobbles were exploited almost exclusively by the aboriginal inhabitants. The interior portion of the larger cobbles is relatively fine–grained and appears to have been the objective of quarrying activities. This inner portion can approach the quality of fine chert and chalcedony in some outcrops. The outer portion is coarser, with many impurities and small and irregular weathering fractures which make the establishment of a platform for flake removals very difficult. Much of this outer material was discarded during quarrying activities.

Welded Tuff. A wide range of welded tuffs are found throughout Nye County. They are derived mainly from volcanic ash flows. Composition ranges from rhyolitic to andesitic. Some of the finer rhyolitic tuffs can be used for chipped–stone implements, while the coarser andesitic tuffs are best suited for groundstone. Color is from buff to brown for the coarser tuffs on Pahute Mesa, and red to purple for the finer tuffs. Some green varieties are also known from the region. All have a fine–grained groundmass with prominant phenocrysts of quartz, potassium feldspar, orthoclase, plagioclase, biotite, or clinopyroxene. Some of the welded tuffs are similar to the silicified volcanics, but the lustre is duller and the texture coarser in comparison.

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APPENDIX B

Table 1. Descriptions of sites within 1.6 km of the Sample Unit 19–25.

Site Number	Site Type	Description
26NY1016	Lithic scatter	White welded tuff, obsidian, tachylite, and pink/white chert and chalcedony flakes. One Elko Eared and 1 Elko Corner–notched projectile points.
26NY1017	Lithic scatter	Approximately 24 white chert flakes, 2 chert bifaces, and 1 obsidian projectile point mid–section.
26NY1018	Lithic scatter	Chert bifaces and flakes.
26NY1019	Lithic scatter	Chert flakes, 3 white/pink chert bifaces, and 6 obsidian flakes.
26NY1021	Lithic scatter	Obsidian and white chert flakes, 2 obsidian bifaces, and 2 obsidian unifaces.
26NY1978	Locality	1 white/red chert core and 2 white chalcedony flakes.
26NY1979	Locality	1 white chert flake and 1 rhyolite flake.
26NY1980	Locality	1 tachylite projectile point fragment, 1 tachylite flake, and 1 red chert flake.
26NY2606	Isolate	1 obsidian Elko Corner–notched projectile point.
26NY2607	Lithic scatter	White chert, tachylite, obsidian, and purple chert flakes; 1 obsidian Rosespring Corner–notched projectile point, 1 pink chert projectile point distal fragment, 1 white chert Rosespring Corner–notched projectile point, and 1 white chert projectile point proximal fragment.
26NY2608	Lithic scatter	Chert, chalcedony, obsidian, and tachylite flakes; 1 tachylite biface, 1 obsidian Humboldt projectile point, 1 jasper biface fragment, and 1 rhyolite core.
26NY2609	Lithic scatter	4 loci of chert, chalcedony, tachylite, and obsidian flakes.
26NY2610	Isolate	Tachylite biface mid–section.
26NY2611	Temporary Camp	Obsidian and chert flakes; 1 white/pink contracting stemmed point distal fragment, 2 groundstone fragments, 1 tachylite biface, and 2 chalcedony bifaces.
26NY2612	Lithic scatter	Chalcedony and white chert flakes and bifaces, tachylite biface, Elko Corner–notched projectile point, and Elko Side–notched projectile point.
26NY2613	Lithic scatter	Chert and chalcedony flakes; 1 beige chert projectile point distal fragment, and 1 tachylite Elko Side–notched projectile point.
26NY2614	Lithic scatter	Chert, chalcedony, obsidian, and rhyolite flakes; 1 Elko Eared chert projectile point and 1 obsidian projectile point proximal fragment.

Continued

Table 1. Continued.

Site Number	Site Type	Description
26NY2615	Lithic scatter	Chert, chalcedony, and obsidian flakes; 1 Northern Side–notched (Large Side–notched) obsidian projectile point.
26NY2616	Lithic scatter	Chalcedony and chert flakes; 1 obsidian Pinto projectile point.
26NY3387	Locality	1 white chert flake and 1 obsidian projectile point distal fragment.
26NY3932	Lithic scatter	Obsidian and chalcedony flakes.
26NY3933	Isolate	White chalcedony Eastgate projectile point.
26NY3934	Lithic scatter	White chalcedony and brown chert flakes, 1 obsidian Rosespring and 1 obsidian Humboldt projectile points.
26NY3935	Lithic scatter	Approximately 25 white chalcedony flakes, 1 white chalcedony projectile point proximal section, and 1 obsidian projectile point distal section.
26NY3936	Lithic scatter	Two obsidian and three white chalcedony flakes.
26NY3937	Isolate	Obsidian projectile point medial section.
26NY3938	Lithic scatter	Approximately 300 white chalcedony primary flakes, thinning flakes, and shatter, some obsidian flakes, 2 white chalcedony bifaces, and 1 each white chalcedony Rosegate and Humboldt Concave Base projectile point fragments.
26NY3939	Isolate	White chalcedony flake.
26NY3940	Lithic scatter	Three white chalcedony flakes.
26NY3941	Isolate	Obsidian projectile point medial section.
26NY3942	Isolate	White chalcedony decortication flake.
26NY3943	Rockshelter	2.7 x 5.8 x 1.1 in size with 1 white chalcedony primary flake.
26NY3944	Opportunistic Quarry	White chalcedony outcrop exposures with considerable shatter, decortication flakes, and core reduction flakes (>500 flakes).
26NY3945	Isolate	Obsidian projectile point distal fragment.
26NY3946	Lithic scatter	Approximately 10 white chalcedony flakes.
26NY3947	Temporary Camp	White chalcedony lithic debitage and a milling stone.
26NY3948	Temporary Camp	1 metate fragment, brownware pottery, white chalcedony debitage, 1 biface fragment, and 1 obsidian projectile point fragment.
26NY3949	Isolate	White chalcedony primary flake.

Continued

Table 1. Continued.

Site Number	Site Type	Description
26NY3950	Isolate	Projectile point fragment.
26NY3951	Lithic scatter	White chalcedony flakes; 1 obsidian projectile point distal fragment and 1 obsidian utilized flake.
26NY3952	Isolate	Obsidian projectile point distal fragment.
26NY3953	Isolate	Obsidian biface.
26NY3954	Isolate	Obsidian flake.
26NY3955	Lithic scatter	15 white chalcedony and 1 black chert flakes.

White silicified volcanic has sometimes been called white chalcedony or white chert.

Table 2. High level analysis of debitage recovered from 4 x 4 m units at site 26NY1408.

Type	Size–Grade	Color	Segement	Platform	Cortex	Alteration	Total
Core Reduction Flake	3	Brown	Complete	Collapsed	None	Heat Treated	1
Decortication Flake	3	Translucent	Complete	Collapsed	>25–75%	None	1
Decortication Flake	3	Translucent	Complete	Double–faceted	None	None	1
Core Reduction Flake	3	White	Complete	Collapsed	None	None	3
Core Reduction Flake	3	White	Complete	Single–faceted	>0–25%	None	1
Core Reduction Flake	3	White	Lateral	Collapsed	None	None	1
Decortication Flake	3	White	Complete	Single–faceted	>0–25%	None	1
Decortication Flake	3	White	Complete	Single–faceted	>25–75%	None	1
Decortication Flake	3	White	Complete	Single–faceted	>75%	None	1
Core Reduction Flake	3	Yellow	Complete	Collapsed	>0–25%	Heat Treated	1
Decortication Flake	3	Yellow	Complete	Single–faceted	None	None	1
Decortication Flake	3	Yellow	Complete	Single–faceted	>0–25%	None	1
Decortication Flake	3	Yellow	Proximal	Single–faceted	None	None	1
Core Reduction Flake	4	Buff	Complete	Single–faceted	>0–25%	None	1
Core Reduction Flake	4	Translucent	Complete	Collapsed	>0–25%	Heat Treated	1
Core Reduction Flake	4	Translucent	Complete	Double–faceted	None	None	1
Decortication Flake	4	Translucent	Complete	Collapsed	>25–75%	None	1
Decortication Flake	4	Translucent	Complete	Collapsed	>25–75%	Heat Treated	2
Decortication Flake	4	Translucent	Complete	Collapsed	>75%	None	1
Decortication Flake	4	Translucent	Complete	Single–faceted	>25–75%	Heat Treated	1
Decortication Flake	4	Translucent	Distal	Indeterminate	>0–25%	Heat Treated	1
Core Reduction Flake	4	Gray	Complete	Single–faceted	>0–25%	None	1
Core Reduction Flake	4	Gray	Lateral	Collapsed	>0–25%	Heat Treated	1
Decortication Flake	4	Gray	Complete	Collapsed	>0–25%	Heat Treated	1
Decortication Flake	4	Gray	Complete	Single–faceted	>75%	None	1
Core Reduction Flake	4	White	Complete	Collapsed	None	None	8
Core Reduction Flake	4	White	Complete	Collapsed	None	Heat Treated	1
Core Reduction Flake	4	White	Complete	Collapsed	>0–25%	None	5
Core Reduction Flake	4	White	Complete	Multifaceted	>0–25%	None	1
Core Reduction Flake	4	White	Complete	Single–faceted	None	None	5
Core Reduction Flake	4	White	Complete	Single–faceted	>0–25%	None	3
Decortication Flake	4	White	Complete	Collapsed	None	None	1
Decortication Flake	4	White	Complete	Collapsed	>25–75%	None	2
Decortication Flake	4	White	Complete	Collapsed	>75%	None	3
Decortication Flake	4	White	Complete	Cortex/Faceted	>0–25%	None	1
Decortication Flake	4	White	Complete	Cortex/Faceted	>25–75%	None	1

Continued

Table 2. Continued.

Type	Size–Grade	Color	Segement	Platform	Cortex	Alteration	Total
Decortication Flake	4	White	Complete	Single–faceted	>0–25%	None	1
Decortication Flake	4	White	Complete	Single–faceted	>25–75%	None	1
Decortication Flake	4	White	Complete	Single–faceted	>75%	None	1
Decortication Flake	4	White	Lateral	Collapsed	>75%	None	1
Core Reduction Flake	4	Yellow	Complete	Collapsed	None	None	1
Core Reduction Flake	4	Yellow	Complete	Collapsed	None	Heat Treated	1
Core Reduction Flake	4	Yellow	Complete	Single–faceted	None	None	1
Decortication Flake	4	Yellow	Complete	Collapsed	>25–75%	Heat Treated	1
Decortication Flake	4	Yellow	Complete	Collapsed	>75%	None	1
Decortication Flake	4	Yellow	Complete	Collapsed	>75%	Heat Treated	1
Decortication Flake	4	Yellow	Complete	Single–faceted	>25–75%	None	1
Core Reduction Flake	5	Translucent	Complete	Collapsed	None	None	2
Core Reduction Flake	5	Translucent	Complete	Collapsed	None	Heat Treated	1
Core Reduction Flake	5	Translucent	Complete	Collapsed	>0–25%	None	2
Core Reduction Flake	5	Translucent	Complete	Cortex/Faceted	None	Heat Treated	1
Core Reduction Flake	5	Translucent	Complete	Multifaceted	>0–25%	None	1
Core Reduction Flake	5	Translucent	Complete	Single–faceted	None	None	1
Core Reduction Flake	5	Translucent	Proximal	Collapsed	None	None	1
Core Reduction Flake	5	Translucent	Proximal	Collapsed	None	Heat Treated	1
Core Reduction Flake	5	Translucent	Proximal	Collapsed	>0–25%	Heat Treated	1
Core Reduction Flake	5	Translucent	Proximal	Single–faceted	None	None	1
Decortication Flake	5	Translucent	Complete	Collapsed	>25–75%	None	1
Decortication Flake	5	Translucent	Lateral	Cortex/Faceted	>25–75%	Heat Treated	1
Decortication Flake	5	Translucent	Proximal	Collapsed	>25–75%	Heat Treated	1
Core Reduction Flake	5	Gray	Complete	Collapsed	None	None	2
Core Reduction Flake	5	Red	Lateral	Collapsed	>0–25%	None	1
Core Reduction Flake	5	Red	Proximal	Collapsed	>0–25%	None	1
Core Reduction Flake	5	White	Complete	Collapsed	None	None	9
Core Reduction Flake	5	White	Complete	Collapsed	None	Heat Treated	4
Core Reduction Flake	5	White	Complete	Collapsed	>0–25%	None	3
Core Reduction Flake	5	White	Complete	Collapsed	>0–25%	Heat Treated	1
Core Reduction Flake	5	White	Complete	Collapsed	>75%	None	1
Core Reduction Flake	5	White	Complete	Double–faceted	None	Heat Treated	1
Core Reduction Flake	5	White	Complete	Single–faceted	None	None	3
Core Reduction Flake	5	White	Complete	Single–faceted	None	Heat Treated	1
Core Reduction Flake	5	White	Complete	Single–faceted	>0–25%	None	2

Continued

Table 2. Continued.

Type	Size–Grade	Color	Segement	Platform	Cortex	Alteration	Total
Core Reduction Flake	5	White	Distal	Indeterminate	None	Heat Treated	1
Core Reduction Flake	5	White	Proximal	Collapsed	None	None	1
Core Reduction Flake	5	White	Proximal	Collapsed	None	Heat Treated	3
Core Reduction Flake	5	White	Proximal	Collapsed	>0–25%	Heat Treated	1
Core Reduction Flake	5	White	Proximal	Single–faceted	None	None	2
Core Reduction Flake	5	White	Proximal	Single–faceted	None	Heat Treated	1
Decortication Flake	5	White	Complete	Collapsed	None	None	1
Decortication Flake	5	White	Complete	Collapsed	>25–75%	None	1
Decortication Flake	5	White	Complete	Collapsed	>75%	None	1
Decortication Flake	5	White	Complete	Cortex	>25–75%	None	1
Decortication Flake	5	White	Lateral	Collapsed	>75%	Heat Treated	1
Decortication Flake	5	White	Proximal	Collapsed	>25–75%	None	2
Core Reduction Flake	5	Yellow	Complete	Collapsed	None	None	3
Core Reduction Flake	5	Yellow	Complete	Collapsed	None	Heat Treated	2
Core Reduction Flake	5	Yellow	Complete	Collapsed	>0–25%	Heat Treated	1
Core Reduction Flake	5	Yellow	Complete	Double–faceted	None	None	1
Core Reduction Flake	5	Yellow	Complete	Single–faceted	None	Heat Treated	1
Core Reduction Flake	5	Yellow	Complete	Single–faceted	>0–25%	None	1
Core Reduction Flake	5	Yellow	Distal	Indeterminate	None	None	1
Core Reduction Flake	5	Yellow	Lateral	Collapsed	>75%	None	1
Core Reduction Flake	5	Yellow	Proximal	Collapsed	None	None	2
Decortication Flake	5	Yellow	Complete	Collapsed	>25–75%	None	3
Decortication Flake	5	Yellow	Complete	Collapsed	>75%	None	1
Decortication Flake	5	Yellow	Complete	Cortex/Faceted	>25–75%	None	1
Decortication Flake	5	Yellow	Complete	Cortex/Faceted	>75%	Heat Treated	1
Decortication Flake	5	Yellow	Complete	Single–faceted	None	None	1
Decortication Flake	5	Yellow	Complete	Single–faceted	>25–75%	None	3
Decortication Flake	5	Yellow	Complete	Single–faceted	>75%	Heat Treated	1
Decortication Flake	5	Yellow	Proximal	Collapsed	>25–75%	None	1
Core Reduction Flake	6	Buff	Complete	Collapsed	None	None	1
Core Reduction Flake	6	Buff	Proximal	Single–faceted	None	None	1
Decortication Flake	6	Buff	Proximal	Multifaceted	>25–75%	None	1
Biface Thinning Flake	6	Translucent	Complete	Collapsed	None	None	4
Core Reduction Flake	6	Translucent	Complete	Collapsed	None	None	2
Core Reduction Flake	6	Translucent	Complete	Collapsed	None	Heat Treated	1
Core Reduction Flake	6	Translucent	Complete	Single–faceted	None	None	1

Continued

Table 2. Continued.

Type	Size-Grade	Color	Segement	Platform	Cortex	Alteration	Total
Core Reduction Flake	6	Translucent	Lateral	Indeterminate	None	None	1
Biface Thinning Flake	6	Gray	Complete	Single-faceted	None	Heat Treated	1
Biface Thinning Flake	6	Gray	Distal	Indeterminate	None	Heat Treated	1
Core Reduction Flake	6	Gray	Complete	Single-faceted	None	Heat Treated	1
Core Reduction Flake	6	Gray	Proximal	Collapsed	None	None	1
Biface Thinning Flake	6	Red	Complete	Collapsed	None	None	1
Biface Thinning Flake	6	Red	Complete	Multifaceted	None	None	1
Biface Thinning Flake	6	Red	Lateral	Single-faceted	None	None	1
Biface Thinning Flake	6	Red	Proximal	Collapsed	None	None	1
Biface Thinning Flake	6	White	Complete	Collapsed	None	None	4
Biface Thinning Flake	6	White	Complete	Collapsed	None	Heat Treated	3
Biface Thinning Flake	6	White	Complete	Single-faceted	None	None	3
Biface Thinning Flake	6	White	Complete	Single-faceted	None	Heat Treated	2
Biface Thinning Flake	6	White	Distal	Indeterminate	None	None	1
Biface Thinning Flake	6	White	Lateral	Indeterminate	None	Heat Treated	1
Biface Thinning Flake	6	White	Proximal	Collapsed	None	None	1
Biface Thinning Flake	6	White	Proximal	Collapsed	None	Heat Treated	1
Biface Thinning Flake	6	White	Proximal	Cortex/Faceted	None	None	1
Core Reduction Flake	6	White	Complete	Collapsed	None	None	4
Core Reduction Flake	6	White	Complete	Collapsed	>0-25%	None	1
Core Reduction Flake	6	White	Complete	Collapsed	>0-25%	Heat Treated	1
Core Reduction Flake	6	White	Complete	Multifaceted	None	None	1
Core Reduction Flake	6	White	Complete	Single-faceted	None	None	1
Core Reduction Flake	6	White	Complete	Single-faceted	>0-25%	Heat Treated	1
Core Reduction Flake	6	White	Distal	Indeterminate	None	None	3
Core Reduction Flake	6	White	Lateral	Collapsed	None	None	1
Core Reduction Flake	6	White	Lateral	Single-faceted	None	Heat Treated	1
Core Reduction Flake	6	White	Proximal	Collapsed	None	None	2
Core Reduction Flake	6	White	Proximal	Collapsed	None	Heat Treated	1
Core Reduction Flake	6	White	Proximal	Collapsed	>0-25%	None	1
Core Reduction Flake	6	White	Proximal	Multifaceted	None	None	1
Decortication Flake	6	White	Complete	Collapsed	None	None	1
Decortication Flake	6	White	Complete	Single-faceted	None	None	1
Decortication Flake	6	White	Complete	Single-faceted	>25-75%	None	1
Decortication Flake	6	White	Proximal	Single-faceted	>25-75%	Heat Treated	1
Pressure Flake	6	White	Complete	Collapsed	None	None	1

Continued

Table 2. Continued.

Type	Size-Grade	Color	Segement	Platform	Cortex	Alteration	Total
Biface Thinning Flake	6	Yellow	Complete	Collapsed	None	None	2
Biface Thinning Flake	6	Yellow	Complete	Collapsed	None	Heat Treated	3
Biface Thinning Flake	6	Yellow	Complete	Double-faceted	None	Heat Treated	1
Biface Thinning Flake	6	Yellow	Complete	Single-faceted	None	None	3
Biface Thinning Flake	6	Yellow	Complete	Single-faceted	None	Heat Treated	1
Core Reduction Flake	6	Yellow	Complete	Collapsed	None	None	3
Core Reduction Flake	6	Yellow	Complete	Collapsed	None	Heat Treated	1
Core Reduction Flake	6	Yellow	Complete	Collapsed	>0-25%	None	2
Core Reduction Flake	6	Yellow	Complete	Cortex	>0-25%	None	2
Core Reduction Flake	6	Yellow	Complete	Single-faceted	None	None	7
Core Reduction Flake	6	Yellow	Complete	Single-faceted	None	Heat Treated	4
Core Reduction Flake	6	Yellow	Distal	Indeterminate	None	None	1
Core Reduction Flake	6	Yellow	Distal	Indeterminate	None	Heat Treated	1
Core Reduction Flake	6	Yellow	Proximal	Collapsed	None	None	1
Core Reduction Flake	6	Yellow	Proximal	Collapsed	None	Heat Treated	4
Core Reduction Flake	6	Yellow	Proximal	Collapsed	>0-25%	None	1
Core Reduction Flake	6	Yellow	Proximal	Collapsed	>0-25%	Heat Treated	1
Core Reduction Flake	6	Yellow	Proxiaml	Cortex	>0-25%'	None	2
Core Reduction Flake	6	Yellow	Proximal	Single-faceted	None	None	1
Decortication Flake	6	Yellow	Complete	Collapsed	None	None	2
Decortication Flake	6	Yellow	Complete	Collapsed	>0-25%	None	1
Decortication Flake	6	Yellow	Complete	Collapsed	>25-75%	None	1
Decortication Flake	6	Yellow	Complete	Collapsed	>75%	None	1
Decortication Flake	6	Yellow	Complete	Cortex	None	None	1
Decortication Flake	6	Yellow	Complete	Cortex	>75%	None	1
Decortication Flake	6	Yellow	Complete	Single-faceted	>0-25%	None	1
Decortication Flake	6	Yellow	Proximal	Collapsed	None	None	1
Decortication Flake	6	Yellow	Proximal	Cortex	None	Heat Treated	1
Decortication Flake	6	Yellow	Proximal	Single-faceted	>75%	None	1
Biface Thinning Flake	7	Translucent	Complete	Collapsed	None	Heat Treated	2
Biface Thinning Flake	7	Translucent	Lateral	Indeterminate	None	None	1
Biface Thinning Flake	7	Translucent	Medial	Indeterminate	None	None	2
Biface Thinning Flake	7	Translucent	Proximal	Collapsed	None	None	4
Core Reduction Flake	7	Translucent	Complete	Collapsed	None	None	2
Core Reduction Flake	7	Translucent	Complete	Double-faceted	>0-25%	None	1
Core Reduction Flake	7	Translucent	Complete	Multifaceted	None	None	1

Continued

Table 2. Continued.

Type	Size–Grade	Color	Segement	Platform	Cortex	Alteration	Total
Core Reduction Flake	7	Translucent	Distal	Indeterminate	None	Heat Treated	1
Core Reduction Flake	7	Translucent	Distal	Indeterminate	>0–25%	None	1
Core Reduction Flake	7	Translucent	Proximal	Collapsed	None	Heat Treated	2
Core Reduction Flake	7	Translucent	Proximal	Collapsed	>0–25%	None	1
Core Reduction Flake	7	Translucent	Proximal	Cortex	None	Heat Treated	1
Core Reduction Flake	7	Translucent	Proximal	Multifaceted	None	Heat Treated	1
Core Reduction Flake	7	Translucent	Proximal	Single–faceted	None	None	1
Core Reduction Flake	7	Translucent	Proximal	Single–faceted	None	Heat Treated	1
Decortication Flake	7	Translucent	Proximal	Collapsed	None	None	1
Pressure Flake	7	Translucent	Complete	Collapsed	None	None	1
Pressure Flake	7	Translucent	Complete	Collapsed	None	Heat Treated	1
Pressure Flake	7	Translucent	Complete	Single–faceted	None	None	1
Pressure Flake	7	Translucent	Distal	Indeterminate	None	Heat Treated	1
Pressure Flake	7	Translucent	Proximal	Collapsed	None	Heat Treated	1
Biface Thinning Flake	7	Gray	Distal	Indeterminate	None	Heat Treated	1
Core Reduction Flake	7	Gray	Complete	Single–faceted	None	Heat Treated	1
Core Reduction Flake	7	Gray	Lateral	Collapsed	None	None	1
Biface Thinning Flake	7	Red	Complete	Collapsed	None	None	2
Biface Thinning Flake	7	Red	Complete	Single–faceted	None	None	1
Biface Thinning Flake	7	Red	Proximal	Collapsed	None	None	1
Biface Thinning Flake	7	Red	Proximal	Multifaceted	None	None	1
Biface Thinning Flake	7	Red	Proximal	Single–faceted	None	None	1
Biface Thinning Flake	7	White	Complete	Collapsed	None	None	7
Biface Thinning Flake	7	White	Complete	Collapsed	None	Heat Treated	3
Biface Thinning Flake	7	White	Complete	Double–faceted	None	None	1
Biface Thinning Flake	7	White	Complete	Multifaceted	None	Heat Treated	1
Biface Thinning Flake	7	White	Complete	Single–faceted	None	None	1
Biface Thinning Flake	7	White	Distal	Indeterminate	None	None	2
Biface Thinning Flake	7	White	Medial	Indeterminate	None	None	2
Biface Thinning Flake	7	White	Medial	Indeterminate	None	Heat Treated	1
Biface Thinning Flake	7	White	Proximal	Collapsed	None	None	3
Biface Thinning Flake	7	White	Proximal	Single–faceted	None	None	2
Core Reduction Flake	7	White	Complete	Collapsed	None	None	1
Core Reduction Flake	7	White	Distal	Indeterminate	None	None	3
Core Reduction Flake	7	White	Lateral	Collapsed	None	None	1
Core Reduction Flake	7	White	Lateral	Collapsed	None	Heat Treated	1

Continued

Table 2. Continued.

Type	Size–Grade	Color	Segement	Platform	Cortex	Alteration	Total
Core Reduction Flake	7	White	Lateral	Indeterminate	None	None	1
Core Reduction Flake	7	White	Medial	Indeterminate	None	Heat Treated	1
Core Reduction Flake	7	White	Proximal	Collapsed	None	None	1
Core Reduction Flake	7	White	Proximal	Single–faceted	None	None	2
Decortication Flake	7	White	Distal	Indeterminate	None	None	1
Decortication Flake	7	White	Distal	Indeterminate	None	Heat Treated	1
Decortication Flake	7	White	Proximal	Collapsed	None	None	1
Decortication Flake	7	White	Proximal	Single–faceted	None	None	1
Pressure Flake	7	White	Complete	Collapsed	None	None	5
Pressure Flake	7	White	Complete	Collapsed	None	Heat Treated	3
Pressure Flake	7	White	Complete	Double–faceted	None	None	1
Pressure Flake	7	White	Complete	Multifaceted	None	None	1
Pressure Flake	7	White	Complete	Single–faceted	None	None	11
Pressure Flake	7	White	Complete	Single–faceted	None	Heat Treated	1
Pressure Flake	7	White	Distal	Indeterminate	None	None	3
Pressure Flake	7	White	Lateral	Indeterminate	None	None	1
Pressure Flake	7	White	Lateral	Single–faceted	None	None	1
Pressure Flake	7	White	Proximal	Collapsed	None	None	2
Pressure Flake	7	White	Proximal	Collapsed	None	Heat Treated	2
Pressure Flake	7	White	Proximal	Single–faceted	None	None	3
Biface Thinning Flake	7	Yellow	Complete	Collapsed	None	None	1
Biface Thinning Flake	7	Yellow	Complete	Collapsed	None	Heat Treated	2
Biface Thinning Flake	7	Yellow	Complete	Multifaceted	None	None	2
Biface Thinning Flake	7	Yellow	Complete	Single–faceted	None	Heat Treated	2
Biface Thinning Flake	7	Yellow	Distal	Indeterminate	None	None	3
Biface Thinning Flake	7	Yellow	Distal	Indeterminate	None	Heat Treated	1
Biface Thinning Flake	7	Yellow	Lateral	Single–faceted	None	None	1
Biface Thinning Flake	7	Yellow	Medial	Indeterminate	None	None	1
Biface Thinning Flake	7	Yellow	Proximal	Collapsed	None	None	1
Biface Thinning Flake	7	Yellow	Proximal	Collapsed	None	Heat Treated	1
Biface Thinning Flake	7	Yellow	Proximal	Single–faceted	None	Heat Treated	1
Core Reduction Flake	7	Yellow	Complete	Collapsed	None	None	2
Core Reduction Flake	7	Yellow	Complete	Collapsed	None	Heat Treated	2
Core Reduction Flake	7	Yellow	Complete	Double–faceted	None	None	1
Core Reduction Flake	7	Yellow	Lateral	Collapsed	None	Heat Treated	1
Core Reduction Flake	7	Yellow	Medial	Indeterminate	None	Heat Treated	1

Continued

Table 2. Continued.

Type	Size–Grade	Color	Segement	Platform	Cortex	Alteration	Total
Core Reduction Flake	7	Yellow	Proximal	Collapsed	None	None	1
Decortication Flake	7	Yellow	Complete	Collapsed	>75%	None	1
Decortication Flake	7	Yellow	Proximal	Collapsed	>0–25%	None	1
Pressure Flake	7	Yellow	Complete	Collapsed	None	None	2
Pressure Flake	7	Yellow	Complete	Single–faceted	None	None	2
Pressure Flake	7	Yellow	Complete	Single–faceted	None	Heat Treated	1
Pressure Flake	7	Yellow	Proximal	Collapsed	None	None	3
Pressure Flake	8	Translucent	Complete	Single–faceted	None	Heat Treated	1
Pressure Flake	8	Gray	Complete	Collapsed	None	None	1
Biface Thinning Flake	8	White	Medial	Indeterminate	None	None	1
Pressure Flake	8	White	Complete	Collapsed	None	None	7
Pressure Flake	8	White	Complete	Collapsed	None	Heat Treated	3
Pressure Flake	8	White	Complete	Multifaceted	None	None	1
Pressure Flake	8	White	Complete	Single–faceted	None	None	9
Pressure Flake	8	White	Complete	Single–faceted	None	Heat Treated	1
Pressure Flake	8	White	Distal	Indeterminate	None	None	4
Pressure Flake	8	White	Distal	Indeterminate	None	Heat Treated	1
Pressure Flake	8	White	Lateral	Indeterminate	None	None	4
Pressure Flake	8	White	Lateral	Single–faceted	None	None	1
Pressure Flake	8	White	Proximal	Collapsed	None	None	3
Pressure Flake	8	White	Proximal	Collapsed	None	Heat Treated	1
Pressure Flake	8	White	Proximal	Cortex	None	None	1
Pressure Flake	8	White	Proxiaml	Single–faceted	None	None	4
Pressure Flake	8	White	Proximal	Single–faceted	None	Heat Treated	2
Pressure Flake	8	Yellow	Proximal	Collapsed	None	Heat–Treated	1
Pressure Flake	8	Yellow	Proximal	Single–faceted	None	Heat–Treated	1
Total							459

Table 3. Low level analysis of debitage recovered from 4 x 4 m units at site 26NY1408.

Material Type	Size–Grade	Color	Total
Welded Tuff	3	Purple	1
Chert	4	Brown	1
Silicified Volcanic	4	White	2
Silicified Volcanic	4	Yellow	9
Welded Tuff	4	Gray	1
Welded Tuff	4	Purple	8
Welded Tuff	4	Red	2
Obsidian	5	Black	4
Silicified Volcanic	5	Gray	1
Silicified Volcanic	5	Pink	3
Silicified Volcanic	5	Purple	12
Silicified Volcanic	5	White	2
Silicified Volcanic	5	Yellow	1
Welded Tuff	5	Gray	2
Welded Tuff	5	Purple	25
Welded Tuff	5	Red	3
Welded Tuff	5	White	4
Basalt/Fined–grained	6	Black	1
Basalt/Vesicular	6	Purple	1
Chert	6	White	1
Granite	6	White	1
Obsidian	6	Black	16
Silicified Volcanic	6	Gray	9
Silicified Volcanic	6	Pink	2
Silicified Volcanic	6	Purple	34
Silicified Volcanic	6	Red	32
Silicified Volcanic	6	White	4
Silicified Volcanic	6	Yellow	11
Tachylite	6	Black	1
Welded Tuff	6	Gray	3
Welded Tuff	6	Purple	37
Welded Tuff	6	Red	5
Welded Tuff	6	White	1
Basalt	7	Black	1
Chert	7	Brown	1
Chert	7	Gray	3
Chert	7	Purple	1

Continued

Table 3. Continued.

Material Type	Size–Grade	Color	Total
Obsidian	7	Black	191
Silicified Volcanic	7	Black	1
Silicified Volcanic	7	Brown	1
Silicified Volcanic	7	Gray	5
Silicified Volcanic	7	Pink	6
Silicified Volcanic	7	Purple	115
Silicified Volcanic	7	Red	47
Silicified Volcanic	7	White	13
Silicified Volcanic	7	Yellow	25
Welded Tuff	7	Black	1
Welded Tuff	7	Gray	1
Welded Tuff	7	Purple	101
Welded Tuff	7	Red	2
Welded Tuff	7	Red/Brown	11
Welded Tuff	7	Red/Orange	2
Welded Tuff	7	White	2
Welded Tuff	7	Yellow	1
Basalt	8	Black	1
Limestone	8	Yellow	3
Obsidian	8	Black	92
Silicified Volcanic	8	Purple	1
Silicified Volcanic	8	Red	8
Silicified Volcanic	8	White	1
Silicified Volcanic	8	Yellow	14
Welded Tuff	8	Purple	1
Total			892

END

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3/24/94