AN ARCHAEOLOGICAL SURVEY

OF THE

U.S. STEEL PROJECT AREA

by
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MANAGEMENT SUMMARY

In November 1987, Intermountain Research performed a Class III cultural resources inventory (BLM 1985) of the U.S. Steel Project Area for Galactic Services, Inc. The U.S. Steel Project Area encompasses proposed mining development to be located adjacent (southwest) to the Tosawihi Quarries (26Ek3032), a prehistoric opalite quarry complex recommended for nomination to the National Register of Historic Places.

The project area includes about 120 previously surveyed acres in what has come to be called the Tosawihi Quarries Study Area; 28 prehistoric site localities, previously recorded as components of site 26Ek3032 (Elston et al. 1987), occur in the north and east portions of the proposed U.S. Steel Project Area. Previously recorded localities include 13 quarries, 12 lithic reduction sites, 2 rockshelters, and 1 isolated groundstone artifact.

The project area includes an additional 480 acres surveyed during present investigations which recorded 124 new prehistoric sites. These include 9 quarries, 71 lithic reduction sites, 16 small sites, 19 isolated artifacts, and 9 complex sites that may have seen short term residential use.

Most newly recorded sites are spacially discrete lithic reduction stations, or lithic reduction complexes, composed largely of the reduction debris of opalite transported from the nearby Tosawihi Quarries. In the U.S. Steel Project Area, quarry sites are limited to a few small opalite exposures. Nine sites contain small numbers of specialized tools (such as drills, scrapers, projectile points, groundstone), small quantities of obsidian, and a range of reduction stages and opalite materials that suggest short term residential use concurrent with opalite reduction. Collected projectile points include Gatecliff Split Stem, Elko Corner-notched, Large Side-notched, and Rosegate series, suggesting cultural use of the area for at least 5000 years.

Results of investigations suggest 37 sites will be affected by the proposed development, as presently designed: 8 are thought to be ineligible for National Register consideration, 3 are eligible, and 26 are potentially eligible. Recommendations include no further action on behalf of the ineligible sites, avoidance and protection of the 3 eligible sites, and testing and further evaluation of the 26 sites whose eligibility remains to be addressed.

Areal/Intensity Data:

Project study area is about 600 acres.
About 120 acres were previously surveyed (Elston et al. 1987).
About 480 acres were surveyed during present investigations.

Transect Interval/Number/Type	30 meters/44/linear
	30 meters/22/ contour

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ACKNOWLEDGEMENTS

Survey of the U.S. Steel Project Area was supervised by Elizabeth E. Budy, and assisted by Kenneth E. Juell, and Laurie A. Walsh. Michael P. Drews classified projectile points; Robert G. Elston provided supplementary artifact descriptions. Report graphics were produced by Michael P. Drews (text figures), Cardan Corporation (pocket maps), and Elizabeth E. Budy (artifact photos). Cashion Callaway edited the report. Data entry, word processing and report production were accomplished by Katherine Nickerson.

Susan Stornetta assisted the compilation of Intermountain Antiquities Computer System (IMACS) records for 124 sites.

Chapter 1. INTRODUCTION

Intermountain Research was contracted by Galactic Services, Inc. to conduct an archaeological inventory of their U.S. Steel Project Area, located about 45 air miles north of the town of Battle Mountain (Figure 1). The U.S. Steel Project is a proposed mining development to be located southwest of the Tosawihi Quarries (26Ek3032), a prehistoric quarry complex that has been recommended for nomination to the National Register of Historic Places (Figure 2). The project area includes about 120 acres (previously surveyed) in the Tosawihi Quarries Study Area defined by Elston et al. (1987) as well as about 480 acres surveyed during present investigations.

The Class III cultural resources survey (BLM 1985) was conducted to identify and evaluate cultural resources in the project area and to provide recommendations for their management. The work was undertaken in compliance with Executive Order 11593 and the National Historic Preservation Act of 1966, as amended, and as implemented by Advisory Council Procedures 36 CFR, Part 800.

Field work was conducted between November 10 and November 22, 1987. Mr. Stanley Jaynes of the BLM Elko Resource Area office was consulted by telephone on November 9 regarding the pending survey, and was advised of the preliminary results on November 23, 1987.

Figure 1. Project vicinity map.

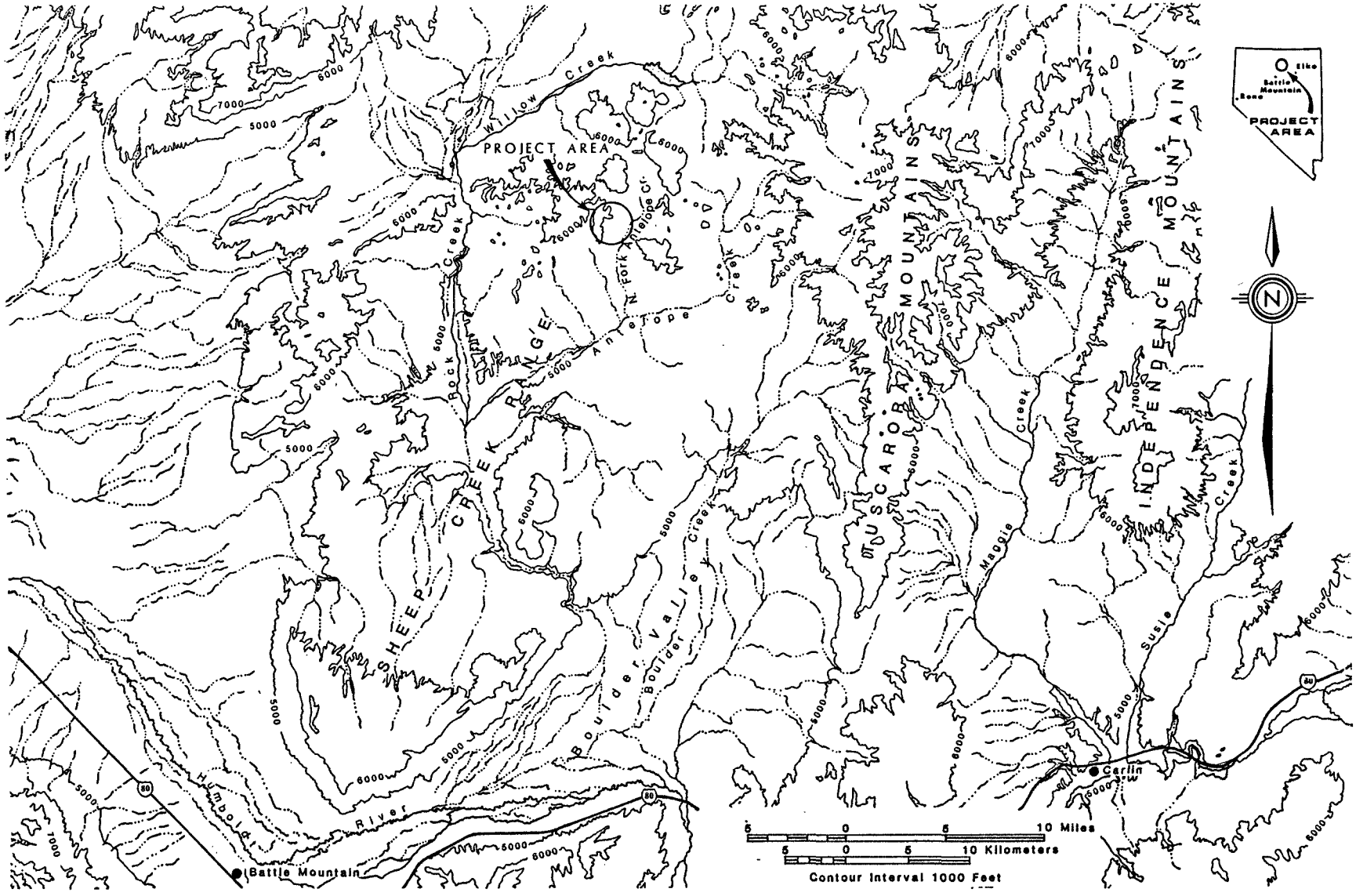
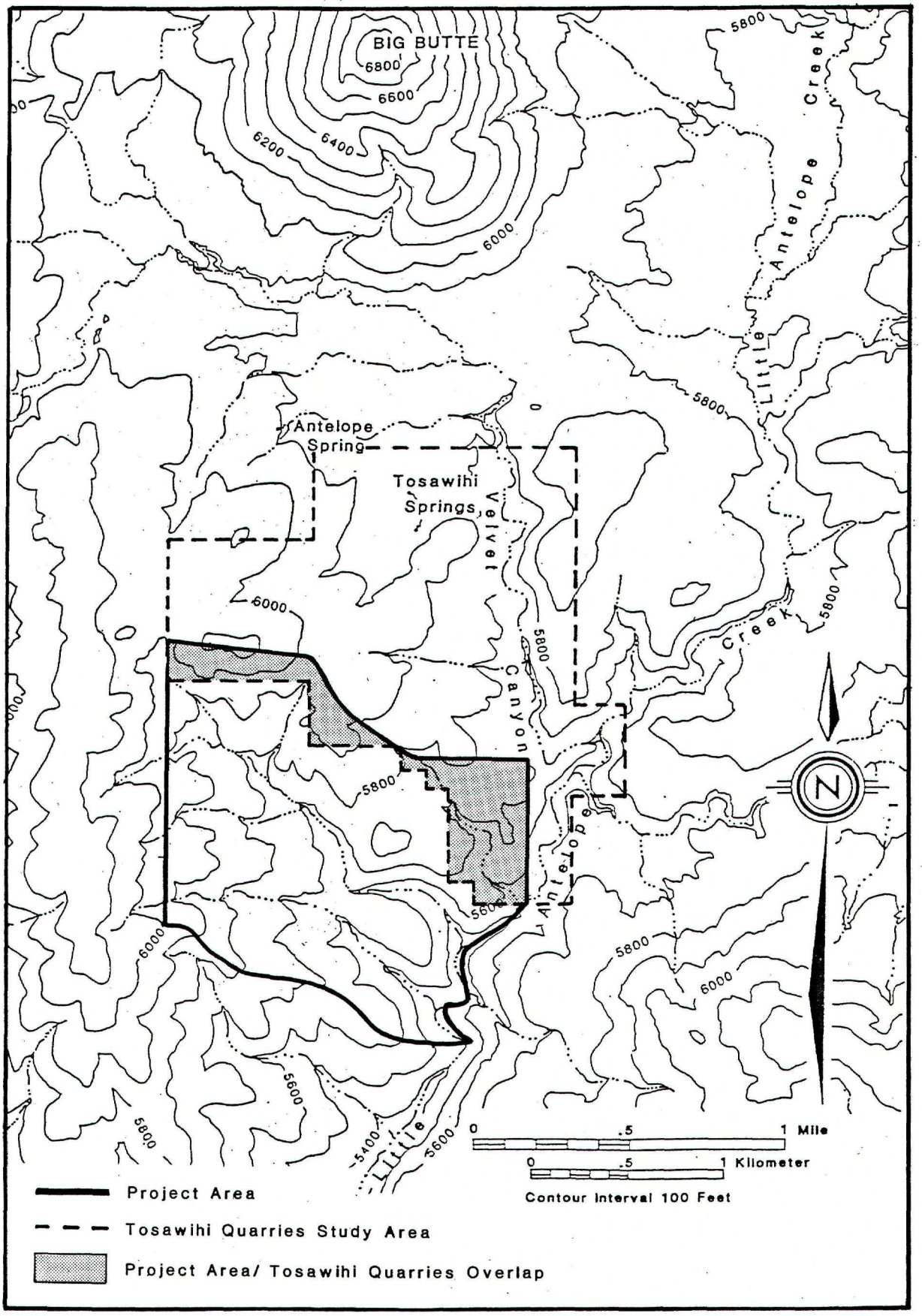

PROJECT AREA
Willow Creek
North Fork Antelope Creek
Antelope Creek
Rock Creek
SHEEP CREEK RANGE
Boulder Valley
Boulder Creek
MUSCARAS MOUNTAINS
Maggie Creek
INDEPENDENCE MOUNTAINS
Susie Creek
Humboldt River
Battle Mountain
Carlin
80
5000
6000
7000
5 0 5 10 Miles
5 0 5 10 Kilometers
Contour Interval 1000 Feet
Elko
Battle Mountain
PROJECT AREA
N

Figure 2. Project location map, showing relationship of the U.S. Steel Project Area to the Tosawihi Quarries Study Area (Elston et al. 1987).


BIG BUTTE
6800
6600
6400
6200
6000
5800
Little Antelope Creek
Antelope Spring
Tosawihi Springs
Velvet Canyon
Creek
Little Antelope Creek
N
0 .5 1 Mile
0 .5 1 Kilometer
Contour Interval 100 Feet
Project Area
Tosawihi Quarries Study Area
Project Area/ Tosawihi Quarries Overlap

Project Description

Galactic Services proposes to develop a gold mine at their U.S. Steel Property. Ore extraction will be by open pit method, and reduction will employ the cyanide heap leaching process. Thus, the mine development will be comprised of pit, haul roads, waste dumps, leach pad, ore piles, topsoil storage, mill site, equipment yard, and other support facilities. Legal descriptions of the project area, based on the U.S.G.S. Willow Creek Reservoir SE Quad, 7.5', (1965), are as follow:

SW 1/4 of SW 1/4 of Section 4, T37N, R48E
W1/2 of NW 1/4 of SW 1/4 of Section 4, T37N, R48E
Portions of SW 1/4 of NE 1/4 of SW 1/4 of Section 4, T37N, R48E
Portions of NW 1/4 of SW 1/4 of SW 1/4 of Section 4, T37N, R48E
Portions of SW 1/4 of SW 1/4 of SW 1/4 of Section 4, T37N, R48E

SE 1/4 of Section 5, T37N, R48E
W 1/2 of SE 1/4 of NE 1/4 of Section 5, T37N, R48E
SW 1/4 of NE 1/4 of Section 5, T37N, R48E
E 1/2 of SE 1/4 of NW 1/4 of Section 5, T37N, R48E
E 1/2 of NE 1/4 of SW 1/4 of Section 5, T37N, R48E
E 1/2 of SE 1/4 of SW 1/4 of Section 5, T37N, R48E

NE 1/4 of NE 1/4 of Section 8, T37N, R48E
NE 1/4 of NE 1/4 of NW 1/4 of Section 8, T37N, R48E
E 1/2 of NW 1/4 of NE 1/4 of Section 8, T37N, R48E
Portions of NE 1/4 of SE 1/4 of NE 1/4 of Section 8, T37N, R48E
Portions of W 1/2 of NW 1/4 of NE 1/4 of Section 8, T37N, R48E

NW 1/4 of NW 1/4 of Section 9, T37N, R48E
N 1/2 of SW 1/4 of NW 1/4 of Section 9, T37N, R48E
SE 1/4 of SW 1/4 of NW 1/4 of Section 9, T37N, R48E
Portions of NW 1/4 of NE 1/4 of NW 1/4 of Section 9, T37N, R48E
Portions of SW 1/4 of NE 1/4 of NW 1/4 of Section 9, T37N, R48E
Portions of NW 1/4 of SE 1/4 of NW 1/4 of Section 9, T37N, R48E
Portions of SW 1/4 of SE 1/4 of NW 1/4 of Section 9, T37N, R48E

While the project area encompasses some 600 acres, proposed developments are planned for the southern portion of the project area. The pit is to be located on Red Hill in an area where intensive minerals exploration has occurred intermittently since 1963 (Hollister 1986:4-6). Red Hill is circumscribed by roads and drill pads from this exploration activity (Figure 3). Support facilities are to be located on ridges and in canyons southwest of Red Hill (Figure 4). A proposed plan of operation for the mine development is detailed in Chapter 8.

Report Organization

The following discussions report the archaeological inventory and evaluation work undertaken on behalf of the U.S. Steel Project. The physical environment of the project area is described in Chapter 2 and the cultural setting is described in Chapter 3. Field and laboratory methods are detailed in Chapter 4. Chapter 5 presents the results of survey and artifact observations are discussed in Chapter 6. The two concluding chapters discuss site significance evaluations (Chapter 7), assess project effects and offer cultural resource management recommendations (Chapter 8).

Figure 3. Overview (north) of Red Hill, site of proposed pit.

Figure 4. Overview (north) of area proposed for ancillary development.

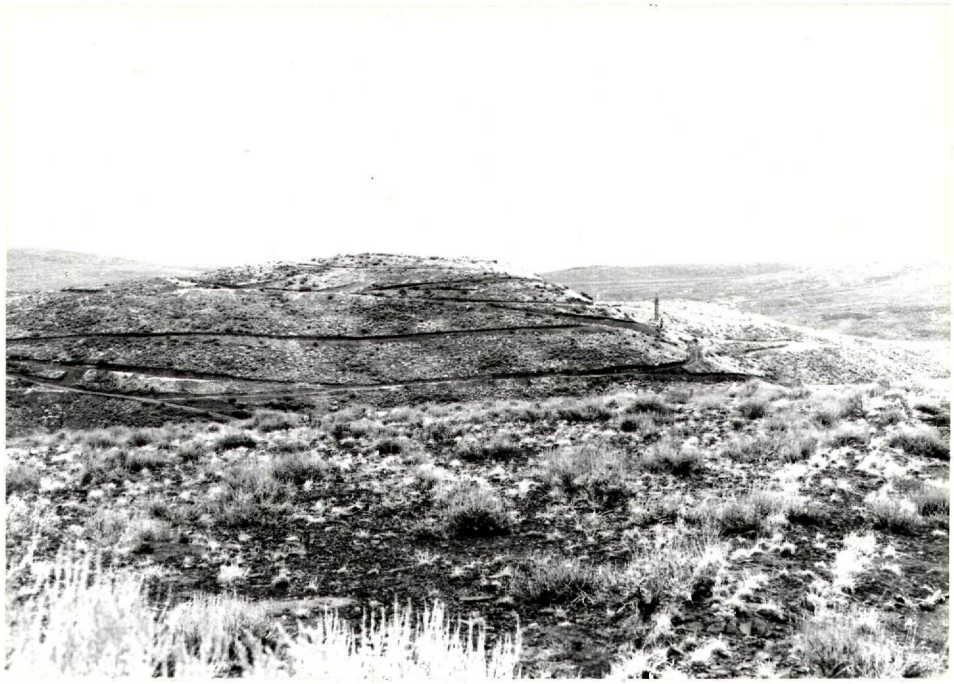


Figure 3.

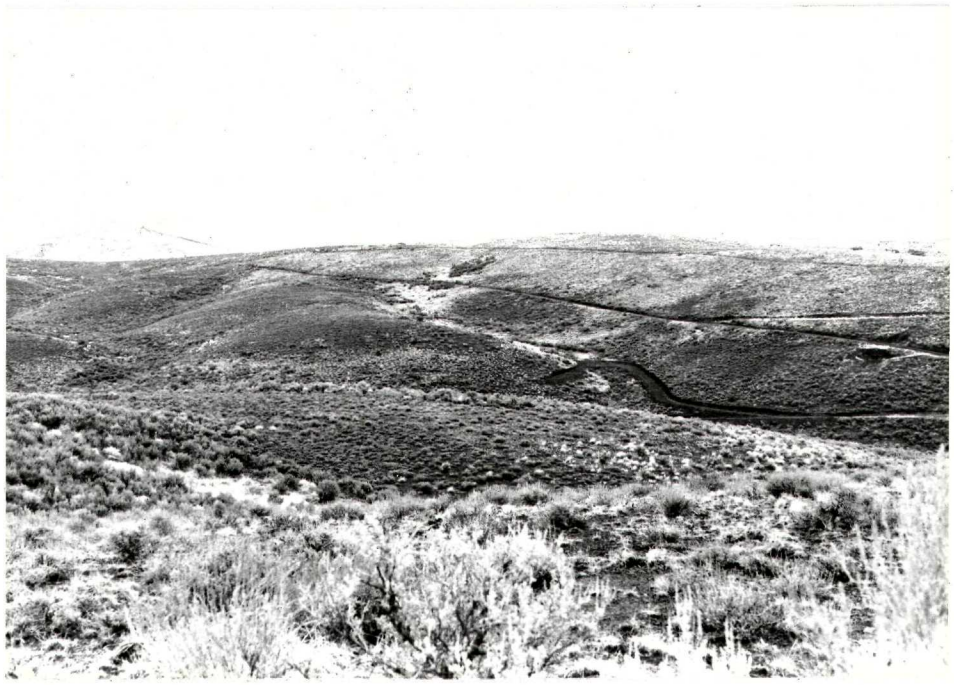


Figure 4.

Chapter 2. PHYSICAL SETTING

The reader is referred to Elston et al. (1987) for a detailed description of the study region. Here, description is confined to the project area and its immediate surrounds.

The project area is located along moderately steep, dissected terrain that forms tributaries to Little Antelope Creek (Figure 5). On the west, a series of southeast-trending finger ridges, cut by narrow ephemeral drainages, descend (10% slope) to the canyon of Little Antelope Creek which forms the east boundary of the project area (figures 5 and 6). On the north, the project area boundary extends from Twin Butte (also known locally as Crow's Nest) on the northwest, along Boundary Ravine, to Little Antelope Canyon near Confusion Gorge. The south boundary of the project area follows the crest of a ridgeline. Basalt Canyon, an important but ephemeral tributary to Little Antelope Creek, bisects the project area, forming a divide between Red Hill and Prospector Point, and providing road access through the area (figures 5 and 7).

Elevations range from 5425 feet amsl on the southeast in Little Antelope Creek, to 6125 feet amsl on the northwest at the summit of Twin Butte. Slopes range from strongly sloping (10%) ridgelines broken by numerous small flats, terraced knoll tops, and saddles, to moderately steep drainage slopes (15-30%), with steep to very steep slopes (33-50%) along the south side of Red Hill, around Prospector Point, and along the north side of Sunday Peak (see Figure 5).

Geology

The geology of the project area has been mapped as Tertiary basalt (Coats 1987: Plate 1), but has not been described in detail. Basalt occurs as talus stripes on ridge slopes and as scattered surface cobbles on ridge tops. On the northwest, talus is composed of large basalt cobbles; on the southwest, thin, tabular pieces of rhyolite are characteristic. Large basalt cobbles were transported prehistorically from the area to the Tosawihi Quarries where they served as hammerstones and provided raw material for projectiles and digging tools; similarly, tabular rhyolite pieces provided seed grinding surfaces and abraders for percussion tools (Elston et al. 1987:6, 94-98).

The Tosawihi Quarries, north of the project area, encompass an extensive opalite zone that was quarried intensively for prehistoric toolstone (Elston et al. 1987).

Figure 5. Topography of the project area.

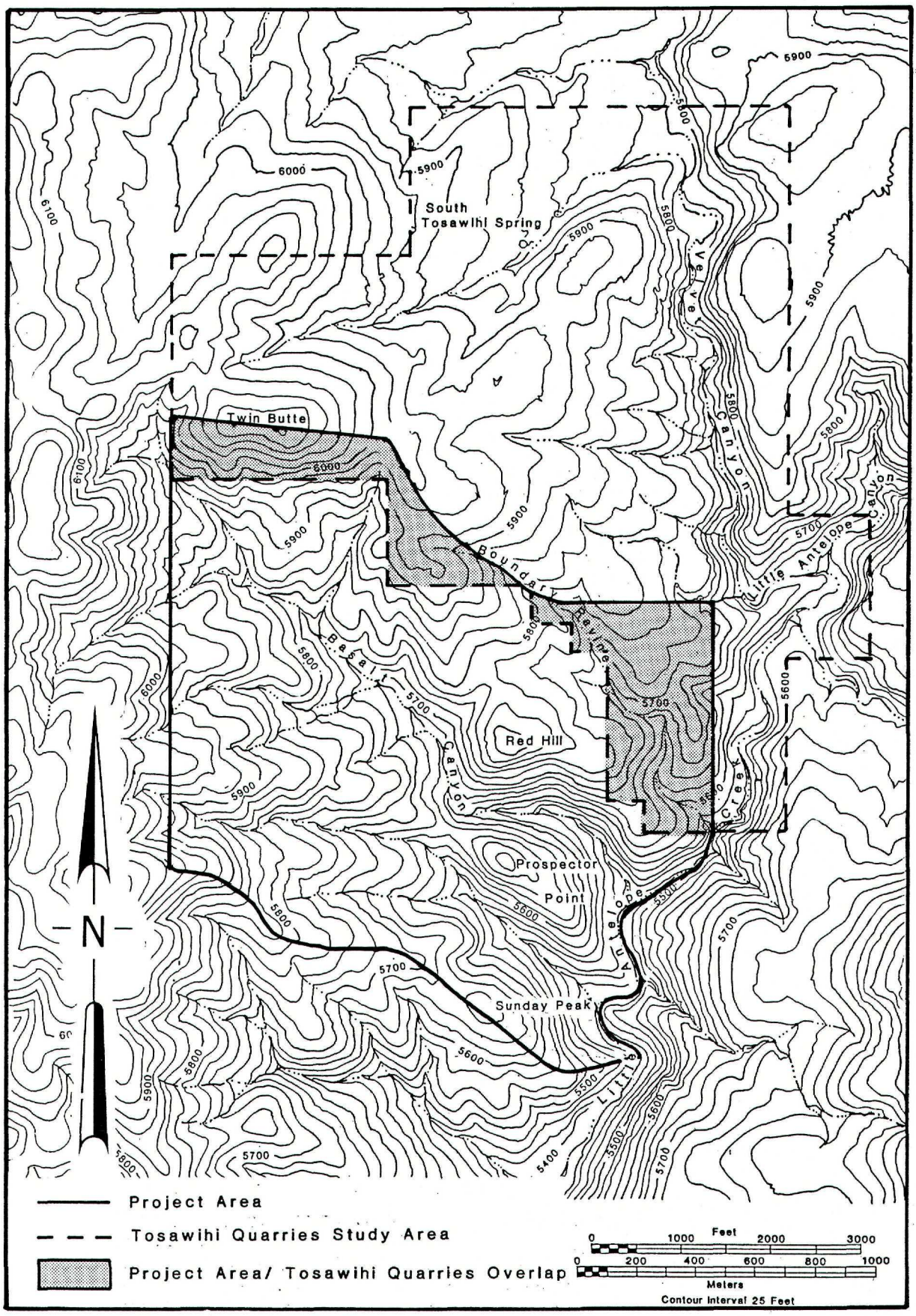

South
Tosawihi Spring
Twin Butte
Boundary
Basalt
Canyon
Red Hill
Prospector
Point
Sunday Peak
Little Antelope Canyon
Little Antelope Creek
N
Project Area
Tosawihi Quarries Study Area
Project Area/ Tosawihi Quarries Overlap
0 1000 Feet 2000 3000
0 200 400 600 800 1000
Meters
Contour Interval 25 Feet

Figure 6. Overview (north) of eastern project boundary, along Little Antelope Canyon. Confusion Gorge can be seen in upper center.

Figure 7. Overview (north) of western project boundary. Twin Butte on western horizon, Red Hill on eastern horizon, Basalt Canyon at photo center, and Big Butte in background.

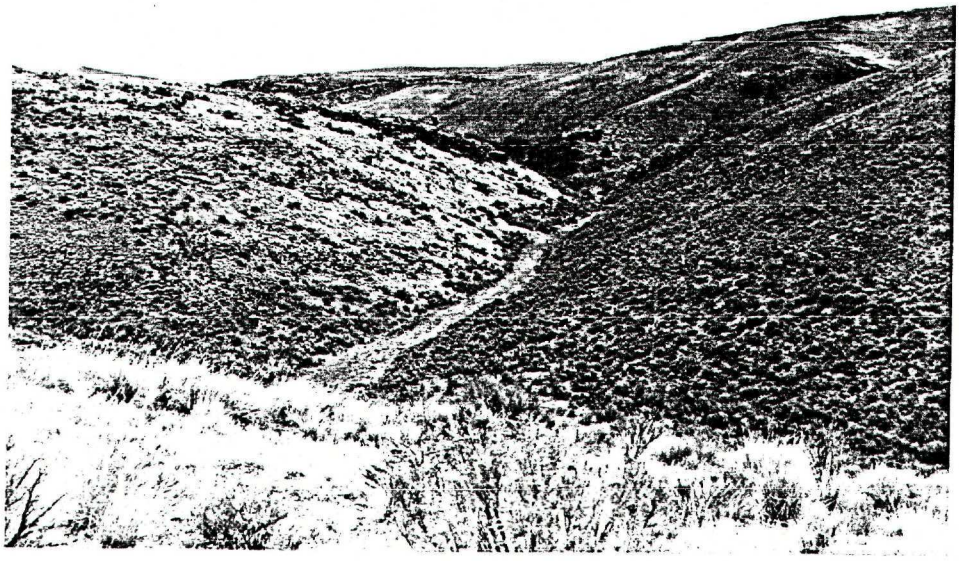


Figure 6.

Figure 7.

Opalite formation is the product of late Miocene or early Pliocene silicification of volcanic rocks and sediments (rhyolitic ash, tuffs, obsidian, and rhyolite) induced by a series of hydrothermal episodes. Permeation of the matrices by silica-rich solutions along fissures and bedding planes resulted in localized deposits of opalite that subsequent millenia of dehydration and crystallization have transformed into a chert-like group of cryptocrystallines (Bailey and Phoenix 1944:17-21).

The surface and near surface deposits of opalite which outcrop in the Tosawihi Quarries are rare in the U.S. Steel Project Area. Boundary Ridge defines the southern limit of the zone of opalite mineralization, although a few small outcrops are located along the southern crest of Red Hill in the project area. Opalite cobbles occur as occasional components of alluvial gravels in the bottom of Basalt Canyon.

Soils deriving from basalts and rhyolites on the western ridges are characteristically red in color. Each of the prominent knolls on the southeast above Little Antelope Creek is a different formation with distinct surficial deposits: Prospector Point and Sunday Peak have dark brown soil with large surface areas covered by gravel-to-pebble-sized pieces of fractured opalite and occasional boulder-sized outcrops of nonsiliceous opalite materials unsuitable for toolstone. Soil color on Red Hill is variable, ranging from light orange to red; nonsiliceous opalite is present on the surface, ranging from gravel-to-cobble-sized pieces, with rare boulders. Siliceous opalite, of variable toolstone quality, occurs as small, near surface outcrops along the south crest of Red Hill and on the extreme northeast margin of the project area along Boundary Ravine. A description of the stratigraphy, processes of alteration, and rock types is being developed (Don Hruska, personal communication 1987).

Hydrology

No perennial water sources are located in the project area. Little Antelope Creek channels seasonal runoff from a sizable watershed. Persistent (but ephemeral) seeps form in Velvet Canyon, a significant tributary to the north. The many small drainages tributary to Basalt Canyon, and thence to Little Antelope Creek, are active only briefly during storm episodes. Two springs occur north of the project area, one at the confluence of Velvet and Little Antelope canyons and one (Tosawihi Spring) in the flats south of Big Butte; both were moribund by mid-August, 1987 (Elston et al. 1987:6).

The fugitive nature of water resources in the vicinity of the Tosawihi Quarries may have constrained prehistoric habitation to short term and/or seasonal use (Elston et al. 1987:111-112).

Vegetation

The study area is an expression of the Artemesian biotic province characteristic of the high desert valleys and lower foothills of the northern Great Basin (Billings 1951:110-113; Cronquist et al. 1972:122-125). Three communities of this sagebrush-grass zone are found in the project area. A low sage community forms open cover on the basalt ridges with their thin soil mantle; species include low sage (Artemesia arbuscula), phlox (Phlox sp.), snakeweed (Gutierrezia sarothrae), green rabbitbrush (Chrysothamnus viscidiflorus), with occasional grasses such as squirreltail (Sitanion hystrix) and Idaho fescue (Festuca idahoensis). Big sage (Artemesia tridentata) mixed with small amounts of rubber rabbitbrush (Chrysothamnus nauseosus), Great Basin wildrye (Elgmus cinereus), and bluebunch wheatgrass (Agropyron spicatum) is limited to steep north-facing slopes, drainage bottoms, and occasional low soil mounds on ridge tops; however, where present, big sage forms a rather dense cover with some nearly impenetrable thickets, especially along drainage bottoms. Grasses and snakeweed compose the third community; grasses form notably thick cover on the top and upper slopes of Prospector Point, but compose small island communities on Red Hill and Sunday Peak.

Fauna

Animals noted during survey were limited to occasional coyote (Canis latrans), cottontail rabbit (Sylvilagus spp.), and chipmunk (Eutamias spp.). Big sagebrush thickets were woven by fresh trails of coyote and cottontail spoor, often overlapping. Badger (Taxidea taxus) burrows and rodent turbated slopes signal the presence of some common, but seldom observed, residents. Antelope (Antilocapra americana) were noted during an earlier survey (Elston et al. 1987:8), and mule deer (Odocoileus hemionus) are likely seasonal visitors.

Chapter 3. CULTURAL SETTING

A cogent summary of ethnographic patterns, cultural chronology, and previous archaeological research is provided in a survey report for the adjacent Tosawihi Quarries (Elston et al. 1987). The discussions which follow highlight selected cultural background information and guide the reader to relevant literature sources.

Ethnography

The project area constitutes a portion of the foraging territory used by the ethnographic Tosawihi, or "White Knife," Shoshoni whose winter settlements were centered along the Humboldt River in the vicinity of present day Battle Mountain (Steward 1938). The group name refers to a locally available white toolstone (Steward 1938:162), most certainly the Tosawihi Quarries opalite. Ethnographic sources include Steward (1937, 1938, 1939, 1941), Harris (1940), and Powell and Ingalls (1874), but they record little ethnographic data concerning the mechanisms of opalite procurement, transport and trade, or relationships to Shoshoni settlement and subsistence. These questions are the focus of previous archaeological studies in the vicinity, as described below.

Previous Research

The archaeology of the project area is tied closely to inquiry into the exploitation and manipulation of opalite toolstone from the Tosawihi Quarries. Though the significance of the quarries has been known for some time (cf. Steward 1938), research has been limited and present understanding is preliminary.

An intensive reconnaissance of the 823 acre Tosawihi Quarries Study Area recently was conducted by Elston et al. (1987). The study recorded 219 prehistoric localities: isolated artifacts, discrete clusters of artifacts, rockshelters, open residential localities, and quarry-related localities (isolated quarry pits, quarry pit complexes, outcrop quarries, adits, and surface cobble quarries).

Investigation of the Tosawihi Quarries was initiated by Mary Rusco in the 1970s. Initial research focused on chemical as well as macroscopic physical characterization of Tosawihi opalites and on the distribution of apparent Tosawihi material in sites outside the quarry source, in light of gravity models

and ethnic boundaries (Rusco 1976a, 1976b, 1978, 1979, 1983). X-ray fluorescence methods for chemical characterization so far have proven equivocal (Duffe' 1976a, 1976b), but other approaches are being contemplated (Mary Rusco, personal communication 1987).

Identification of the nature and distribution of lithic materials derived from the Tosawihi Quarries has been addressed by subsequent research at archaeological sites 70 to 90 km east of the quarry source: at South Fork Shelter (Heizer et al. 1968; Spencer et al. 1987:72), at James Creek Shelter (Elston and Budy 1989), and at sites near Carlin (Rusco and Jensen 1979) and along Susie Creek (Armentrout and Hanes 1987).

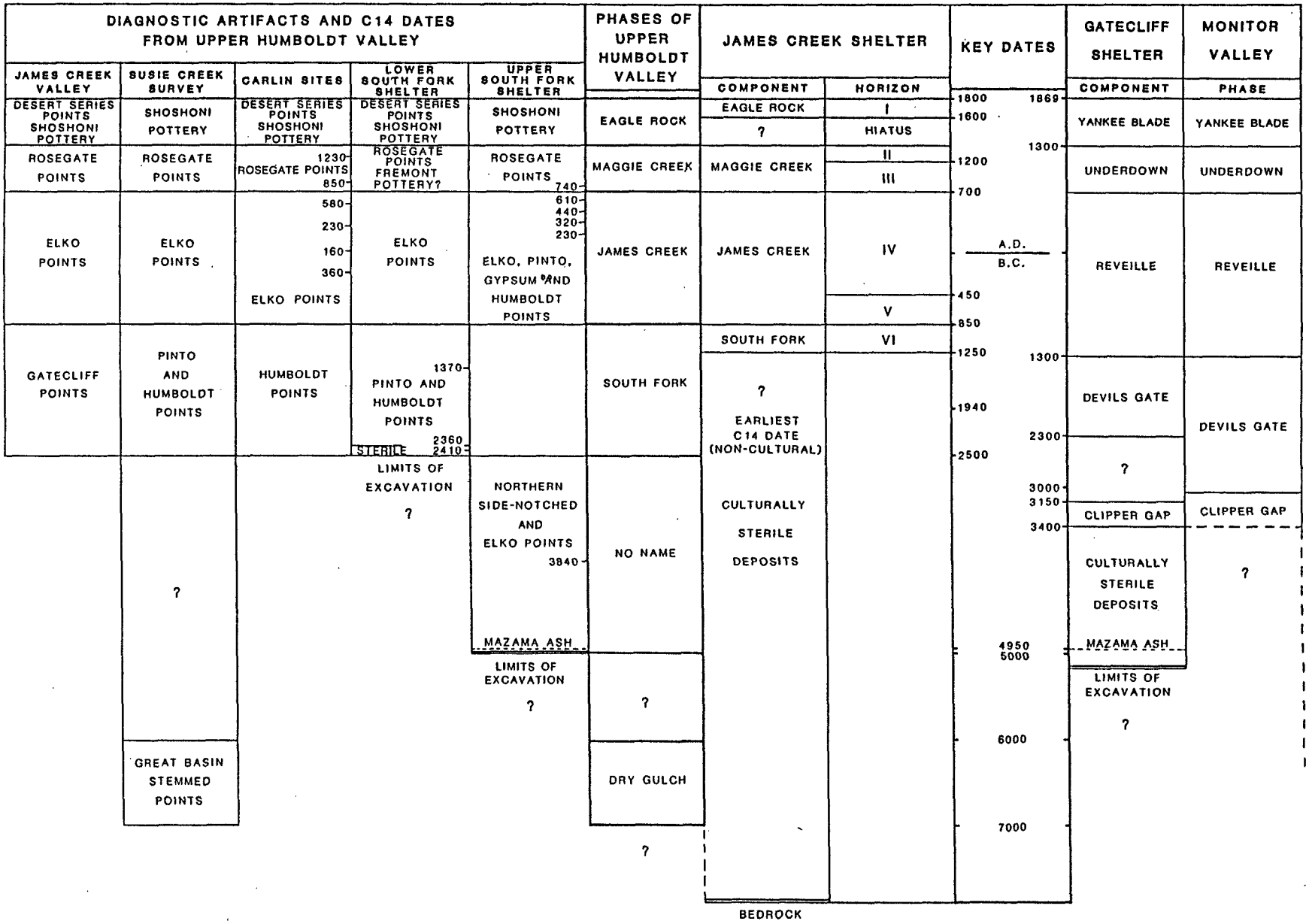
Investigations at five late prehistoric sites at the proposed Rock Creek Dam location, about 30 km southwest of the project area, indicate that reduction of Tosawihi opalite bifaces was a primary activity there; it has been inferred that the material was taken to the sites in the form of Stage II or Stage III bifaces (Clay and Hemphill 1986). Tosawihi opalite was also the dominant toolstone material present at seven sites investigated near the Rossi Mines, located about 10 km east of the Tosawihi Quarries (Rusco 1982); there, projectile points suggest a possible time depth of 8500 years.

The most intensive archaeological investigations to have been undertaken in the region were in connection with development of the Valmy power plant some 50 km southwest of the Tosawihi Quarries; studies included preliminary surveys (Bard 1980; Busby and Bard 1979; Rusco and Seelinger 1974) and intensive surface collections and test excavations at several sites near Treaty Hill (Davis et al. 1976; Rusco and Davis 1979; Elston et al. 1981). These investigations indicate human use of the area over the past 7000 years, with Tosawihi opalite composing the dominant toolstone at the sites studied.

Cultural Chronology

Syntheses of the regional cultural chronology are available in James (1981), Rusco (1982), Smith et al. (1983), and Elston (1986); Figure 8 compares regional cultural sequences. A sequence proposed for the upper Humboldt, based on recent excavations at James Creek Shelter (Elston and Budy 1989), 50 km southeast of the project area, is outlined below.

Figure 8. Prehistoric chronology for the upper Humboldt Valley, Nevada (after Elston et al. 1987:Figure 4).


DIAGNOSTIC ARTIFACTS AND C14 DATES FROM UPPER HUMBOLDT VALLEY
JAMES CREEK VALLEY
SUSIE CREEK SURVEY
CARLIN SITES
LOWER SOUTH FORK SHELTER
UPPER SOUTH FORK SHELTER
PHASES OF UPPER HUMBOLDT VALLEY
JAMES CREEK SHELTER
COMPONENT
HORIZON
KEY DATES
GATECLIFF SHELTER
COMPONENT
MONITOR VALLEY
PHASE
DESERT SERIES POINTS
SHOSHONI POTTERY
SHOSHONI POTTERY
DESERT SERIES POINTS
SHOSHONI POTTERY
DESERT SERIES POINTS
SHOSHONI POTTERY
SHOSHONI POTTERY
EAGLE ROCK
EAGLE ROCK
I
1800
1869
YANKEE BLADE
YANKEE BLADE
?
HIATUS
1600
1300
ROSEGATE POINTS
ROSEGATE POINTS
1230
ROSEGATE POINTS
850
ROSEGATE POINTS
FREMONT POTTERY?
ROSEGATE POINTS
740
MAGGIE CREEK
MAGGIE CREEK
II
III
1200
700
UNDERDOWN
UNDERDOWN
580
230
160
360
610
440
320
230
ELKO POINTS
ELKO POINTS
ELKO POINTS
ELKO POINTS
ELKO, PINTO, GYPSUM AND HUMBOLDT POINTS
JAMES CREEK
JAMES CREEK
IV
A.D.
B.C.
REVEILLE
REVEILLE
450
V
850
SOUTH FORK
VI
1250
1300
1370
PINTO AND HUMBOLDT POINTS
2360
STERILE
2410
GATECLIFF POINTS
PINTO AND HUMBOLDT POINTS
HUMBOLDT POINTS
SOUTH FORK
?
EARLIEST C14 DATE (NON-CULTURAL)
1940
2300
2500
DEVILS GATE
DEVILS GATE
?
3000
3150
3400
CLIPPER GAP
CLIPPER GAP
LIMITS OF EXCAVATION
?
NORTHERN SIDE-NOTCHED AND ELKO POINTS
3840
MAZAMA ASH
NO NAME
CULTURALLY STERILE DEPOSITS
CULTURALLY STERILE DEPOSITS
MAZAMA ASH
4950
5000
LIMITS OF EXCAVATION
?
?
?
6000
GREAT BASIN STEMMED POINTS
DRY GULCH
7000
?
BEDROCK

Dry Gulch Phase: ? - 6000 B.C.

Diagnostic artifacts for the earliest known phase for the upper Humboldt include large, concave-base projectile points, Great Basin Stemmed points, flaked stone crescents, heavy core tools, scrapers, and choppers. Originally defined as a lacustrine adaptation, or the Western Pluvial Lakes Tradition (Bedwell 1973), presently it is recognized in riparian and upland settings as well. Regarded as pre-Archaic in the broader sequence of Great Basin adaptations (Elston 1982), the phase is characterized by a distinctive lithic technology, lack of seed grinding implements, and a high degree of residential mobility. Artifacts diagnostic of the phase have been noted at Valmy (Elston et al. 1981), Susie Creek (Armentrout and Hanes 1987), Rye Patch Reservoir (Rusco and Davis 1982), and at the Tosawihi Quarries (Elston et al. 1987).

No Name Phase: 5000-2500 B.C.

The emergence of the Early Archaic adaptation in the upper Humboldt River drainage is marked by Northern Side-notched and Humboldt Series projectile points (Heizer and Hester 1973; Thomas 1981, 1983). Elsewhere in the Great Basin, early Archaic adaptations reflect the inception of intensified seed use, increased locational diversity in land-use patterns, probable increase in breadth of diet, and logistical structuring of subsistence pursuits. In the upper Humboldt, few sites of this time period have been observed (Elston and Budy 1989).

South Fork Phase: 2500-850 B.C.

The Middle Archaic adaptation on the upper Humboldt is not well characterized by existing data; however, Humboldt and Gatecliff Series projectile points are considered diagnostic (Elston and Budy 1989).

James Creek Phase: 850 B.C.-A.D. 700

This phase marks the full expression of the Archaic adaptation. Elko Series projectile points are the principal phase-markers, and their distribution indicates the exploitation of an extremely wide range of settings and resources, a marked broadening of the prey-base, and a more eclectic use of the environment.

Maggie Creek Phase: A.D. 700-1300

At James Creek Shelter, this phase is characterized by further intensification of plant exploitation, increased pursuit of small game, and introduction of the bow and arrow. Rosegate Series projectile points (and Fremont Grayware ceramics in the eastern Great Basin) are diagnostic.

Eagle Rock Phase: A.D. 1300 to protohistoric times

The phase apparently represents the archaeological record of the Numic peoples who occupied the area at historic contact. Along the upper Humboldt, the phase is marked by Desert Series projectile points (Desert Side-notched and Cottonwood), and by Shoshone Brownware ceramics (Elston and Budy 1989).

History

The project area is located in the historic Ivanhoe Mining District (Bailey and Phoenix 1944:17-21). Mercury ore was discovered in 1911, but development, north of the project area at the Clementine, Butte, and Velvet workings, dates from about 1929 (Zeier 1987:6). Mining continued intermittently through the 1940s, with most production generated by the Butte Quicksilver Mine. Mercury mining increased with the advent of World War II and lasted (at least intermittently) until 1947. Mining saw a brief resurgence between 1957 and 1962, and again in 1966, likely in response to increased international mercury prices (Zeier 1987:6). In 1979, exploratory drilling for other mineral resources was initiated in the area. Gold was found associated with the local opalite formation and deposits at Red Hill, initially located by U.S. Steel (Hollister 1986), motivate the present proposed mining developments.

Chapter 4. STUDY METHODS

Field work was accomplished in two field sessions in November, 1987. Session I surveyed 250 acres and recorded 62 sites. Session II surveyed 230 acres and recorded an additional 62 sites.

Two periods of snowfall imposed constraints on field work, interrupting and delaying survey which resumed when snow cover diminished to less than 30% coverage. Finally, a few small areas on north-facing slopes and small narrow drainages remained with 30-60% snow cover (Figure 9); it should be noted that these areas were inspected casually but were not accorded the systematic coverage received by the remainder of the project area. The potential for the occurrence of cultural remains in these areas is considered negligible.

Survey Methods

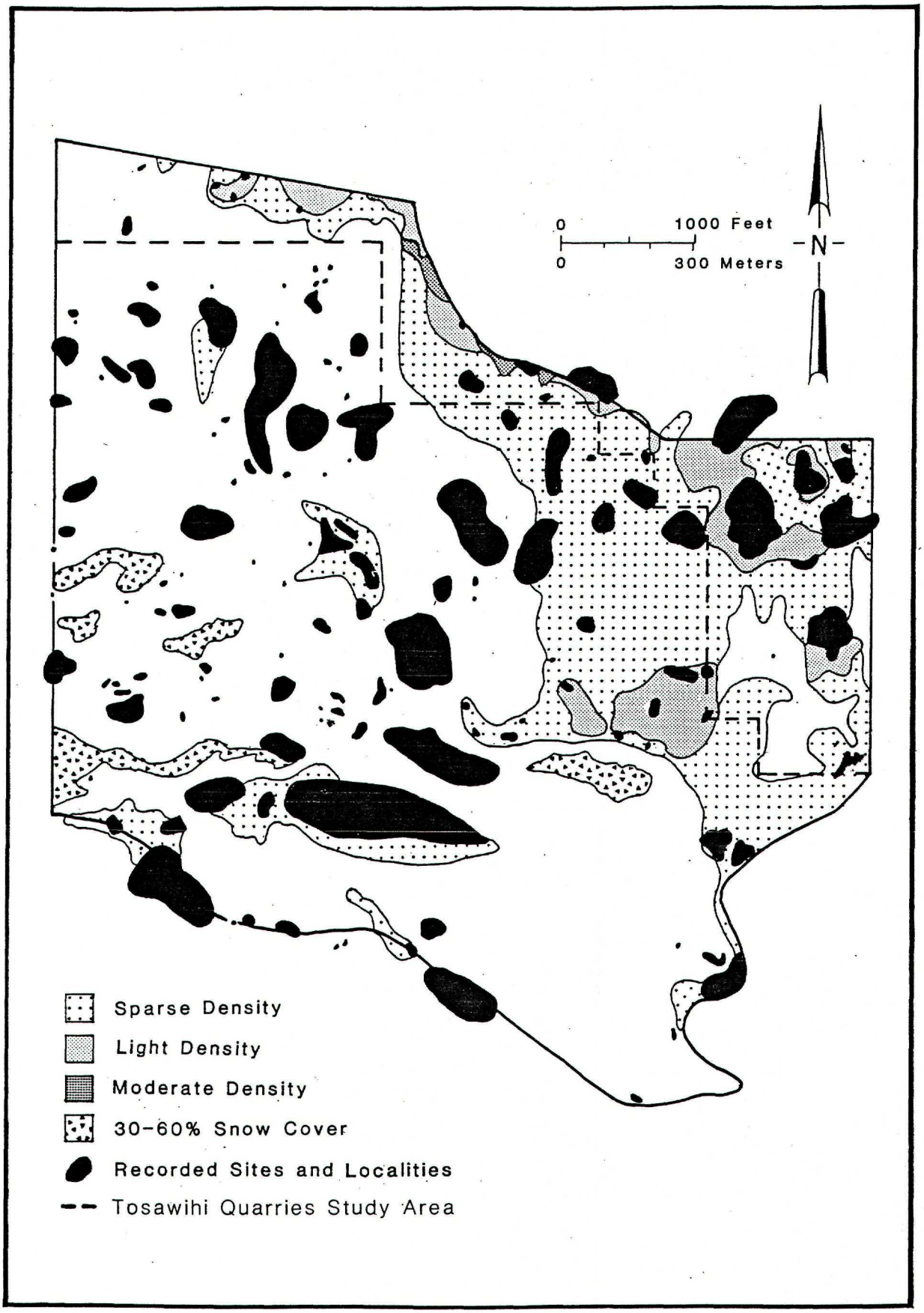
Except for minor adjustments dictated by snow cover and terrain, survey was conducted at the same level of intensity and used the same reconnaissance strategies implemented during the earlier survey of the Tosawihi Quarries Study Area (Elston et al. 1987). Galactic Services, Inc. provided 1:6000 (1 in. = 500 ft.) topographic maps (5 feet contour intervals) of the project area; these were used to orient transects, maintain geographic control, and plot archaeological sites. Survey was facilitated by an existing survey grid staked at 400-foot intervals over most of the project area.

Survey transect interval was established at 30 meters, using both cardinal direction and contour transects. Forty-four cardinal direction transects, some oriented north-south, others oriented east-west, were established over the western and northern portions of the project area. The steep slopes of Red Hill, Prospector Point, and Sunday Peak were surveyed along 22 transects oriented parallel to slope contours.

Recording

Each field party member was responsible for recording all cultural observations made along each transect that he/she walked. Each spacially discrete observation was assigned a temporary site number; data were recorded on field transect records. Intermountain Antiquities Computer System (IMACS) site forms then were completed for each of the 124 prehistoric sites recorded.

Figure 9. Project area map showing zones of snow cover relative to recorded sites and localities.


0
1000 Feet
0
300 Meters
N
Sparse Density
Light Density
Moderate Density
30-60% Snow Cover
Recorded Sites and Localities
Tosawihi Quarries Study Area

Consistent with methods used by Elston et al. (1987), debitage density over the project area was recorded at 100-foot intervals along survey transects. The estimation and recording of debitage density observed the following conventions:

0:	No debitage noted over 100 transect-feet.
Sparse:	Average density of less than 1 flake/m^2.
Light:	Average density of 1-100 flakes/m^2.
Moderate:	Greater than 100 flakes/m^2; bare ground visible.
Heavy:	Unbroken pavement of debitage; bare ground not visible.

Unlike the primary quarry zone to the north, where debitage forms a variable density, but ubiquitous, scatter, sites in the project area tend to be spacially discrete and zones between sites are characterized by zero or sparse amounts of debitage (see Figure 9). Light density scatters were recorded as discrete sites. Exceptions are noted only in the few places where local opalite sources were quarried for toolstone, and where debitage materials have been dispersed down steep slopes (see Figure 9).

Collection

Due to the scarcity of temporal indicators in the vicinity, all projectile points observed (n=11) were collected. In addition, one exceptionally large biface was collected from a disturbed context at site 631-38. Similarly, an unmodified obsidian pebble was collected along Little Antelope Creek, outside the project area.

Following field work, collected artifacts were cleaned, numbered, cataloged, and bagged for storage. Catalog numbers, comprised of temporary site number and specimen number, were applied directly to individual items with china white or black india ink coated with clear lacquer. Field and laboratory notes and logs, mapping notes, photo logs and negatives, artifact assemblage and catalog, and this report will be accessioned by the Museum of Anthropology, University of Nevada, Reno, where they will be available to future

teaching and research endeavors. Intermountain Antiquities Computer System (IMACS) site forms have been filed with the BLM Elko Resource Area office.

Lithics Analysis

Prior to their collection, artifacts were plotted on field maps and proveniences were recorded with compass bearings and survey coordinates. Classification of projectile points is based on morphological criteria specified by Thomas (1981). In addition to length, width, thickness, and weight attributes, notching or shoulder angles are measured and various ratios between attributes calculated. Bifaces recorded during survey were classified according to the three stage reduction scheme developed by Muto (1971), and as further described by Elston et al. (1987) for bifaces examined in the Tosawihi Quarries.

Chapter 5. RESULTS OF SURVEY

A total of 152 sites occur in the project area (Figure 10, pocket map); 28 are localities recorded during survey of the Tosawihi Quarries Study Area (Elston et al. 1987); 124 are new sites recorded during present survey. New sites include two sites observed previously by BLM personnel, but not fully recorded until the present study: site 631-35 (CRNV-01-2009) and site 631-45 (CRNV-01-2008).

Previously Recorded Localities

Previously recorded localities are represented by isolated artifacts, and discrete features and feature clusters originally recorded as components of the Tosawihi Quarries Site (26Ek3032) (Elston et al. 1987). Previously recorded locality numbers discussed here are prefaced by a 611- designator to set them apart from temporary numbers (prefaced by a 631- designator) assigned to sites recorded by the present survey.

Relative percentages of localities by type, as defined in Elston et al. (1987:53-66), are listed in Table 1, below. Summary descriptions follow.

Table 1. Summary of Previously Recorded Locality Types in the Project Area.

Locality Type	Number	%
Outcrop Quarry	3	10.7
Isolated Quarry Pit	3	10.7
Quarry Pit Complex	7	25.0
Small Reduction Station	8	28.5
Reduction Station Complex	4	14.3
Rockshelter/Reduction Station	1	3.6
Rockshelter/Undetermined	1	3.6
Isolated Artifact	1	3.6
Total	28	100.0

Quarry Localities

Quarry localities are classified according to the nature of the related opalite exposure (e.g., bedrock outcrop, cobbles in colluvium) and, consequently, by presence or

absence of extraction pit features at each. Thirteen previously recorded quarry localities are summarized by type in Table 2, below.

Table 2. Previously Recorded Quarry Locality Types.

Type	Reference Number	Max. Area (sq. m.)	Exotic Materials/ Specialized Tools
Outcrop Quarry			
	611-1	900	None noted
	611-12	150	None noted
	611-13	375	Basalt hammerstones
Isolated Quarry Pit			
	611-2	15	Rhyolite hammerstone
	611-206	2,280	None noted
	611-207	30	Basalt cobble spalls
Quarry Pit Complex			
	611-10	10,000	None noted
	611-24	9,000	Rhyolite hammerstones
	611-35	2,700	Rhyolite hammerstones
	611-36	21,600	None noted
	611-39	24,000	None noted
	611-43	7,200	None noted
	611-45	2,700	None noted

The three outcrop quarries are located along the rimrock edging Red Hill; all are described as very localized, poor-to-medium quality toolstone sources (Elston et al. 1987).

In general, quarry pit features are associated with abundant, good quality toolstone sources. The seven quarry pit complexes reflect fairly intensive exploitation of rather large opalite source areas. They range in area from 2,700 to 24,000 square meters; all evidence thick accumulations of quarrying debris, including variable amounts of reduction flakes, shatter, cores, and bifaces. The only exotic lithic materials (i.e., other than local opalite) noted were rhyolite and basalt hammerstones and basalt cobble spalls.

Of the three isolated quarry pits recorded, two (611-2 and 611-207) evidence only light flake scatters and are located well outside the primary opalite outcrop zone; both

contained rhyolite and basalt hammerstones. Locality 611-206 is a small pit in a large diffuse lithic scatter dominated by historically produced mining shatter and natural angular fragments.

Reduction Localities

Reduction stations contain concentrations of lithic debitage, usually reflecting core reduction and/or biface thinning. Little or no on-site quarrying is evident at these localities, but opalite sources and quarry features may be present nearby. Reduction localities are further segregated by size and complexity. Small reduction stations encompass areas of no more than 350 square meters each and evidence only one flaking concentration. Reduction station complexes vary in area from 600 to 2250 square meters and evidence more than one flaking concentration or overlapping accumulations of reduction debitage. Reduction station localities are summarized in Table 3, below.

Table 3. Previously Recorded Reduction Locality Types.

Type	Reference Number	Max. Area (sq. m.)	Exotic Materials/ Specialized Tools
Small Reduction Station			
	611-34	345	None noted
	611-37	10	None noted
	611-181	20	None noted
	611-184	4	Obsidian flakes
	611-185	10	None noted
	611-186	1	None noted
	611-200	25	None noted
	611-216	20	None noted
Reduction Station Complex			
	611-25	2,250	None noted
	611-46	600	Basalt cobbles/ reduction flakes
	611-180	1,000	Obsidian flakes
	611-203	1,400	None noted

Reduction localities are thought to represent brief, isolated episodes of tool reduction, or overlapping accumulations of several brief episodes. However, tool reduction often is embedded in other activities (such as hunting) that leave less visible archaeological records (Elston et al. 1987:59). In this regard, it is interesting to observe that unmodified flakes of imported obsidian were noted at two reduction localities (611-46 and 611-180) and that basalt apparently was reduced at one of these localities (611-46).

Rockshelter Localities

Rockshelters are natural overhangs at the bases of cliffs, in cliff faces, or rock outcrops, which provide protection from the elements and can serve a variety of cultural uses. Two previously recorded rockshelters are located in the project area (Table 4).

Table 4. Previously Recorded Rockshelter Localities.

Type	Reference Number	Max. Area (sq. m.)	Exotic Materials/ Specialized Tools
Rockshelter/ Reduction Station	611-3	50	None noted
Rockshelter/ Undetermined	611-164	25	None noted

Rockshelter locality 611-3, classified as a reduction station, consists of a scatter of about 200 secondary flakes in a small alcove in the rimrock above Little Antelope Canyon. Rockshelter locality 611-164, called Prospect Shelter, is enigmatic. It is located in an overhang formed by a poor quality opalite ledge; quarry pits (locality 611-24) are apparent in the colluvial mantle above the outcrop that forms the shelter. Reduction debitage was visible at the surface and to a depth of about one meter (in a historic pit in the shelter).

Isolated Artifact Locality

One isolated artifact was recorded previously in the project area. Locality 611-93 is a metate fragment found face (i.e., grinding surface) down on a steep (33%) slope in an area otherwise devoid of cultural materials. The metate is split near the center down its long axis, but only one section was found. High polish and a well developed basin on the grinding surface indicate heavy use wear prior to the split (Elston et al. 1987: Appendix A).

Newly Recorded Sites

Newly recorded sites were classified into general functional types based on debitage density, spacial distribution, and tool and/or debitage categories (Table 5). For the most part, site type definitions follow Elston et al. 1987:53-66; differences reflect a smaller number of quarry types, a larger number of discrete reduction areas, and the presence of what may be short term residential sites.

Table 5. Summary of Newly Recorded Site Types.

Site Type	Total Recorded	Percent of New Sites
Outcrop Quarry	3	2.4
Talus Quarry	2	1.6
Cobble Quarry	4	3.2
Reduction Station	33	26.6
Reduction Complex	38	30.7
Reduction Complex/ Residential Site	9	7.3
Small Site	16	12.9
Isolated Artifact	19	15.3
Total	124	100.0

Quarry Sites

Quarry sites are classified according to the kind of opalite exposure available for toolstone extraction, including outcrop quarries (opalite bedrock outcrop), talus quarries (opalite cobbles accumulated as talus), and cobble quarries (occasional surface opalite cobbles). Table 6 provides a summary of newly recorded quarries.

Table 6. Newly Recorded Quarry Sites.

Site Number	Max. Area (sq. m.)	Toolstone Source Description
Cobble Quarry		
631-14	24	Occasional large cobbles; white; poor to medium quality.
631-40	1,800	Occasional small cobbles; milky white; poor to medium quality.
631-67	6,750	Occasional large cobbles; white-yellow; poor to medium quality.
631-102	900	Very sparse cobbles; overall poor quality; white-grey.
Talus Quarry		
631-35	1,200	Thick talus cobbles; good quality; white-grey.
631-38	800	Thick talus cobbles; good quality; red-blue-white.
Outcrop Quarry		
631-37	400	Bedrock outcrop; medium quality; red-white.
631-39	1,500	Bedrock outcrop; poor to good quality; white.
631-59	600	Bedrock outcrop; poor quality; grey-white.

All quarry types combined account for only 7.3% of the newly recorded sites. Opalite is exposed as bedrock only in the vicinity of Red Hill (sites 631-37, 631-39, and 631-59), and toolstone quality appears to be highly variable. Talus cobble accumulations are also present on Red Hill (sites 631-35 and 631-38), and associated reduction debitage suggests intensive prehistoric use of high quality toolstone; however, modern minerals exploration has obscured prehistoric patterns at site 631-35. Occasional surface opalite cobbles are available along the lower reaches of Basalt Canyon and four sites (631-14, 631-40, 631-67, and 631-102) evidence on-site cobble assay and/or reduction. Naturally occurring opalite

suitable for use as toolstone is absent elsewhere on the southwest periphery of the Tosawihi Quarries.

Reduction Sites

Reduction sites, classified as reduction stations (n=33) and reduction complexes (n=38), are the most numerous site types encountered in the project area.

Reduction stations, ranging from 4 square meters to 1,200 square meters in area, include as few as 20 to as many as 3000 items; in each case, sites are thought to reflect brief, isolated episodes of lithic reduction. Table 7 summarizes small reduction stations.

Table 7. Summary of Reduction Stations.

Site No.	Max. Area (sq. m)	Total Debitage Items	Relative Abundance PF	SH	SE	BFT	Absolute Counts C	B1	B2	
631-1	225	300	-	2	2	-	-	1	-	
631-2	25	500	-	-	2	3	-	-	-	*
631-3	24	200	-	-	3	-	2	4	-	
631-4	400	27	-	-	2	1	-	-	-	
631-5	288	500	-	1	3	1	1	1	-	
631-11	4	100	-	-	2	-	-	-	-	
631-17	40	20	-	-	2	-	-	-	-	
631-19	240	30	-	-	2	2	-	-	-	
631-22	30	100	-	-	2	1	1	1	-	
631-23	5	500	-	-	2	3	-	-	-	
631-24	165	25	-	1	2	1	-	1	-	
631-27	36	25	1	-	-	2	-	-	-	
631-31	450	100	-	-	3	-	-	1	-	
631-32	105	250	-	-	3	-	-	-	-	
631-36	70	200	-	-	3	-	2	-	-	
631-41	45	200	-	2	2	-	-	-	-	
631-42	150	50	-	2	2	2	2	2	-	
631-43	36	20	-	-	2	2	-	-	-	
631-44	450	25	-	2	2	-	2	1	-	
631-46	70	500	-	-	3	2	1	2	-	
631-47	150	200	-	-	3	1	-	1	-	
631-54	300	500	-	-	3	2	-	-	1	
631-61	9	3000	-	2	3	2	-	1	-	
631-65	50	200	-	-	3	-	-	-	-	
631-69	100	2000	-	-	3	2	1	1	2	
631-70	90	1000	-	-	3	1	-	2	-	**
631-71	200	500	-	-	2	3	1	1	-	**

Table 7. Continued.

Site No.	Max. Area (sq. m)	Total Debitage Items	Relative Abundance PF	SH	SE	BFT	Absolute Counts C	B1	B2	
631-81	150	25	-	-	2	1	-	-	-	
631-82	1,200	25	-	-	2	-	1	-	-	
631-88	225	2000	-	-	2	3	3	1	1	
631-96	450	150	-	2	2	-	-	-	-	
631-100	50	50	-	-	3	-	-	-	-	
631-119	900	200	-	-	3	-	-	-	-	**

Debitage Categories

PF = primary flakes
SH = shatter
SE = secondary flakes
BFT = biface thinning flakes

Relative Abundance

- = not recorded
1 = rare
2 = common
3 = dominant

* specialized tool present
** obsidian present

Debitage at reduction stations is dominated by secondary interior and biface thinning flakes. Secondary flakes were conspicuous (common or abundant) at 96% of reduction stations; biface thinning flakes were noted at 57% of these sites (Table 8). Large, early Stage I bifaces are the most common modified artifact found at reduction stations (present in 45.5% of these sites) (Table 9). Most were fragments, likely reflecting manufacture breaks; others apparently were rejected because of material flaws. A number of cores (n=17) were observed, present at 33.3% of reduction stations. Cores generally are trimmed, chunky pieces with some areas of cortex; however, several appear to be small prepared cores.

Obsidian was observed at three sites: a small obsidian biface (with remnant cortex) was noted at site 631-70, one unmodified obsidian flake was recorded at site 631-71, and two were noted at site 631-119. In addition, an opalite flake tool, bifacially modified on one edge, unifacially modified on the other, was recorded at site 631-2.

Table 8. Debitage Abundance at Reduction Stations.

	Primary Flakes	Shatter	Secondary Flakes	Biface Thinning Flakes
	No. of Sites (%)	No. of Sites (%)	No. of Sites (%)	No. of Sites (%)
Rare	1 (3%)	2 (16%)	--	7 (21%)
Common	--	6 (18%)	18 (54%)	8 (24%)
Dominant	--	--	14 (42%)	4 (12%)
Present	1 (3%)	8 (24%)	32 (96%)	19 (57%)

Table 9. Artifact Types at Reduction Stations.

Artifact Type	No. of Sites	% of Sites
Core	11	33.3
Biface I	15	45.5
Biface II	3	9.0
Exotic Obsidian	3	9.0
Opalite Flake Tool	1	3.0

In summary, reduction stations reflect primarily Stage I or Stage II biface reduction. Though opalite sometimes was transported to the sites as trimmed, chunky pieces, the prevalence of secondary flakes, especially biface thinning flakes, suggests most artifacts left the sites as Stage II bifaces. The presence of obsidian, and two specialized tools, suggests other functions (e.g., hunting, tool repair), at four sites.

Reduction complexes reflect a range of artifacts and debitage similar to reduction stations, but consist of extensive lithic scatters which are thought to represent overlapping accumulations resulting from many episodes of use. Comparative data from reduction complexes is presented in Table 10.

Table 10. Summary of Newly Recorded Reduction Complexes.

Temporary Site No.	Maximum Area (sq. m)	Debitage Density Range (items per sq. m) Low	High	No. of Flaking Loci	No. of Artifacts C	B1	B2	B3	
631-6	3,150	1.0	25	2	-	6	-	-	
631-8	6,300	1.0	100	5	1	-	2	-	
631-10	1,200	1.0	300	3	4	1	-	-	
631-13	1,350	0.2	100	1	-	-	-	-	
631-15	22,875	1.0	100	4	X	1	-	-	
631-18	2,700	0.2	50	1	-	1	-	-	
631-20	1,500	0.03	2	-	1	1	-	-	
631-25	13,000	1.0	200	2	-	1	-	-	
631-26	5,400	50.0	150	1	1	X	X	-	
631-29	1,500	1.0	2	-	1	-	-	1	
631-30	1,125	1.0	10	-	-	-	-	-	
631-48	1,875	0.1	200	7	X	X	-	-	*
631-51	14,250	1.0	200	3	-	3	-	-	
631-52	2,100	2.0	200	2	4	3	-	-	
631-55	5,850	1.0	200	1	-	-	-	-	
631-56	11,250	1.0	15	1	-	-	-	-	
631-57	2,400	1.0	100	X	-	2	-	-	
631-58	1,200	1.0	250	1	-	-	-	-	
631-60	3,000	2.0	3	1	-	1	-	-	
631-62	6,750	0.1	15	-	-	1	-	-	
631-63	2,400	1.0	100	11	-	-	-	-	
631-64	2,700	2.0	5	-	-	-	-	-	
631-66	1,200	0.1	15	-	1	-	-	-	
631-68	1,350	0.1	15	4	-	1	-	-	
631-72	1,950	1.0	5	-	-	-	-	-	
631-86	3,750	0.3	20	-	3	-	-	1	
631-87	400	1.0	500	3	-	-	-	-	
631-89	525	1.0	20	2	-	-	-	-	**
631-90	4,500	0.1	50	1	2	-	1	-	
631-93	2,700	0.1	5	-	-	-	-	-	
631-95	7,875	4.0	25	-	-	2	-	-	
631-101	6,300	0.2	20	-	-	1	-	-	
631-106	1,800	0.1	20	1	-	-	-	-	
631-108	1,800	1.0	50	-	-	-	1	-	
631-112	1,800	20.0	150	-	-	-	1	-	
631-113	400	15.0	100	X	-	-	-	-	
631-114	2,100	1.0	15	-	-	1	-	-	
631-122	1,200	0.1	6	-	-	-	-	-	

C = Core
B1 = Stage I Biface
B2 = Stage II Biface
B3 = Stage III Biface

* = basalt hammerstone present
** = quartzite hammerstone present
X = several present, not counted

Many reduction complexes evidence numerous, spacially discrete, flaking stations; these stations are small, 5 to 10 meters in diameter, and often contain up to 5000 debitage items, several bifaces and/or cores, and occasionally a basalt hammerstone (site 631-48, for example). Notably, large numbers of Stage II bifaces are present at site 631-26, similar to observations at reduction complexes with residential components (see discussion below). Other reduction complexes evidence no concentrated flaking stations, but rather, consist of widely dispersed flakes that vary in size and color (accumulations of numerous brief uses over time?).

Reduction Complex/Residential Sites

Nine reduction complexes/residential sites were recorded. Artifact variety, abundance, and potential for shallow subsurface features (hearths, camping refuse pits) suggests these sites were used as short term camps (Thomas 1983, 1984). Selected data is summarized in Table 11.

Table 11. Summary of Reduction Complex Residential Sites.

Temporary Site No.	Max. Area (sq. m)	Debitage Density Range (items per (sq. m) Low	High	No. of Flaking Loci	No. of Cores/Bifaces C	B1	B2	B3	Other Artifacts OF	BF	ST	GS	HS
631-21	1,800	1	50	-	1	-	-	3	-	X	-	-	
631-45	19,500	25	500	+15	X	X	X	X	X	X	X	-	X
631-50	18,500	25	200	8	-	X	X	-	X	X	X	X	X
631-103	4,950	1	15	-	-	2	3	-	-	-	X	-	-
631-104	3,600	15	25	-	-	-	-	-	-	-	X	-	-
631-109	21,500	50	500	6	-	X	X	-	X	X	X	-	X
631-111	8,400	1	500	+3	-	1	-	-	X	X	-	-	X
631-115	69,000	1	150	X	-	X	X	-	X	-	X	-	-
631-120	10,500	5	100	3	-	-	-	-	-	-	X	-	-

C = Core
B1 = Stage I Biface
B2 = Stage II Biface
B3 = Stage III Biface

OF = Obsidian Flakes
BF = Basalt Flakes
ST = Specialized Flake Tool
GS = Groundstone
HS = Hammerstone
X = Many present, not counted

Reduction complex/residential sites are dominated by opalite reduction debitage, but obsidian and basalt (tools and debitage) are present in small amounts. Residential and reduction components compose overlapping activity areas at the smaller sites (especially sites 631-21, 631-103, 631-104, 631-111) while several larger sites (e.g., 631-45, 631-50, 631-115) evidence a central residential locus surrounded by numerous discrete flaking stations. Stage II bifaces are abundant at four of these sites; this is consistent with Elston's hypothesis (Elston et al. 1987:111) that Stage II bifaces are target forms and were produced most often at residential sites near the quarries. Sites also include small numbers of specialized tools (e.g., projectile points, drills, scrapers, knives) common to short term campsites. Groundstone is a common component at residential sites in the Great Basin; however, it is quite rare at sites in the project vicinity. Of the newly recorded sites, only site 631-50 contained groundstone (several small fragments from one heavily used metate).

Small Sites

The remaining sites recorded in the project area by the present survey are small sites (n=16) and isolated artifacts (n=19).

Sites with fewer than 20 items are included, for convenience, into the small site category; however, these are quite variable in artifact content (and probable function) (Table 12).

Table 12. Artifact Observations at Newly Recorded Small Sites.

Temporary Site No.	Max. Area (sq. m)	Artifact Counts ST	C	B1	B2	B3	PF	SH	SE	BFT	Total Items
631-16	1,200	-	-	-	-	-	-	-	-	11	11
631-75	1	-	-	-	-	-	-	-	5	-	5
631-76	5	1	-	-	-	-	-	-	2	-	3
631-77	2	-	1	-	-	-	-	1	3	-	5
631-79	15	-	-	2	-	1	-	-	2	-	5
631-84	3	-	-	3	-	-	-	-	3	-	6
631-85	10	-	-	2	-	1	-	-	3	-	6
631-94	25	-	-	-	-	-	2	-	-	-	2
631-98	30	-	-	-	-	-	-	-	12	-	12
631-105	3	-	-	-	-	-	-	-	-	3	3

Table 12. Continued.

Temporary Site No.	Max. Area (sq. m)	Artifact Counts ST	C	B1	B2	B3	PF	SH	SE	BFT	Total Items
631-116	36	-	1	-	-	-	-	-	4	1	6
631-117	3	1	-	-	-	-	1	-	1	-	3
631-118	3	-	-	1	-	-	-	1	2	-	4
631-121	24	-	-	-	-	-	-	-	-	4	4
631-123	60	-	-	1	-	-	-	-	5	-	6
631-124	4	-	-	-	-	-	3	-	-	-	3
Total		2	2	9	0	2	6	2	42	19	84

ST = Specialized Flake Tool
C = Core
B1 = Stage I Biface
B2 = Stage II Biface
B3 = Stage III Biface
PF = Primary Flake
SH = Shatter
SE = Secondary Flake
BFT = Biface Thinning Flake

Most small sites encompass areas of from 1 to 60 square meters; an exception, site 631-16, is a scatter of eleven biface thinning flakes over a small saddle covering 1,200 square meters in area. Several small sites exhibit an assemblage diversity that is not expected considering small assemblage size. For example, the five items comprising site 631-79 include two Stage I bifaces of white opalite (both broken), one Stage III biface of butterscotch-colored opalite with a developed haft element (carefully made, waxy material, but broken along the base), and two unmodified secondary flakes of white opalite. Site 631-117, with three items total, includes one untypeable projectile point of heat-treated opalite, resharpened along one edge (perhaps for use as a knife); one large, chunky (7cm x 5 cm x 1cm) core reduction flake with cortex; and one small secondary flake - all of different colored opalite materials. At the other extreme, site 631-124 consists only of three primary flakes of grey-white opalite. It is of interest primarily because of its location on the steep eastern slopes of Prospector Point where no other cultural materials were recorded.

Formed artifacts such as cores, bifaces, and projectile points, observed in isolated contexts, were recorded as discrete phenomena and assigned separate site numbers. Newly recorded isolated artifact sites are summarized in Table 13, below.

Table 13. Newly Recorded Isolated Artifacts.

Temporary Site No.	Artifact Type	Description
631-7	Stage I Biface	White opalite, broken
631-9	Stage I Biface	White opalite, broken
631-12	Core	White-yellow opalite; unidirectional
631-28	Projectile Point	Rosegate Series, tip broken
631-33	Stage I Biface	White opalite; very crude
631-34	Stage I Biface	White-tan opalite; complete
631-49	Stage I Biface	White opalite; shock break
631-53	Core	Purple opalite; bidirectional
631-73	Stage I Biface	Stage Grey opalite; roughly bifacial
631-74	Stage I Biface	Grey-white opalite; large
631-78	Projectile Point	Elko Corner-notched
631-80	Projectile Point	Untypeable fragment
631-83	Core	White opalite, fragment
631-91	Stage I Biface	White opalite, broken
631-92	Stage II Biface	White opalite, broken
631-97	Projectile Point	Gatecliff Split Stem
631-99	Projectile Point	Untypeable, midsection fragment
631-107	Stage I Biface	Yellow-white opalite, complete
631-110	Projectile Point	Untypeable, resharpened to drill

It is interesting to observe that isolated artifacts and small sites reflect a range of reduction activities similar to reduction stations and reduction complexes. Debitage is dominated by early stage bifaces and secondary and biface thinning flakes. Projectile points and small specialized tools may suggest hunting and other subsistence related activities.

In summary, sites located in the U.S. Steel Project Area primarily relate to the reduction of opalite derived from the nearby Tosawihi Quarries; local quarries are few in number and quite limited in size. Compare the low relative percentage of quarries in the U.S. Steel Project Area (7% of new sites, or 22% of combined new and previously recorded sites) to the high percentage (48%) of quarries in the Tosawihi Quarries Study Area (Elston et al. 1987:64-65). On the other hand, reduction sites compose the largest category of sites in the U.S. Steel Project Area (57% of new sites, 55% of combined new and previously recorded sites), but compose a small percentage (22%) of localities in the Tosawihi Quarries Study Area (Elston et al. 1987:64-65).

The production of large, thin Stage II bifaces seem to be a primary focus of site activities on the periphery of the Tosawihi Quarries, and is especially noticeable at short term residential camps in the project area. Subsistence activities are reflected in hunting related artifacts (projectile points) and seed grinding tools (groundstone), as well as in drills, knives, and scrapers of more general utility. Data present at sites in the U.S. Steel Project Area can contribute to a number of identified regional and local research issues (cf. Elston 1987; see Chapter 7).

Chapter 6. ARTIFACT DESCRIPTIONS

Artifacts collected during field survey include 11 projectile points and 1 large biface. An unmodified obsidian pebble was collected outside the project area as well. The following discussion describes and illustrates the collected artifacts, and discusses artifact observations made in the field.

Bifaces

As noted earlier, most bifaces found at reduction sites are Stage I or Stage II forms rejected due to material flaws or because they broke during manufacture.

Specimen 631-38-1 is an early Stage I biface similar to those reduced at Tosawihi Quarries localities north of the present project area (Figure 11b). The opalite at site 631-38 is unique in the project area, both for its abundance and its high toolstone quality; it includes an unusual range of material colors, dark red to blue to yellow.

The dark red, yellow banded biface is one of the largest complete bifaces observed in the project area, measuring 23.5 cm long by 11 cm wide by 4.3 cm thick. The artifact may have been discarded after removal of a large flake from one surface exposed stress fractures and a large vug. It is interesting to note that the removed flake approximates the dimensions of Stage II bifaces from a Tosawihi Quarries cache collected by Rusco (Elston et al. 1987:104) (Figure 11a). The flake scar measures 15 cm long by 9 cm wide; the Rusco biface measures 16.2 cm long by 8.2 cm wide by 1.8 cm thick. Similar Stage II bifaces are thought to represent target artifacts, that is, forms ordinarily produced for transport elsewhere (Elston et al. 1987:104).

Projectile Points

Four of the 11 collected projectile points are typologically distinct and serve as chronological markers. They include one Gatecliff Split Stem (specimen 631-97-1), one Elko Corner-notched (specimen 631-78-1), one Large Side-notched (specimen 631-115-1), and one Rosegate series (631-28-1). Projectile point attributes are given in Table 14.

Figure 11a. Stage II biface from a Tosawihi Quarries cache (Elston et al. 1987:104).

Figure 11b. Large, Stage I biface from quarry site 631-38.

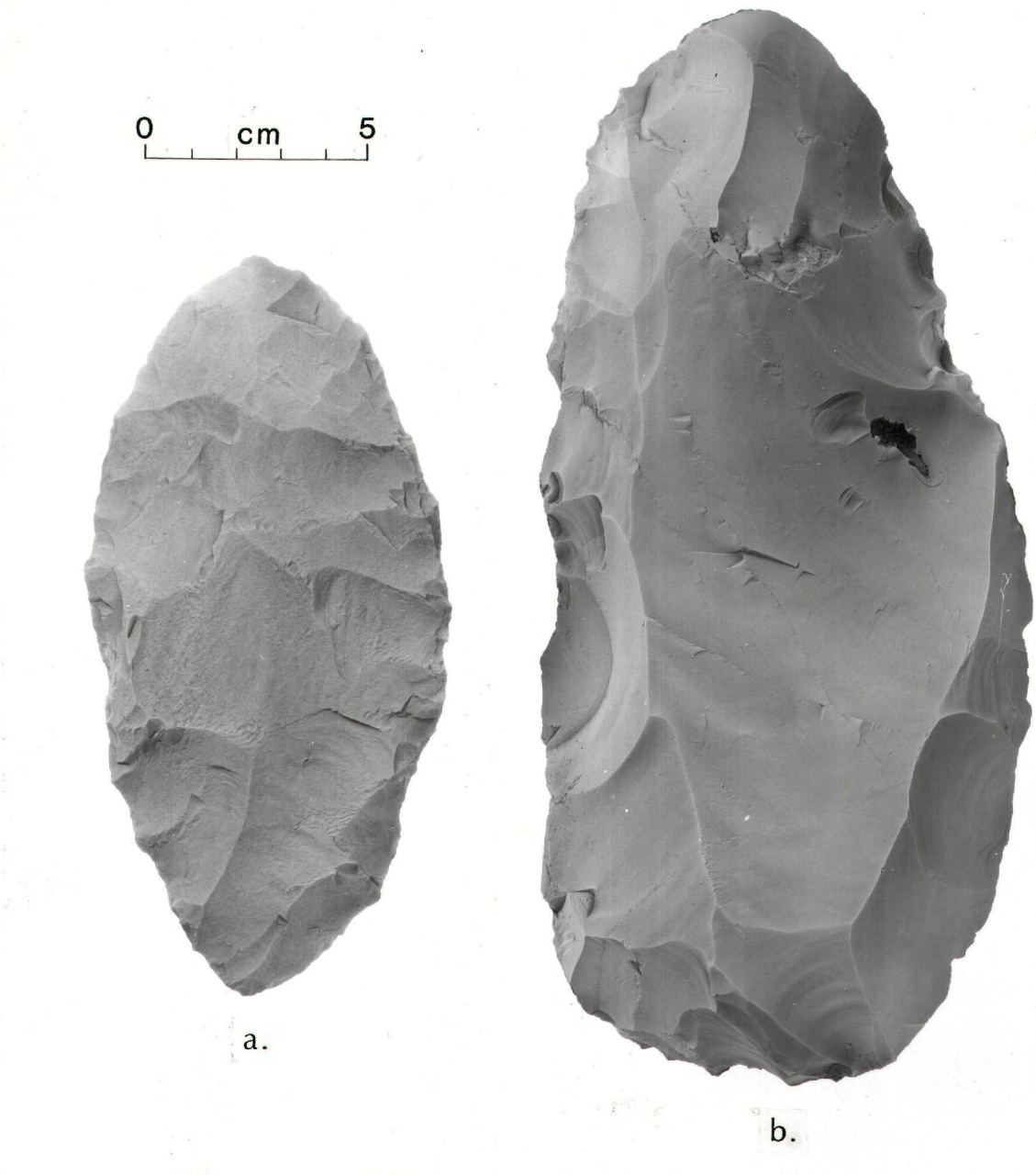

0 cm 5
a.
b.

Table 14. Attribute List for Projectile Points Collected from Sites on the Southwest Periphery of the Tosawihi Quarries.

Catalog No.	Type	Material	Ls	Lt	La	Lm	Wm	Wb	Nw	Th	Wt.	Est. Wt.	DSA	PSA	NOI	(BIR)	Lt/Wm	Wb/Wm	Lm/Lt	HT
631-28-1	RSG	*White Chert	13.6	28.4	28.4	-	20.1	7.5	6.2	3.6	1.0	2.0	127	101	26	1.0	1.41	.37	-	Yes
631-45-1	UN	Basalt	11.8	-	-	-	-	(15.1)	11.4	4.7	.8	3.0	220	140	60	-	-	-		No
631-78-1	ECN	*Pink-white chert	25.4	(40.6)	(40.6)	-	22.1	(12.3)	10.9	4.9	2.2	3.0	151	118	33	1.0	1.84	.56	-	Yes
631-80-1	UN	*White Chert	16.7	-	-	-	-	-	-	-	.6	-	-	-	-	-	-	-	-	Yes
631-97-1	GSS	*White Chert	42.0	53.4	51.0	-	24.0	13.9	12.8	5.3	5.1	5.6	131	96	35	.96	2.23	.58	-	?
631-99-1	UN	*White Chert	12.8	-	-	-	-	-	-	-	5.6	-	-	-	-	-	-	-	-	Yes
631-103-1	Out of Key	Obsidian	28.5	48.6	44.0	-	16.1	16.1	0	4.6	2.2	4.0	-	-	-	.90	3.00	1.00	-	No
631-109-1	UN	Obsidian	30.1	-	-	-	-	-	-	4.7	2.2	-	-	-	-	-	-	-	-	No
631-110-1	Preform	*Pink Chert	35.0	-	-	-	-	-	-	4.0	2.4	-	-	-	-	-	-	-	-	Yes
631-115-1	LSN	Obsidian	28.6	(38.2)	(36.2)		(17.1)	(17.1)	7.0	3.8	1.7	2.0	182	178	4	.94	2.23	1.00	-	No
631-117-1	Preform	*White Chert	27.3	-	-	-	-	-	-	3.3	1.2	-	-	-	-	-	-	-	-	Yes

Measurements are in millimeters and grams; numbers in parentheses are estimated.

Abbreviations:

ECN - Elko Corner-notched
GSS - Gatecliff Split Stem
LSN - Large Side Notch
RSG - Rosegate Series
UN - Untypeable

Ls - Actual Length
Lt - Total Length
La - Length of Longitudinal End
Lm - Length from Proximal End of point of Maximum Width

Wm - Maximum Width
Nw - Neck Width
Wb - Basal Width
Th - Thickness

Wt - Weight in Grams
DSA - Distal Shoulder Angle, between 90-270o
PSA - Proximal Shoulder Angle, between 0-270o
NOI - Notch Opening Index
BIR - Basal Indentation Ration, La/Lt
HT - Heat Treated

* All chert likely are Tosawihi opalite

Gatecliff Split Stem points are dated between 3000 B.C. and 1300 B.C. at Gatecliff Shelter (Thomas 1983:185-186) and mark the South Fork Phase on the upper Humboldt (Elston and Budy 1989). In the central Great Basin, Elko Corner-notched points span the interval between 1300 B.C. and A.D. 700 (Thomas 1983:182), but these points may have greater antiquity and have persisted longer in the northern Great Basin (Aikens 1970). At James Creek Shelter on the upper Humboldt, the type dates between 850 B.C. and A.D. 700 (Elston and Budy 1989). Large Side-notched points like specimen 631-115-1 are poorly dated. Specimens larger than Desert Side-notched points, but smaller than Northern Side-notched points, occur in numerous contexts dated prior to A.D. 1300 (Thomas 1981:19). Rosegate points are confined to the period between A.D. 700 and A.D. 1300 (Thomas 1983:179-180), and mark the Maggie Creek phase on the upper Humboldt (Elston and Budy 1989).

Specimen 631-28-1 (Figure 12b) keys to the Rosegate Series, resembling the Eastgate subtype (Heizer and Baumhoff (1961:123-124). The point is made from white, heat treated chert (probably Tosawihi opalite). The tip and one tang are broken; no attempt was made to repair the truncations. The isolated context of the find, and the nature of the breaks, suggest the point broke on impact.

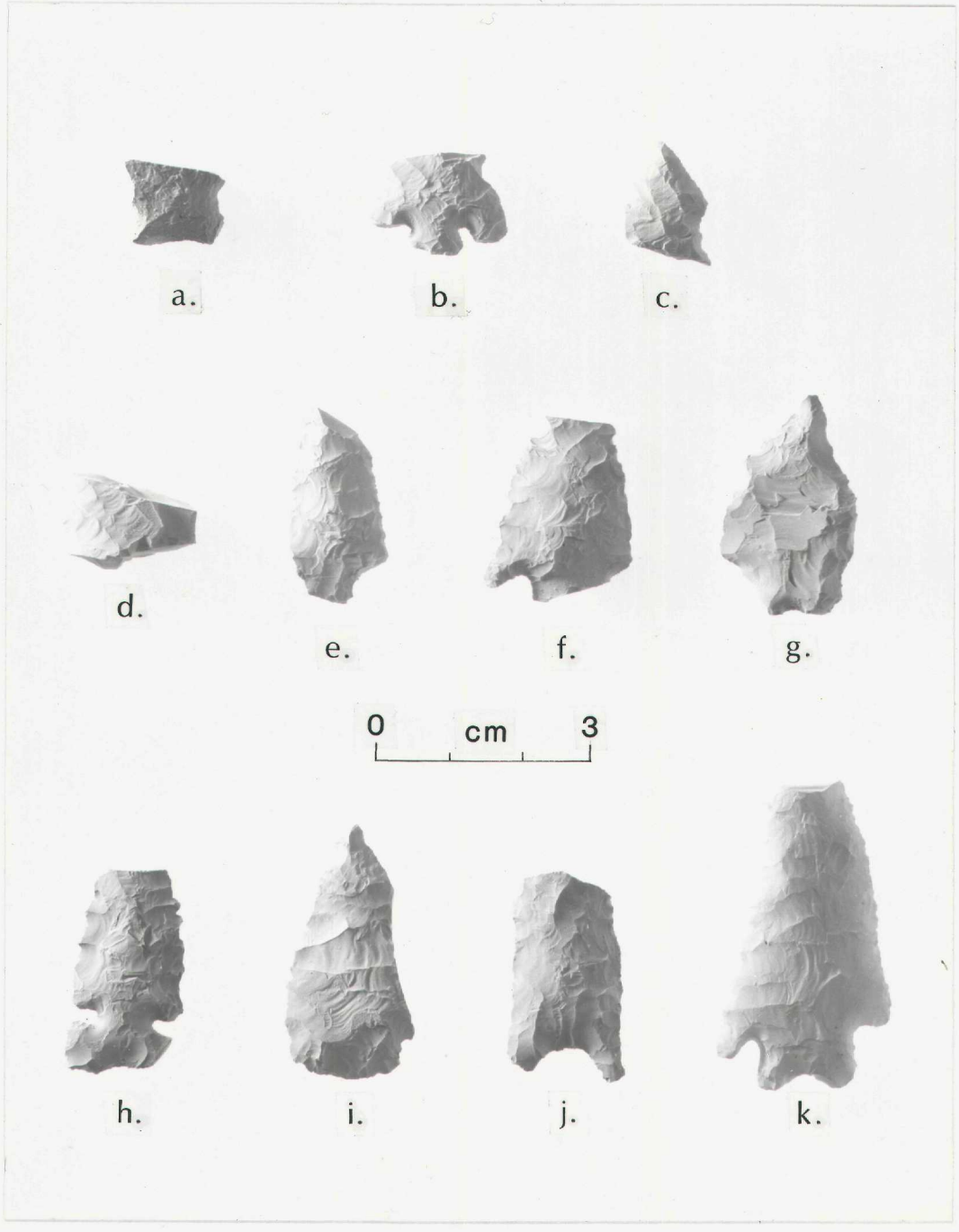
Specimen 631-45-1 (from Locus D at reduction complex/ residential site 631-45) is a small basal point fragment made from fine-grained, black basalt (Figure 12a). Both shoulders and base appear to be reworked, but it is difficult to be certain given the nature of the material and small size of the fragment. Though untypeable, the item may represent a portion of a reworked Humboldt or Elko Eared point.

Specimen 631-78-1, an isolated artifact, keys to the Elko Corner-notched type, but break patterns and extensive reworking suggest a complex history for this small artifact (Figure 12f). The base broke, apparently a result of notching failure. The tip also broke, but this looks like a bending fracture, and reworking attempted repair. In other words, the artifact looks like a failed point preform which was used as a knife until the tip broke off. One last attempt was made to salvage the tool (fix the tip) before it finally was abandoned. The material is a creamy white chalcedonous chert with red-orange inclusions and waxy luster indicating heat treatment.

Specimen 631-80-1, an isolated artifact, is a very small, untypeable point fragment of opaque white, heat treated chert (likely Tosawihi opalite). It has a single notch and appears to be either an expedient point that broke on impact along the

Figure 12. Collected projectile points.

a. Specimen 631-45-1
b. Specimen 631-28-1
c. Specimen 631-80-1
d. Specimen 631-99-1
e. Specimen 631-117-1
f. Specimen 631-78-1
g. Specimen 631-109-1
h. Specimen 631-115-1
i. Specimen 631-110-1
j. Specimen 631-103-1
k. Specimen 631-97-1


a.
b.
c.
d.
e.
f.
g.
0
cm
3
h.
i.
j.
k.

basal haft or a reworked point fragment that was discarded before necessary modifications were completed (Figure 12c). The presence of the extensively modified (and expended) tool in an area of great toolstone abundance suggests it arrived in a hunters tool kit. Perhaps the artifact was a nearly used up tool fired before the hunter had a chance to make a better projectile or perhaps it was not fired at all but merely discarded because better materials were at hand.

Isolate 631-97-1 keys to the Gatecliff Split Stem type. The point is made from opaque white, heat treated chert (likely Tosawihi opalite). The tip is missing and both lateral edges have been resharpened extensively on one face. The left margin (as illustrated in Figure 12k) has been reduced to the extent that it is concave in outline. The tip was truncated by a bending break after resharpening. Ring cracks on the truncation surface near one corner may indicate an attempt to rejuvenate the edge with burin technique (cf. Vaughan 1985). Traces of an unidentified bright red substance are present along one truncation corner.

Isolate 631-99-1 is an untypeable midsection fragment (Figure 12d) of opaque white, heat treated chert (likely Tosawihi opalite). A ring crack on the lower truncation, and linear cracks on the upper (opposite face), suggest smash truncation (a bipolar technique), a method used to recycle tool fragments (cf. Budy and Elston 1986).

Specimen 631-103-1, from reduction complex/residential site 631-103, is a small, concave-based obsidian projectile point (Figure 12j). Though it broadly resembles one of the Humboldt Series, it is not lanceolate in outline (basal width/maximum with ratio exceeds 0.90) and it falls out of Thomas's (1981) key. The tip broke upon impact, and the resulting hinge fracture extends along most of one surface.

Specimen 631-109-1, from Locus A at reduction complex/ residential site 631-109, is an untypeable, reworked obsidian projectile point (Figure 12g). A longitudinal flake scar with hinge termination on one face is similar to the impact scar on specimen 631-103-1 described above. Exhibiting drill-like use wear, the point apparently broke on impact and was refashioned for use as a drill.

Isolate 631-110-1 is a reworked point preform made of creamy pink, heat treat chert (possibly Tosawihi opalite). The margin of the ventral flake surface was prepared (roughened by grinding) but not thinned. A lateral fracture

may have occurred as a notching failure. The tip was resharpened (prior to the lateral break) as if for use as a drill (Figure 12i).

Specimen 631-115-1, from Locus A at reduction complex/ residential site 631-115, is a Large Side-notched obsidian projectile point (Figure 12h). Its edges are serrated but are not noticeably reworked. The tip and portion of one tang are broken, probably as a result of impact fracture.

Specimen 631-117-1, from very small scatter site 631-117, seems to be a failed point reworked for use as a cutting tool (Figure 12e). It is made from white, heat treated chert. Both tangs are snapped off, perhaps as a result of notching failures. Only the dorsal surface of the original flake is fully reduced, but both margins have been resharpened bifacially. The tool apparently was abandoned after the tip broke.

Obsidian

Sites in the project area are notable for the presence of small amounts of imported obsidian. Debitage (and one small core) observed in the field included pieces of obsidian shatter bearing cortex, indicating on-site core or natural pebble reduction, as well as small controlled thinning flakes, reflecting small biface and/or tool manufacturing. Small obsidian tools (projectile points and bifaces) were also observed at several sites. Though obsidian is not available in the project area, debitage size and tool forms suggest a nearby source characterized by rounded, pebble-sized nodules.

At site 631-109, the largest piece of obsidian shatter (with cortex) measured 30mm x 15mm x 10mm. A split core observed at site 631-50 measured 60mm x 40mm x 30mm. All obsidian tools are small (see for example Figure 12g, h, j). The largest tool noted in the field was a biface retouched along two edges (illustrated from a field drawing in Figure 13). The artifact measures 45 mm wide by 36 mm long and 14mm thick; cortex along the proximal edge retains the rounded shape of the original pebble.

One unmodified obsidian pebble (55mm x 61mm x 47mm) was collected (purely fortuitously) along Little Antelope Creek about 5 miles south/southwest of the project area (Figure 14); this area may be a source of obsidian for artifacts found at sites in the project area. The prevalence and distribution of obsidian in Tosawihi Quarries vicinity is unknown at present.

Figure 13. Obsidian biface with cortex (from field drawing, site 631-70).

Figure 14. Obsidian pebble collected along Little Antelope Creek.

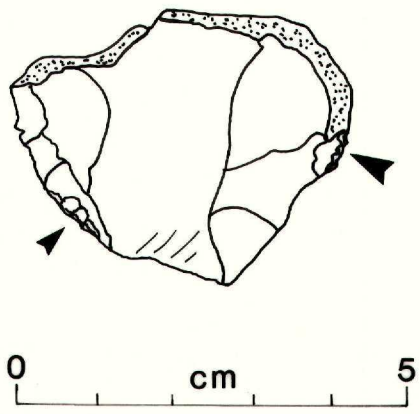


Figure 13.

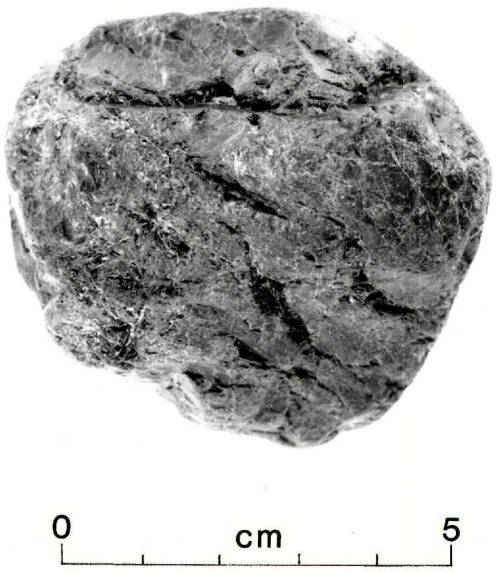


Figure 14.

Chapter 7. SIGNIFICANCE EVALUATIONS

The 152 sites and localities occurring in the U.S. Steel Project Area were evaluated in terms of their eligibility for nomination to the National Register of Historic Places. The National Register of Historic Places was developed by the Department of the Interior to serve as a means of isolating properties worthy of cultural resource management consideration. In order for a property to be eligible for nomination to the Register, it must possess integrity and satisfy at least one of four criteria of significance as outlined in 36 CFR 800.60 (NPS 1982). Integrity and significance are discussed below, followed by eligibility assessment of sites in the U. S. Steel Project Area.

Integrity Standards

To possess integrity, a property must retain sufficient physical character to convey its association with past patterns, persons, designs, technology, or events. Although designed primarily for use in the evaluation of standing structures, the following National Park Service evaluation standards (NPS 1982:44) can be applied to prehistoric sites:

LOCATION	Is the site in its original location or has it been moved or redeposited (i.e., by stream action, road grading)?
SETTING	Is the surrounding physical environment the same as it was during the period of occupation? Is the relationship between the site and its physical surroundings the same as when it was occupied?
DESIGN	Is the design of the resource intact or have any patterns been destroyed or altered by human or other processes?
MATERIAL/ WORKMAN-SHIP	Is the material at the site authentic or has original material been removed or additional material introduced?
FEELING	Do the resource and its setting convey a sense of time and place appropriate to the period of occupancy?

All sites recorded in the U.S. Steel Project Area convey a similar sense of setting and feeling associated with the Tosawihi Quarries. Site integrity has been effected by environmental forces (e.g., slopewash, rodent turbation) and by modern minerals exploration activities (e.g., roads, drill sites, blading). The integrity of each site was rated according to the degree of surface disturbance it has sustained, as summarized in Table 15. Results of the integrity rating exercise appear in Appendix B.

Table 15. Integrity Rating Scheme.

Score	Scoring Standards
1	Severely disturbed over more than 50% of site area. Disturbance may be a result of extensive erosion, numerous roads, drill pads, minerals exploration features, bulldozer cuts, or of artifact collection.
2	Moderately to heavily disturbed over less than 50 of total site area. Disturbance may be a result of erosion, roads, or minerals exploration, but significant portions of the site remain intact.
3	Discrete, areal disturbance restricted to less than 25% of total site area. Disturbance may include a road or mining exploration feature as well as slopewash and rodent turbation.
4	Essentially undisturbed. Minor disturbance may be a result of slopewash, trampling or bioturbation.

Sites with low integrity (that is, a score of 1) are considered ineligible for nomination to the National Register of Historic Places. Sites with moderate (2) to high (4) integrity may be eligible, depending upon their research significance. Significance standards are applied to all sites demonstrating moderate to high integrity, as described below.

Significance Standards

Of the four criteria of significance given in 36 CFR Part 60.6, one is most relevant to the prehistoric archaeological resources under consideration here: does the site contribute to an understanding of prehistory? Four standards developed by Glassow (1977) were employed to assess the ability of sites to contribute to an understanding of prehistory:

VARIETY	How many different classes of information are present?
QUANTITY	How much information is present?
CLARITY	Are human behavioral components discrete (especially temporal and spatial components), i.e., not inextricably mixed? Is the pattern of organization clear and straightforward?
RESEARCH POTENTIAL	Does the resource have the potential to address identified local or regional data gaps, research goals, or methodological problems?

The four standards are closely interrelated and, together, form the basis on which to quantify relative site significance (cf. Zeier 1981). The potential for yielding scientifically valuable data is measured in terms of the existing data base, that is, site significance is considered relative to ability of the site to contribute to identified regional and local research issues. Elston (1987) has analyzed major issues relevant to the Tosawihi Quarries and vicinity; those research problems bearing on present project area are summarized below. A discussion of the quantification system devised to measure site significance in National Register terms follows.

Research Issues

Research issues identified by Elston (1987) concern regional chronology and settlement, as well as site specific problems such as understanding site formation and site function. Problems specific to the Tosawihi Quarries, such as toolstone characterization and variability, also can be addressed to some degree by certain sites in the U.S. Steel Project Area. Eight identified issues are relevant to the sites in the U. S. Steel Project Area.

1. Cultural Chronology. A cultural chronology describes the dates and sequence of phases in the culture history of a locality or region (Willey and Phillips 1958:22). Local chronological questions include the earliest use of Tosawihi chert, the inception of intensive extraction techniques, and the inception of rockshelter and open site occupation.

> Construction of a local cultural chronology for Tosawihi that can be fitted into, or even expand, the regional sequence, requires a series of radiocarbon dates from stratified or otherwise discrete cultural deposits.... Datable charcoal may be present in quarry pits or in waste dumps at outcrop quarries. Moreover, hearths have been used for warming and/or cooking in quarry areas, and hearths may also be present in some of the small, discrete surface lithic scatters designated as Reduction Stations (Elston 1987:14).
>
> Other dating methods, such as obsidian hydration, may be applicable to establishing a chronology.... Stratigraphic superposition will allow the relative dating of artifacts within stratified deposits.... The presence of temporally diagnostic artifacts, such as projectile points, help constrain the age of the deposits in which they are found.... It is remotely possible that rock varnish on basalt hammerstones ... can be dated directly using either the cation-ratio method, or radiocarbon dating using a linear accelerator... (Elston 1987:15).

2. Place of the Quarries in the Regional Economy. Sites in the vicinity of the Tosawihi Quarries may be excellent places to address the issue of "embeddedness" of lithic procurement (Binford 1979, 1985a, 1985b; Binford and Stone 1985; Gould 1980, 1985; Gould and Saggers 1985). Did people go to Tosawihi to get toolstone, or did they get toolstone while they were there doing something else?

> In order to know whether assemblages representing non-quarrying activities at Tosawihi are unique or similar to assemblages from non-quarry sites elsewhere, comparative data must be gathered from sites in the surrounding region. A stratified archaeological sample of the landscape bounded by Rock Creek, Willow Creek, the crest of the Tuscaroras, and middle Boulder Valley would be sufficient to characterize the distribution and

variability among sites reflecting regional subsistence and settlement systems and provide the necessary comparative data (Elston 1987:12).

3. Site Formation Processes. Interpretation of the archaeological record depends upon an understanding of how archaeological sites were formed and how they have been transformed (Binford 1979, 1980; Schiffer 1976).

> People create archaeological sites by living and working on them. Use of space is differentiated as people sleep in one place, work in another, and dispose of refuse in yet another. Erosion, deposition, soil formation, bioturbation, chemical change, and human activity all affect archaeological deposits as they are created and for as long as they exist thereafter. Understanding how archaeological localities were formed ... is central to their functional interpretation (Elston 1987:13)

4. Site Function, Site Structure, and the Organization of Production. Quarry localities, workshops, rockshelters, and open habitation sites should all exhibit different site structures because each was used for a different set of activities over different periods of time by different sized groups. The ethnographic literature regarding stone tool manufacture should provide models for the structure of quarry and base camp workshops (Binford and O'Connell 1984, 1986; Gould 1977, 1980; Hayden 1979; O'Connell 1974, n.d.; Tindale 1965).

> A strong formal characterization of the differences in debitage (stage, size, raw material type, presence or absence of heat treatment) observable at quarry pits and at habitation sites ... will help evaluate whether the reduction carried on there was simply pre-transport lightening of the load or whether folks were staying in place long enough to make the production of finished tools worthwhile (Elston 1987:18).

> Changes in the function and structure of various Tosawihi localities, and the organization of lithic production through time, would signal changes in use of the quarry district as a whole, possibly related to large scale subsistence and settlement patterns (Elston 1987:18).

Of particular interest are the functions of "Flaking Stations", that is, small, discrete lithic scatters, usually on ridges or in small rockshelters. Do these represent hunting stations, procurement of lithic material by groups just passing through the quarry area on their way elsewhere, or places where specialized reduction tasks were carried out (Elston 1987:17)?

5. Geologic Context of Tosawihi Toolstone. Opalite toolstone sources occur as bedrock outcrops, thinly mantled bedrock, talus deposits, and colluvium containing opalite clasts. Each source area varies through a particular range of quality and may require different methods of extraction and processing.

The geologic context of Tosawihi chert or "opalite" thus determined its accessibility to prehistoric people and strongly affected the strategies they used to extract it (Elston et al. 1987:110). Additional information is required in order to fully understand these strategies (Elston 1987:6).

6. Variability in Toolstone Quality. Particular opalite exploitation strategies likely are related to differences in toolstone quality (workability and durability) among various quarry sources.

If exploitation of a particular deposit of toolstone depended on its quality, it would be very useful to know how toolstone quality varies across the quarries and between bedrock outcrops, talus deposits, and colluvial soils (Elston 1987:7).

7. Chemical Identification of Tosawihi Toolstone. The spacial distribution of Tosawihi chert can tell much about trade, toolstone economics, and settlement and subsistence throughout the western Great Basin.

The question of chemical identification of Tosawihi chert, and its segregation from other, more local, materials is a pressing issue, inhibiting all attempts at a broader view of Tosawihi; a realistic evaluation of the importance of the place depends upon an ability to determine how far and in what volumes Tosawihi chert actually travelled.

> Renfrew's (1977) decay, or inverse gravity model, can be used to predict fall-off (both in terms of volume and reduction state) with increasing distance from the quarries (Elston 1987:7).

8. Quantity of Toolstone Processed and Removed From Tosawihi. In conjunction with studies of chronology, and settlement and subsistence, estimates of the quantity of toolstone processed and removed from Tosawihi can allow assessment of the importance of that toolstone resource and the total human investment of time and energy devoted to obtaining it (Ahler 1986:18).

> The amount of material processed at quarry pits and discarded at workshops could be estimated from yield of debitage in pit berms and workshop site deposits...(Elston 1987:9).

Sites in the U.S. Steel Project Area contain data that can address the issues summarized above, but how can individual sites be evaluated for their relative research value? To address this question, a systematic method of quantifying site significance (after Zeier 1981) was applied to sites in the project area.

To measure site significance, selected classes of information relevant to identified research questions were listed and a numerical score assigned to each class present at a given site (Table 16). Each site in the project area was evaluated for relative artifact abundance (maximum artifact density per square meter), clarity of site organization (number of spacially discrete activity areas and/or possible residential features), and variety of data classes present (quarry features, reduction stage forms, specialized tools, potentially dateable basalt and obsidian).

Significance scores are comparable and provide an objective measure of relative site significance; scores range from a low of 3 (lowest possible score = 3) to a high of 16 (highest possible score = 19). Sites scoring 10 or higher appear to have significant research potential and suggest National Register eligibility. Intensive evaluation (testing) is necessary at these sites to verify their National Register eligibility and to define data recovery strategies appropriate to each. Although all sites contain some research information, those with low research value, that is, scoring 4 or lower, are considered ineligible for National Register consideration. Sites with moderate research potential (scoring from 5 through 9) require additional assessment (data

recording, collection and analysis, or testing) in order to clarify their National Register eligibility status. Results of the significance rating exercise for each site in the project area are provided in Appendix B. Eligibility assessments are summarized below.

Table 16. Research Significance Rating Scheme.

RESEARCH CRITERIA	SCORE
Quantity Measures	
1-10 items/sq. m.	1
>10-100 items/sq. m.	2
>100 items/sq. m.	3
Clarity Measures	
Isolated artifact	1
Undifferentiated spacially	2
Single activity locus	3
Multiple activity loci	4
Multiple activity loci/ Possible residential features	5
Variety Measures	
Quarry Categories	
On-site opalite source	1
Quarry feature	1
Reduction Categories	
Cores	1
Stage I bifaces	1
Stage II bifaces	1
Stage III bifaces	1
Specialized Activity Measures	
Groundstone	1
Hammerstones/cobble spalls	1
Basalt Biface Reduction Debitage	1
Obsidian	1
Specialized Tools	1
	Total Score

National Register Eligibility Assessments

The following discussion separates significance evaluations for newly recorded sites and localities recorded previously (Elston et al. 1987).

Newly Recorded Sites

Of the 124 newly recorded sites, 9 (7.3%) appear eligible for National Register consideration, 45 (36.3%) sites are considered ineligible, and the eligibility of 70 (56.4%) sites is uncertain from the present level of information.

As shown in Table 17, two of the nine (22.2%) recorded quarries are considered ineligible to the National Register, one because of extensive disturbance, the other because of low research potential. The remaining quarries (77.8%) have moderate research potential, but eligibility assessments require additional information.

Table 17. National Register Assessment of Newly Recorded Quarry Sites.

Site Number	Integrity Score	Significance Score	National Register Status
Cobble Quarry			
631-14	4	4	Not eligible
631-40	4	6	Unclear
631-67	4	5	Unclear
631-102	3	6	Unclear
Talus Quarry			
631-35	1	N/A	Not eligible
631-38	2	9	Unclear
Outcrop Quarry			
631-37	3	7	Unclear
631-39	3	9	Unclear
631-59	4	6	Unclear

Site 631-35 may have been a good quality toolstone source, likely with quarry pit features, but road construction, blading, and drilling have trenched through the opalite talus source, rendering it difficult to segregate prehistoric reduction debris from opalite shattered and fractured by minerals exploration. The site is not eligible to the National Register due to lack of integrity. Site 631-14 is a small cobble quarry associated with a sparse flake scatter; low research potential renders it ineligible to the National Register.

Portions of sites 631-38 and 631-39 are disturbed by roads, but intact sections preserve significant prehistoric quarry data. These quarry sites, and others of uncertain National Register status, are strategically located on the periphery of the primary opalite zone to the north. These quarries contain data appropriate to understanding variability in toolstone sources and associated variability in procurement strategies and may contribute to chemical and geologic investigations at the Tosawihi Quarries.

The National Register eligibility of reduction stations is, for the most part, unclear. Six (18%) have limited research potential and are considered ineligible; 27 (82%) have moderate research value and require additional assessment (Table 18).

Table 18. National Register Assessment of Newly Recorded Reduction Stations.

Site No.	Integrity Score	Significance Score	National Register Status
631-1	4	6	Unclear
631-2	4	7	Unclear
631-3	4	7	Unclear
631-4	4	5	Unclear
631-5	4	9	Unclear
631-11	4	5	Unclear
631-17	4	4	Not eligible
631-19	4	4	Not eligible
631-22	4	6	Unclear
631-23	4	6	Unclear
631-24	4	5	Unclear
631-27	4	4	Not eligible
631-31	4	5	Unclear
631-32	4	5	Unclear
631-36	2	6	Unclear
631-41	4	5	Unclear
631-42	4	7	Unclear
631-43	4	4	Not eligible
631-44	4	6	Unclear
631-46	3	8	Unclear
631-47	5	6	Unclear
631-54	3	7	Unclear
631-61	4	7	Unclear
631-65	1	N/A	Not eligible
631-69	4	9	Unclear
631-70	4	9	Unclear
631-71	4	9	Unclear
631-81	3	4	Not eligible
631-82	4	6	Unclear
631-88	4	9	Unclear
631-96	3	5	Unclear
631-100	4	5	Unclear
631-119	4	5	Unclear

In spite of widely variable significance scores, reduction stations may provide useful research opportunities. They are spacially discrete and are thought to represent temporally discrete, single use episodes. Many such sites manifest clear patterns of organization that indicate specific toolstone reduction techniques, can be used to develop quantifiable measures of extracted and processed toolstone, and may provide models for understanding more complex site structure. Elston (1987) notes that site function may not be obvious at these sites. They may have served as hunting camps, way stations for highly mobile groups, and/or task specific reduction loci. Clarification of site function can contribute to understanding regional settlement patterns and the "embeddedness" of lithic procurement (Elston 1987). Chronological data may be available in small hearths, temporally sensitive artifacts, or other dateable materials present (e.g., obsidian, basalt).

Reduction complexes can address a similar range of research issues, but individual sites are more variable in content and spacial organization than at reduction stations. Two (5.3%) reduction complexes have high research potential and appear eligible National Register consideration; both contain numerous discrete flaking loci, staged reduction artifacts, and abundant data. Six (15.8%) are spacially diffuse and functionally undifferentiated reduction scatters lacking formed artifacts; these have low research value and are considered ineligible to the National Register (Table 19).

Table 19. National Register Assessment of Newly Recorded Reduction Complexes.

Site No.	Integrity Score	Significance Score	National Register Status
631-6	4	7	Unclear
631-8	4	9	Unclear
631-10	4	9	Unclear
631-13	4	6	Unclear
631-15	4	10	Apparently eligible
631-18	4	7	Unclear
631-20	4	5	Unclear
631-25	4	8	Unclear
631-26	4	8	Unclear
631-29	4	6	Unclear
631-30	4	3	Not eligible
631-48	4	10	Apparently eligible
631-51	3	9	Unclear
631-52	3	9	Unclear
631-55	3	6	Unclear
631-56	3	5	Unclear
631-57	3	7	Unclear
631-58	4	6	Unclear
631-60	3	4	Not eligible
631-62	4	5	Unclear
631-63	3	7	Unclear
631-64	3	3	Not eligible
631-66	3	5	Unclear
631-68	4	8	Unclear
631-72	4	3	Not eligible
631-86	4	8	Unclear
631-87	4	7	Unclear
631-89	4	7	Unclear
631-90	4	7	Unclear
631-93	4	3	Not eligible
631-95	3	7	Unclear
631-101	4	5	Unclear
631-106	4	5	Unclear
631-108	4	5	Unclear
631-112	4	6	Unclear
631-113	4	7	Unclear
631-114	4	5	Unclear
631-122	4	4	Not eligible

Though few in number, reduction complex/residential sites yield the highest significance scores. Seven of the nine recorded (77.8%) appear eligible for National Register consideration; two sites are of uncertain status (Table 20).

Table 20. National Register Assessment of Newly Recorded Reduction Complex/ Residential Sites.

Site No.	Integrity Score	Significance Score	National Register Status
631-21	4	10	Apparently eligible
631-45	3	16	Apparently eligible
631-50	4	15	Apparently eligible
631-103	3	11	Apparently eligible
631-104	3	9	Unclear
631-109	4	14	Apparently eligible
631-111	4	12	Apparently eligible
631-115	4	12	Apparently eligible
631-120	4	8	Unclear

Three large sites (631-45, 631-50, and 631-115) are expected to contain hearths (with dateable charcoal), complex site structure, multiple activity areas, diagnostic tools, dateable materials (obsidian, basalt), and tools and debitage reflecting a range of production stages and strategies. Thus, these sites can be expected to address all research issues discussed earlier. Other sites are smaller in size and contain fewer data categories and less data abundance. They may exemplify very short term residential use and/or small group size and could be usefully compared to patterns observed at larger residential sites.

Reduction complex/residential sites have the highest significance scores (Table 20), as expected, but it is interesting to note that high scores for reduction stations and reduction complexes are comparable or higher than low scores for possible residential sites. This is taken as a measure of the utility of the rating system. In other words, when site significance is evaluated against specifically identified research issues, a range of site types, rather than only one or two site types, will achieve moderately high significance scores.

The last categories of newly recorded sites to be considered are small sites and isolated artifacts. Isolated artifacts are not considered eligible for nomination to the National Register; rating scores are included in Table 21 for comparative purposes.

Table 21. National Register Assessment of Newly Recorded Isolated Artifacts.

Site No.	Artifact Type	Integrity Score	Significance Score	National Register Status
631-7	Stage I Biface	4	3	Not eligible
631-9	Stage I Biface	4	3	Not eligible
631-12	Core	4	3	Not eligible
631-28	Projectile Point	1	N/A	Not eligible
631-33	Stage I Biface	4	3	Not eligible
631-34	Stage I Biface	4	3	Not eligible
631-49	Stage I Biface	4	3	Not eligible
631-53	Core	4	3	Not eligible
631-73	Stage I Biface	4	3	Not eligible
631-74	Stage I Biface	4	3	Not eligible
631-78	Projectile Point	1	N/A	Not eligible
631-80	Projectile Point	1	N/A	Not eligible
631-83	Core	4	3	Not eligible
631-91	Stage I Biface	4	3	Not eligible
631-92	Stage II Biface	4	3	Not eligible
631-97	Projectile Point	1	N/A	Not eligible
631-99	Projectile Point	1	N/A	Not eligible
631-107	Stage I Biface	4	3	Not eligible
631-110	Projectile Point	1	N/A	Not eligible

No small sites are considered clearly eligible for National Register consideration, and 12 (75%) are considered ineligible due to their low research potential (Table 22). Four small sites require additional study to address National Register assessment; high artifact diversity, but low abundance may signal use of these sites as overnight camps or specialized activity areas.

Table 22. National Register Assessments of Newly Recorded Small Sites.

Site No.	Integrity Score	Significance Score	National Register Status
631-16	3	3	Not eligible
631-75	4	4	Not eligible
631-76	4	4	Not eligible
631-77	4	4	Not eligible
631-79	4	6	Unclear
631-84	4	5	Unclear
631-85	4	5	Unclear
631-94	4	3	Not eligible
631-98	4	3	Not eligible
631-105	4	3	Not eligible
631-116	4	4	Not eligible
631-117	3	5	Unclear
631-118	4	4	Not eligible
631-121	4	4	Not eligible
631-123	2	3	Not eligible
631-124	4	4	Not eligible

Previously Recorded Localities

Twenty-eight previously recorded cultural localities that occur in the U.S. Steel Project Area were identified originally as components of the Tosawihi Quarries Archaeological District (Elston et al. 1987). A subsequent recommended refinement of the boundaries of site 26Ek3032, the Tosawihi Quarries, removed 4 of the 28 localities from the site (Intermountain Research 1987). Thus, four previously recorded localities are now considered discrete sites and are treated accordingly in following discussions. The remaining 24 previously recorded localities (listed in Table 23), all represent components of 26Ek3032, a site considered eligible for National Register consideration (Elston et al. 1987). Treatment of site 26Ek3032, or any of its components, is not considered herein.

Table 23. List of Previously Recorded Localities Occurring Inside the Boundaries, as Refined, of Site 26Ek3032.

Type	Reference Number
Outcrop Quarry	611-1
Isolated Quarry Pit	611-2
	611-206
	611-207
Quarry Pit Complex	
	611-10
	611-24
	611-35
	611-36
	611-39
	611-43
	611-45
Small Reduction Station	611-34
	611-37
	611-184
	611-185
	611-186
	611-200
	611-216
Reduction Station Complex	611-25
	611-46
	611-203
Rockshelter/Reduction Station	611-3
Rockshelter/Undetermined	611-164
Isolated Artifact	611-93

The four previously recorded localities now considered separate sites were rated for integrity and significance; all demonstrate moderate research potential but require additional assessment to determine their National Register eligibility. Results are presented in Table 24.

Table 24. National Register Assessments for Four Previously Recorded Localities.

Site Type	Reference Number	Integrity Score	Significance Score	National Register Status
Outcrop Quarry	611-12	4	8	Unclear
	611-13	3	9	Unclear
Reduction Station	611-181	4	5	Unclear
Reduction Complex	611-180	4	8	Unclear

In summary, 128 sites (including 4 previously recorded localities) have been evaluated in terms of their eligibility for nomination to the National register of Historic Places (Table 25). While nine sites appear Register eligible, more intensive evaluation (testing) is needed to confirm assessments. Similarly, present data is insufficient to assess eligibility for 74 sites, and additional study is required. Forty-five sites appear ineligible for National Register consideration. Finally, 24 previously recorded localities occur within the boundaries (as recommended) of site 26Ek3032, which presently is considered eligible for nomination to the National Register of Historic Places.

Table 25. National Register Eligibility Status of 152 Sites in the U.S. Steel Project Area.

Ineligible Sites	Apparently Eligible Sites	Eligibility Unclear	Eligibility Unclear (continued)	Eligible Localities of (26Ek3032)
631-7	631-15	631-1	631-70	611-1
631-9	631-21	631-2	631-71	611-2
631-12	631-45	631-3	631-79	611-3
631-14	631-48	631-4	631-82	611-10
631-16	631-50	631-5	631-84	611-24
631-17	631-103	631-6	631-85	611-25
631-19	631-109	631-8	631-86	611-34
631-27	631-111	631-10	631-87	611-35
631-28	631-115	631-11	631-88	611-36
631-30		631-13	631-89	611-37
631-33		631-18	631-90	611-39
631-34		631-20	631-95	611-43
631-35		631-22	631-96	611-45
631-44		631-23	631-100	611-46
631-49		631-24	631-101	611-93
631-53		631-25	631-102	611-164
631-60		631-26	631-104	611-184
631-64		631-29	631-106	611-185
631-65		631-31	631-108	611-186
631-72		631-32	631-112	611-200
631-73		631-36	631-113	611-203
631-74		631-37	631-114	611-206
631-75		631-38	631-117	611-207
631-76		631-39	631-119	611-216
631-77		631-40	631-120	
631-78		631-41	611-12	
631-80		631-42	611-13	
631-81		631-43	611-180	
631-83		631-46	611-181	
631-91		631-47		
631-92		631-51		
631-93		631-52		
631-94		631-54		
631-97		631-55		
631-98		631-56		
631-99		631-57		
631-105		631-58		
631-107		631-59		
631-110		631-61		
631-116		631-62		
631-118		631-63		
631-121		631-66		
631-122		631-67		
631-123		631-68		
631-124		631-69		
Total 45		9	74	24

Chapter 8. CULTURAL RESOURCE MANAGEMENT RECOMMENDATIONS

The purpose of the present archaeological investigation was to identify all cultural resources located in the U.S. Steel Project Area, assess their significance, and make management recommendations for significant sites that may be affected by proposed minerals development.

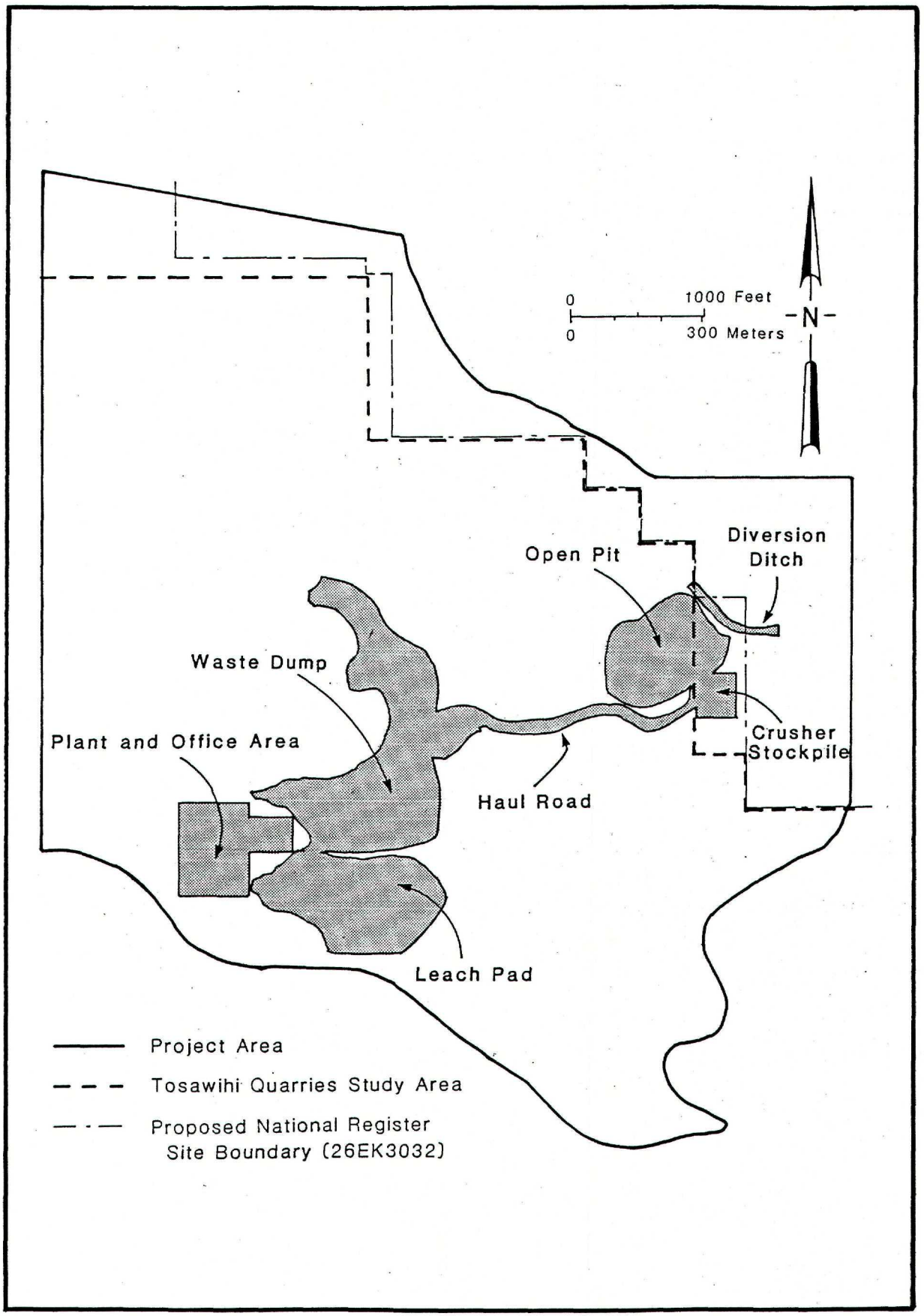
A proposed plan of operations, provided by Galactic Services, Inc., is mapped relative to recorded archaeological sites in Figure 15 (in pocket); a small scale representation of the plan appears as Figure 16. The operating plan calls for an open pit mine to be located on Red Hill. A crusher stockpile pad is to be located on the southeast edge of the pit, with a diversion ditch placed along the ravine to the northeast. Waste is to be dumped in Basalt Canyon and along the lower slopes of the finger ridges to the west. A leach pad is to be constructed in a small unnamed drainage to the south; processing plant, office, and crusher area are located on the west. A haul road connecting mine pit with processing facilities will require cutting back the steep slopes on the south edge of Red Hill and filling in the drainage where the road will cross Basalt Canyon.

Project Effects

Thirty-seven sites are located in or adjacent to proposed developments: 14 are within delimited development areas, 23 occur within 200 feet of developments (Table 24). It is assumed all sites inside project developments will be impacted; moreover, any site located within 200 feet of a proposed development is considered to be within a potential impact zone, due to our understanding that present project design may undergo slight modifications as development work proceeds.

The 37 sites include 8 considered ineligible for National Register consideration, 6 that appear eligible for National Register nomination, 20 sites of potential, but uncertain eligibility, and three localities that are components of National Register eligible site 26Ek3032 (as defined by Intermountain Research 1987).

Figure 16. Proposed Plan of Operations.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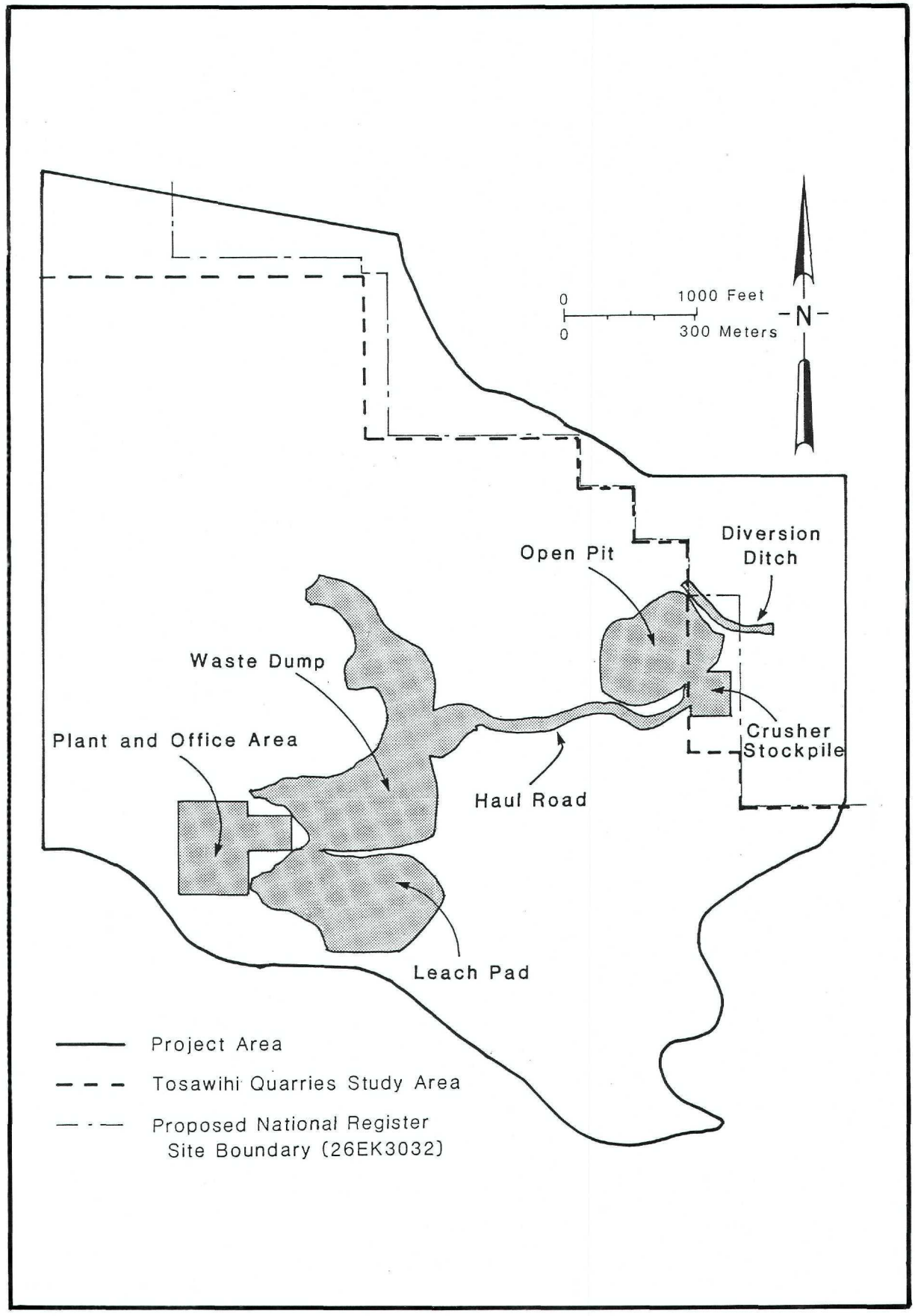
1000 Feet
0
300 Meters
N
Diversion Ditch
Open Pit
Waste Dump
Plant and Office Area
Crusher Stockpile
Haul Road
Leach Pad
Project Area
Tosawihi Quarries Study Area
Proposed National Register Site Boundary (26EK3032)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300 Meters
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Diversion Ditch
Open Pit
Waste Dump
Plant and Office Area
Crusher Stockpile
Haul Road
Leach Pad
Project Area
Tosawihi Quarries Study Area
Proposed National Register Site Boundary (26EK3032)

Table 26. Summary of Sites Located Inside and Adjacent to, Proposed Mining Developments.

Proposed Design Element	Sites Within Development	Sites Adjacent Development (distance from development)	National Register Status
Oxide East Pit			
	---	631-35 (150' W)	Not eligible
Diversion Ditch			
		611-25 (150' N)	Eligible*
		611-36 (100' N)	Eligible*
	---	631-55 (10' N)	Unclear
Crusher and Stockpile Pad			
		611-93 (150' E)	Eligible*
Haul Road			
	611-13		Unclear**
	631-37		Unclear
	631-39		Unclear
	631-47		Unclear
		631-36 (150' N)	Unclear
		631-38 (100' S)	Unclear
		631-43 (200' S)	Not eligible
Waste Dump			
	631-45		Apparently eligible
	631-50		Apparently eligible
	631-63		Unclear
	631-64		Not eligible
	631-67		Unclear
	631-68		Unclear
	631-101		Unclear
		631-46 (150' E)	Unclear
		631-48 (175' W)	Apparently eligible
		631-49 (75' W)	Not eligible
		631-52 (150' N)	Unclear
		631-66 (50' N)	Unclear
		631-69 (150' N)	Unclear
		631-70 (150' N)	Unclear
		631-74 (150' N)	Not eligible
		631-75 (100' W)	Not eligible

Table 26. Continued.

Proposed Design Element	Sites Within Development	Sites Adjacent Development (distance from development)	National Register Status
Waste Dump/ Leach Pad Overlap			
	631-115		Apparently eligible
Leach Pad			
		631-117 (180' S)	Unclear
		631-118 (75' S)	Not eligible
		631-119 (175' S)	Unclear
		631-122 (50' S)	Not eligible
Crusher Area			
	631-112		Unclear
Plant and office			
	631-111		Apparently eligible
		631-108 (25' W)	Unclear
		631-109 (100' S)	Apparently eligible

* previously recorded locality, component of 26Ek3032 (amended site boundary).

** previously recorded locality outside 26Ek3032 (amended site boundary).

Management Recommendations

Management actions recommended for the 37 affected sites are summarized in Table 27 and detailed below.

No further action is recommended on behalf of the eight sites considered ineligible for nomination to the National Register.

Avoidance and protection by project design of three previously recorded localities is recommended. These localities have not been recorded as discrete archaeological sites, but, rather, as components of Site 26Ek3032 (Elston et al. 1987). Site 26Ek3032 incorporates an area which has been determined eligible for nomination to the National Register of Historic Places. It should be noted, however, that the boundary of site 26Ek3032 remains to be clarified (Figure 16; see also Rusco 1983, Elston et al. 1987, Intermountain Research 1987).

Six sites appear eligible for National Register consideration. It is recommended that a testing program be implemented at these sites to confirm their eligibility (or demonstrate their ineligibility).

The National Register eligibility status of 20 sites is uncertain; data obtained at the survey level of investigation suggest a potential for eligibility but, as with the 11 sites above, do not confirm it. It is recommended that a testing program be implemented to evaluate these sites so that determinations of eligibility can be made. Once eligibility determinations have been made for each of the 26 sites tested, a data recovery program should be implemented, based on information generated by testing results, at each site eligible for nomination to the National Register of Historic Places.

Modification of the present proposed plan of operations may require concomitant modification of the management recommendations provided here. Consistent with above recommendations, sites which occur within 200 feet of project elements can be expected to sustain impacts from project development and should be considered within a potential impact zone. Sites apparently or potentially eligible for National Register consideration should be tested, and data recovery undertaken at those determined eligible for Register nomination. Sites considered ineligible for National Register consideration should require no further attention.

Finally, we make two further recommendations: first, formally record locality 611-13 as a discrete site; second, formally amend the boundary of site 26Ek3032, as recommended in "A Draft Cultural Resources Management Plan for the Tosawihi Quarries Archaeological Site, Elko County, Nevada" (Intermountain Research 1987:5; Figure 2).

Table 27. Recommended Actions for 37 Sites (and previously recorded localities) Affected by Proposed Project Developments.

No Further Action (site type)	Avoid by Project Design (site type)	Confirm National Register Eligibility (site type)	Evaluate National Register Eligibility (site type)
631-35 (TQ)	611-25 (RC)	631-45 (RC/RS)	611-13 (OQ)
631-43 (RS)	611-36 (QPC)	631-48 (RC)	631-36 (RS)
631-49 (IA)	611-93 (IA)	631-50 (RC/RS)	631-37 (OQ)
631-64 (RC)		631-109 (RC/RS)	631-38 (TQ)
631-74 (IA)		631-111 (RC/RS)	631-39 (OQ)
631-75 (SS)		631-115 (RC/RS)	631-46 (RS)
631-118 (SS)			631-47 (RS)
631-122 (RC)			631-52 (RC)
			631-55 (RC)
			631-63 (RC)
			631-66 (RC)
			631-67 (CQ)
			631-68 (RC)
			631-69 (RS)
			631-70 (RS)
			631-101 (RC)
			631-108 (RC)
			631-112 (RC)
			631-117 (SS)
			631-119 (RS)
Total 8	3	6	20

Key: IA = Isolated Artifact
SS = Small Scatter
RS = Reduction Station
RC = Reduction Complex
RC/RS = Reduction Complex/ Residential Site
TQ = Talus Quarry
OQ = Outcrop Quarry
CQ = Cobble Quarry
QPC = Quarry Pit Complex

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APPENDIX A: IMACS Site Forms (bound separately)

APPENDIX A: IMACS SITE FORMS

APPENDIX TO

An Archaeological Survey of the
U.S. Steel Project Area

by
Elizabeth E. Budy

Intermountain Research Project No. 631
Intermountain Research Cultural Resources Use Permit N-39918
Bureau of Land Management Cultural Resources Report No.1-1124(P)

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January 1988

APPENDIX B: Site Evaluation Forms

TOSAWIHI QUARRIES:
ARCHAEOLOGICAL INVESTIGATIONS AND ETHNOGRAPHIC STUDIES IN NEVADA

Note:

One or more pages have been removed from this part of the report due to sensitivity of specific archaeological site location information. Qualified persons may contact the Nevada Bureau of Land Management, Elko Field Office, to inquire about obtaining additional information.