Return to a Jack Rabbit Roasting Site (35HA3055) in Southeastern Oregon: The Obsidian Sourcing and Hydration Evidence

By: Scott Thomas, Patrick O'Grady, Craig Skinner and Jennifer Thatcher
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Introduction

The discovery of 35HA3055 occurred during the Bureau of Land Management (BLM) Beatys Butte fire rehabilitation surveys of August/September 2000. It was discovered by BLM archaeologist Patrick O'Grady on the sloping edge of a relic shoreline of ancient Lake Catlow in what is now Catlow Valley. Catlow Valley is a large basin south of Harney and Malheur Lake which is fed by streams emanating from Beatys Butte, Hart Mountain and the west side of the Steens Mountains (Figure 1). No permanent lake is found in this part of the Catlow Basin today. The site is located near the bottom of the basin at 4567 feet elevation. Although most of the vegetation in the site area was destroyed during the Beatys Butte Fire of June, 2000, nearby islands of unburned vegetation, show a cover of big sagebrush, rabbit brush and grasses.

The site was conspicuous due to an abundance of chert flakes in the midst of the Beatys Butte obsidian source area; a 110 square mile concentration of tool quality obsidian nodules and debitage. From a distance, yellowish-brown chert flakes were discernable against the burned-off sloping edge of the old shoreline. Closer examination revealed that obsidian flakes and burned and unburned bone fragments were also present, suggesting the possible existence of a hearth. Cultural materials were situated atop and within a thin (10-15cm) layer of sheet sand that has accumulated on the leeward slope of the lake terrace and gives the area a hummocky appearance. The small, discrete nature of the flake and bone scatter coupled with the presence of burned bone fragments seemed to indicate that 35HA3055 represented a single event in the prehistoric human use of the area; probably a temporary stop to rest, maintain equipment, and prepare and consume food.

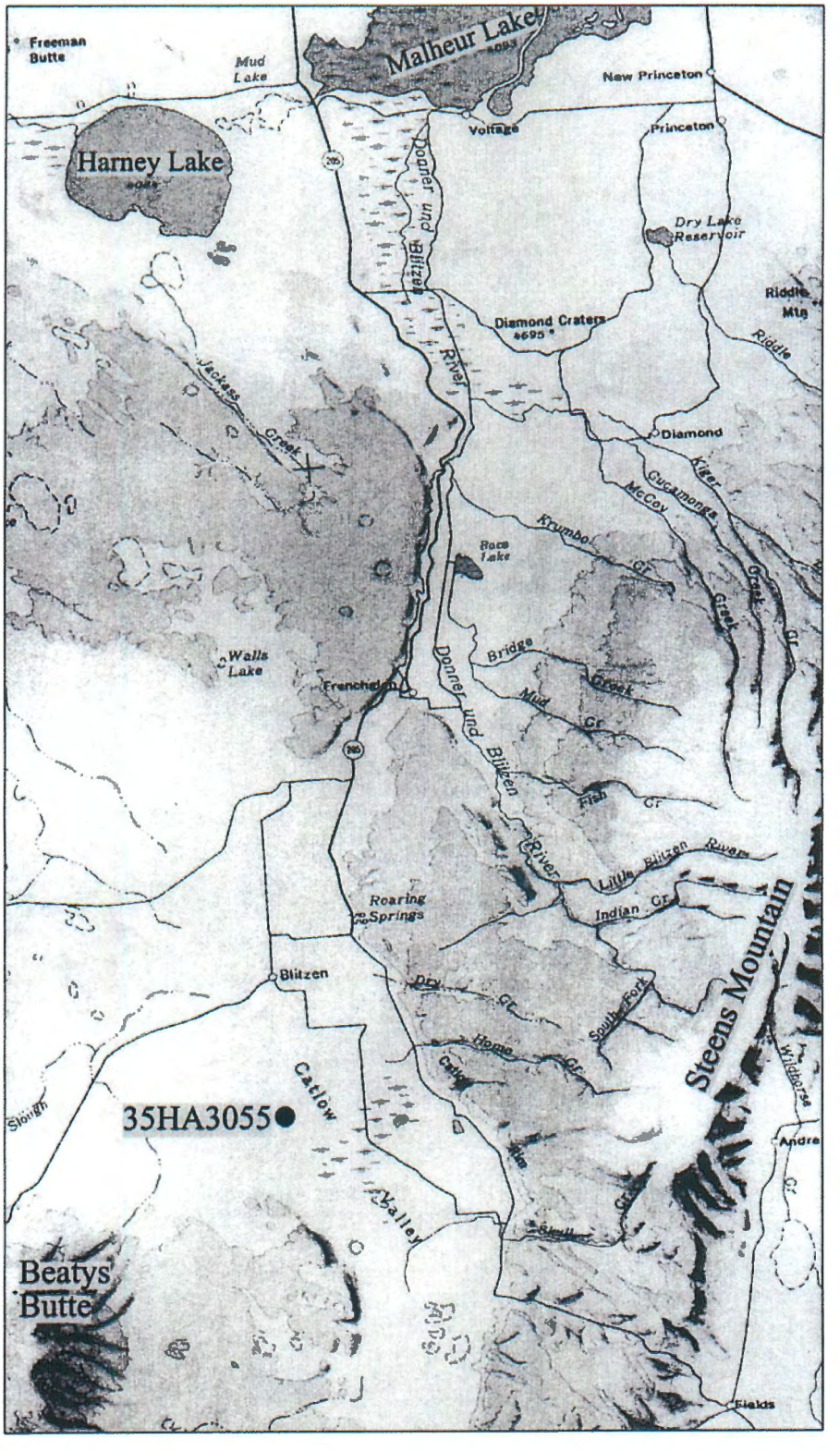
Initially, the scatter was recorded and artifacts and bone fragments were collected by O'Grady, Laurie Thompson, Emily Mueller and Scott Thomas in 1x1 meter collection units from the surface of a 3x4 meter grid (Figure 2). Later, Scott Thomas, the Burns BLM District Archaeologist, saw an opportunity to collect faunal and lithic data and possibly a radiocarbon sample from a shallow, but potentially stratified context at 35HA3055. He and crew member Dan Braden returned to the site in late September and excavated six 1x1 meter units and two 0.5 x 1 meter units (Figure 2).

Two of the authors presented a preliminary report about the site at the 2001 NWAC (Thomas, et al. 2001). The current authors will summarize the 2001 presentation and then focus on the newly completed obsidian studies data and what they suggest about travel patterns and obsidian procurement preferences of the people who occupied this camp. Additionally, an obsidian hydration date will be generated using a tentative rate for the predominant obsidian at the site.

Stratigraphy

Three stratigraphic units were noted at the site (Figure 3). Uppermost is Stratum 1, composed of a loose sheet of light brownish gray (10YR 6/2) silty sand and averaging about 10cm in thickness. Below Stratum 1 is a light gray (7.5YR 7/1) silty fine sand that shows more structure than Stratum 1. Stratum 2 has consistent polygonal cracking and is 5 to 6 cm thick. Stratum 3 is divided into an upper Stratum 3a and lower Stratum 3b. Stratum 3a is a light brown (7.5YR 6/3) silty fine sand that appears to be a weakly developed soil approximately 10cm thick. Even though the Munsell designation for this stratum is "light brown", it appears reddish brown in the profile, especially compared to Stratum 1 and 2. Stratum 3b is a very weakly cemented light brown (7.5YR 6/4) silty fine sand. The thickness of Stratum 3b is unknown. It is probable Stratum 3a and 3b correlate to Unit D at nearby Skull Creek Dunes (35HA496). Mehringer and Wigand (1986) estimate the top of Unit D to date to 1000 BP. The lithic debitage, faunal and floral material were located in Stratum 1 and the top 2 cm of Stratum 2.

Figure 1. Site 35HA3055, Vicinity Map



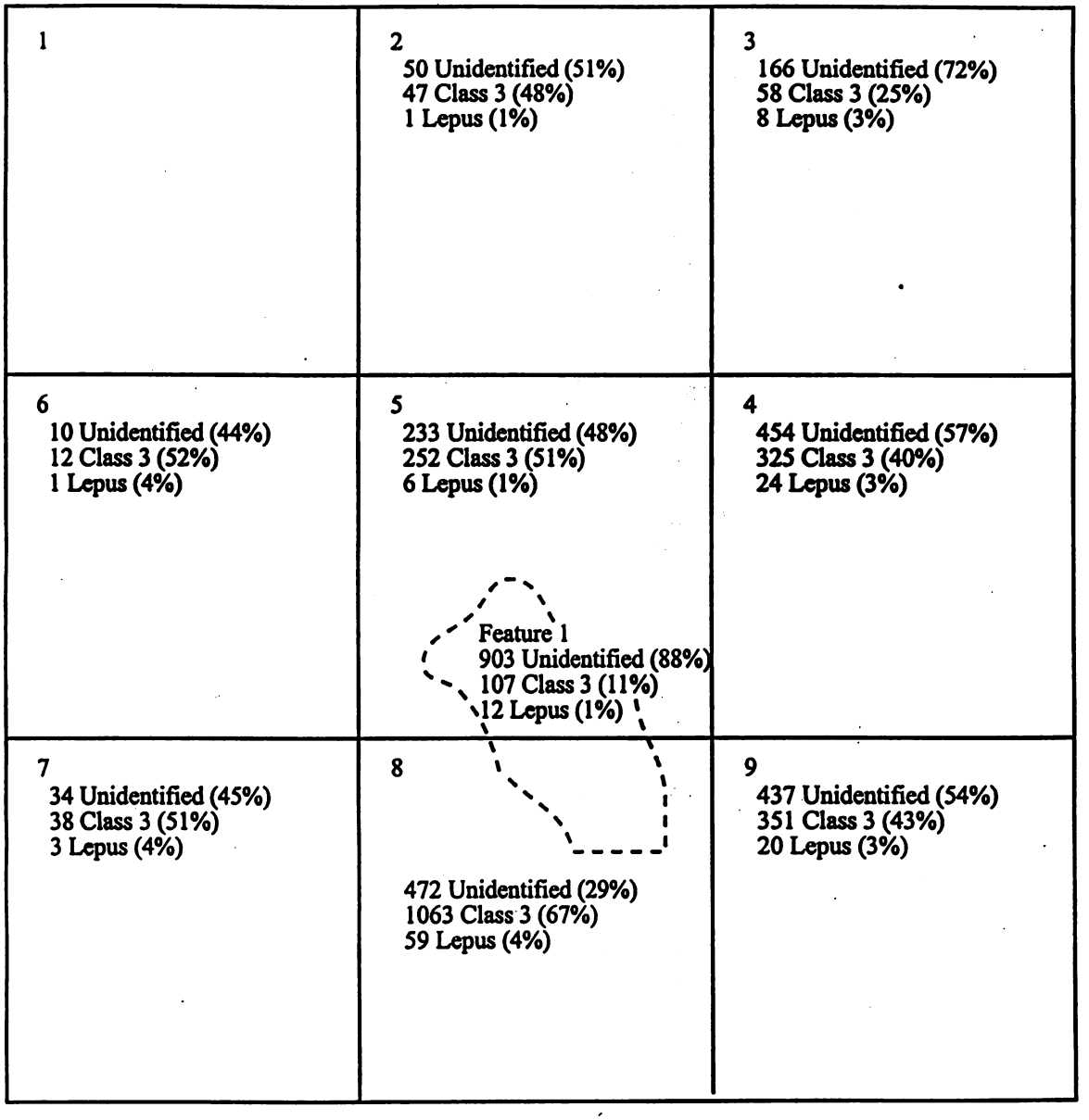
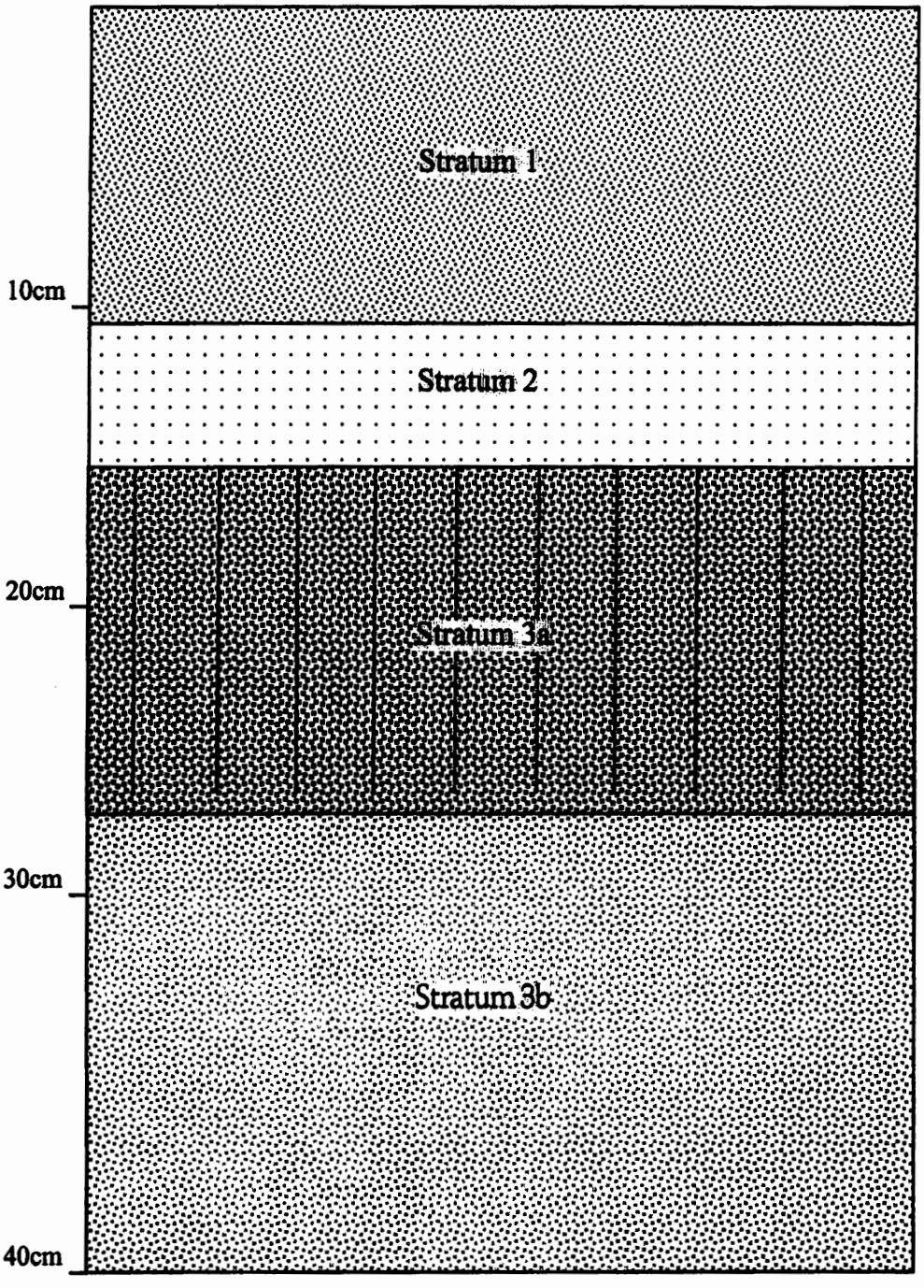


Figure 2. 35HA3055: Unit totals for faunal remains

Figure 3. Site 35HA3055, Stratigraphy



Profile of NW corner of Unit 2.

Site Features

Feature 1, a roughly oval hearth and associated fire affected sediments, was found in the south half of Unit 5 and northwest quarter of Unit 8 (Figure 4). The hearth was first noted in the bottom 2-3 cm of Stratum 1 and continued 2-3 cm into Stratum 2. It appears as a moderately gray stain measuring 60 cm north-south by 40 cm east-west and is irregular in outline. Surrounding the gray stain was a 10-15 cm wide zone of fire affected (slightly reddened with a bit more structure) Stratum 2 sediments. These slightly baked sediments were 2 cm higher than the surrounding Stratum 2 surface and were probably produced when the shallow hearth pit was dug into the Stratum 2 surface from slightly above in Stratum 1. The northwest third of the gray stain was covered by baked Stratum 2 sediments, indicating that the hearth may have been partially covered with sediments during use or immediately after use. A C14 date from sagebrush charcoal recovered in situ and from flotation analysis of Feature 1 sediments (Helzer 2001) yielded a calibrated date range of 465 to 291 BP (2 sigma).

Floral Remains

Macrobotanical analysis was conducted by Marge Helzer (2001) on four bulk soil samples from a hearth feature at 35HA3055. The procedure involved flotation of one liter soil samples submerged in water and stirred vigorously to form a strong vortex. The floating material (light fraction) was poured off through a 150 micron (.25 mm) mesh sieve. This process was done several times until no visible light fraction was floating on the surface of the water. The remaining sediment (heavy fraction) was then poured through a 250 micron (.5mm) mesh sieve and rinsed. Dried samples were passed through a series of graduated sieves in order to sort the sediment into size categories. All the sediment was scanned under a binocular stereo microscope at 10x - 40x and botanical material, bone, and lithics were removed. Charcoal larger than 2 mm was separated and weighed.

The botanical material in these samples is represented by what appears to be a predominance of charred Artemisia (sagebrush). No seeds were recovered. PET, processed edible tissue, were recovered in two samples, and although fragmentary, they may indicate the presence of starchy foods such as roots or tubers. Despite the fact that there can generally be a wide range of variation in the preservation of plant material in archaeological sites, even small features such as the one represented at this site can produce valuable information. The presence one species of wood and the recovery of PET material aid in the interpretation of site as a whole. Identification of the PET is pending.

Faunal Remains

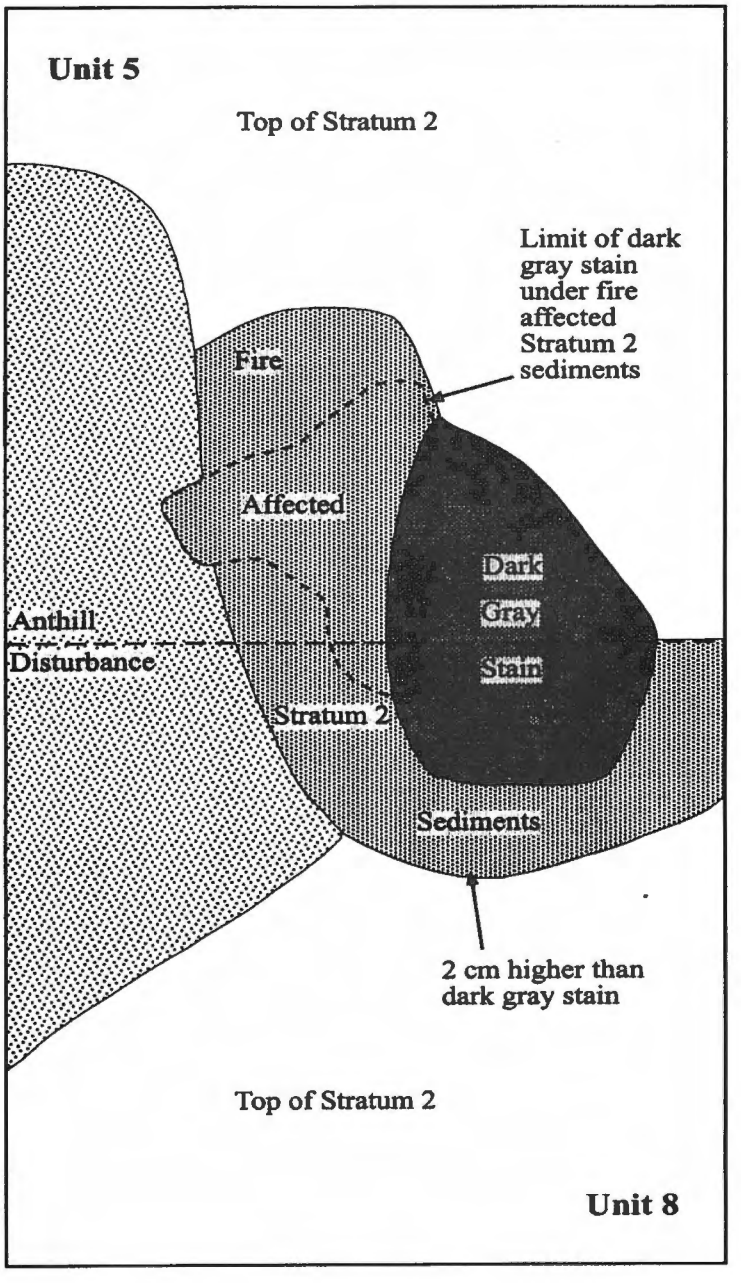
A total of 5146 bone fragments was recovered at 35HA3055 and analyzed by Pat O'Grady (2001). Preservation of the faunal remains was good. Skeletal elements were highly fragmented, but those elements, which retained articular surfaces and diagnostic landmarks, could often be used to make identifications at least to the level of family.

Several factors needed to be addressed regarding the location and condition of the archaeofaunas at 35HA3055: setting, possible effects of the range fire, and the possible sources of faunal remains. Despite the location of 35HA3055 mid-slope on a terrace of Lake Catlow, down slope wind and water transport mechanisms may have had little affect on site integrity. First, its placement on the leeward side of the lake terrace supported a depositional, not erosional environment. Second, the very limited dispersal of chert and bone fragments in relation to the small hearth suggests that down slope wash has been held to a minimum. In fact, the three distinct strata noted in the ca. 13 cm of deposits at the site indicated a slow, but consistent depositional environment.

The second factor that may have affected 35HA3055 faunal remains is the recent range fire. The presence of scattered sagebrush stumps which are burned just above or even with the ground surface seems to suggest that the fire moved quickly through the area and did not penetrate the soil surface. Faunal remains recovered from the surface accounted for less than one percent of the total number of bone fragments collected at the site and the potential of range fire-altered remains to affect the overall outcome of this analysis is negligible. The faint discoloration of sediments indicating the hearth's presence would likely not have been visible if root burning had occurred during the course of the fire. Thus, it seems probable that subsurface faunal remains were unaffected.

Because many of the bones recovered from archaeological sites in the Northern Great Basin are fragmented, a variety of complete specimens recovered in concentrations may be indicative of natural deposition, as in the case of a

Figure 4. Site 35HA3055, Feature 1, Plan View



rodent burrow death. Naturally deposited remains can have a cleaner appearance and are often lighter in color than culturally deposited bones. Other indications of natural deposition may include tooth puncture marks or striations resulting from gnawing by predators or highly concentrated digested fragments originating from raptor pellets or carnivore scats. Little bone *believed* to be naturally deposited was collected from 35HA3055.

The majority of faunal remains were recovered from Units 4, 5, 8, and 9 which surround the hearth on all sides, but most of the identified remains were deposited on the south and east perimeter of the hearth in a somewhat crescentic band; mixed in with high concentrations of unidentifiable fragments. Units 2, 3, 6, and 7 appear to be in a zone of dispersal, peripheral to the main area of deposition surrounding the hearth. Almost 39% of the bones were burned and 46% were calcined, remarkably high concentrations for any site.

Three basic categories of faunal remains were established which included leporid, size class 3 (rabbit sized animals), and unidentifiable fragments. After completion of the initial round of identifications, it was evident that most of the identifiable bones at the site were from one genus (*Lepus* sp.), and it became a relatively simple matter to identify them, one by one, using black-tailed jackrabbit specimens in the comparative collection. A total of 127 bone fragments out of 139 placed into the family of Leporidae were identifiable as *Lepus,* a category including both black-tailed and white-tailed jackrabbits (Table 1).

Table 1: Leporid remains recovered from 35HA3055

Element	Total	Sides represented
tibia, distal	12	7L, 5R
mandibular condyle	11	5L, 5R, 1?
scapular acetabulum	7	4L, 2R, 1?
femur, head	6	3L, 2R, 1?
mandible	5	2L, 1R, 2?
zygomatic	3	3L
astragalus	3	2L, 1R
pelvic acetabulum	2	2L
humerus, distal	2	1L, 1R
humerus	2	1L, 1?
ulna	2	1L, 1?
maxilla	2	1R, 1?
femur	1	1R
radius	1	1L
innominate	1	1R
mandible/maxilla	53	-
molars	9	-
bulla	5	-
rib	2	-
vertebra	2	-
podials	2	-
tibia, midsection	1	-
humerus, proximal	1	-
metapodials	1	-
phalanges	1	-
ilium	1	-
patella`	1	-
total	139	60
MNI		7

A Minimum Number of Individuals ([MNI] Grayson 1984) analysis of sided elements indicated that at least seven jackrabbits are represented in this assemblage. One hundred twelve of the identified remains were either burned or calcined and 15 were unaltered. Unaltered specimens included fragments of five ribs, three humeri, two scapulae, two tibias, an ulna, a mandible, and a molar. The most abundant of the identifiable remains were mandible and maxilla fragments. Hind limb fragments were next in abundance, and it was the identification of seven right distal tibias, which led to the determination that at least seven jackrabbits (MNI) were represented at 35HA3055. Many of the tibia fragments showed a specific pattern of breakage, possibly indicating that the feet were broken or twisted off in much the same manner from one to another.

Most of the identifiable remains came from the four units surrounding the hearth and the absence of vertebral, pelvic, and podial elements was conspicuous. These missing elements may indicate that butchering and field dressing of the carcasses occurred at a distance from the hearth location, and cooking of the meat was conducted in a manner that favored the use of forelimbs, hindlimbs, and cranial portions of the carcasses. The majority of the meat on a jackrabbit's body is found on the forelimbs and hindlimbs and those body portions, perhaps along with crania, would have been relatively simple to manipulate over an open fire with a minimum of cooking implements. The majority of *Lepus*, Class 3 and unidentifiable fragments bear evidence of high intensity heat alteration in the form of burning and calcining. This attribute and the disproportionate occurrence of certain elements from meaty portions of the carcass seem to suggest that specific portions of jackrabbits were being selected for cooking and discarded in close proximity to the hearth following consumption. The absence of immature jackrabbit remains may indicate that the animals were captured in late fall or winter, when adults congregate in large numbers at preferred feeding areas, but evidence from the site provided no clear indication of seasonality.

The concentration of bone on the south and east edges of the hearth is reminiscent of the "drop" zone described by Binford (1978) for a Nunamiut hunting stand, where men awaiting the arrival of caribou herds were observed while conducting various activities. These activities included the removal of marrow from large mammal bones while sitting in front of a hearth. Smaller fragments of shattered bone simply dropped to the ground around them within close proximity to the fire, while larger articular ends were pitched over the shoulder into a "toss zone" 2-3 meters from the hearth. No toss zone was noted at 35HA3055. This may be because the small size of the animals being consumed did not require larger fragments to be removed from the sitting area, that excavations did not extend into the toss zone, or that the pattern described for the Nunamiut is not applicable to this site. Binford (1978) also notes that Nunamiut hearths always have a vacant side, based on wind direction and manifested archaeologically through zones of high or low density debris. A low density scatter of bone and lithic debris was noted to the north and west of the hearth at 35HA3055 which may indicate that the wind blew that direction at the time the site was used.

It is possible that the remains of species other than jackrabbits lie obscured in the highly fragmented assemblage, but no identifications other than leporids were made. It is unusual that species diversity remained very low even as sample size increased. We would anticipate finding quite a variety of taxa in a bone assemblage of more than 5000 specimens.

Stone Tools and Fire Affected Rock

Three scrapers/utilized flake tools, one of obsidian and two of chert, and one utilized flake of obsidian were recovered at the site. In addition, one grinding slab and three mano fragments were recovered. The mano fragments are all of basalt and the grinding slab fragment is welded tuff. It is likely that all of the ground stone fragments were fire cracked although none of them exhibit any reddening caused by oxidation.

The scrapers/utilized flake tools are indicative of butchering activities and ground stone may be evidence of plant food preparation. An alternative explanation for the presence of ground stone fragments is their adaptive re-use as boiling stones. Suitable rock in the site area is scarce and these fragments could have been collected at nearby sites and re-used at 35HA3055.

Lithic Debitage

Cryptocrystalline silicate (CCS; five color varieties of chert and one of chalcedony) is the predominant tool stone at the site, comprising 78% (331 of 422) of the assemblage. Obsidian accounts for the remaining 22% (91of 422). Nearly 100% of the debitage was interior (i.e. without cortex), with the exception of six of the sixteen (38%) obsidian flakes submitted for XRF analysis. Sixty percent of the flakes are less than 1cm in long, 30% are 1 to 2 cm and the remainder are greater than 2 cm. The highest flake density in the excavated units was noted in Units 4, 8 and 9 with moderate densities observed in Units 2, 3 and 5. The lowest densities were observed in Unit 6 and 7. It is evident lithic reduction intensity was the greatest directly to the east and south of Feature 1, while moderate levels occurred to the north and east. The lowest level of activity was seen to the west of Feature 1.

As mentioned above, the high proportion of CCS flakes compared to obsidian is highly unusual in the Beatys Butte obsidian source area. Two flakes in the CCS assemblage resemble the oolitic, buff-colored Eagles Nest Chert found near Malheur and Harney lakes. The remainder of the CCS assemblage does not resemble any local sources.

A majority of the lithic reduction activity at the site was late stage, indicating tool manufacture and/or re-sharpening. The flaking debris could have resulted from the production of small expedient cutting tools from prepared cores and cobble fragments (in the case of some of the obsidian) as well as re-sharpening more formal tools such as knives.

Obsidian Studies

Obsidian Flake/Tool Analysis

The following (Table 2) is a brief description of the 15 flakes and two tools submitted for XRF analysis:

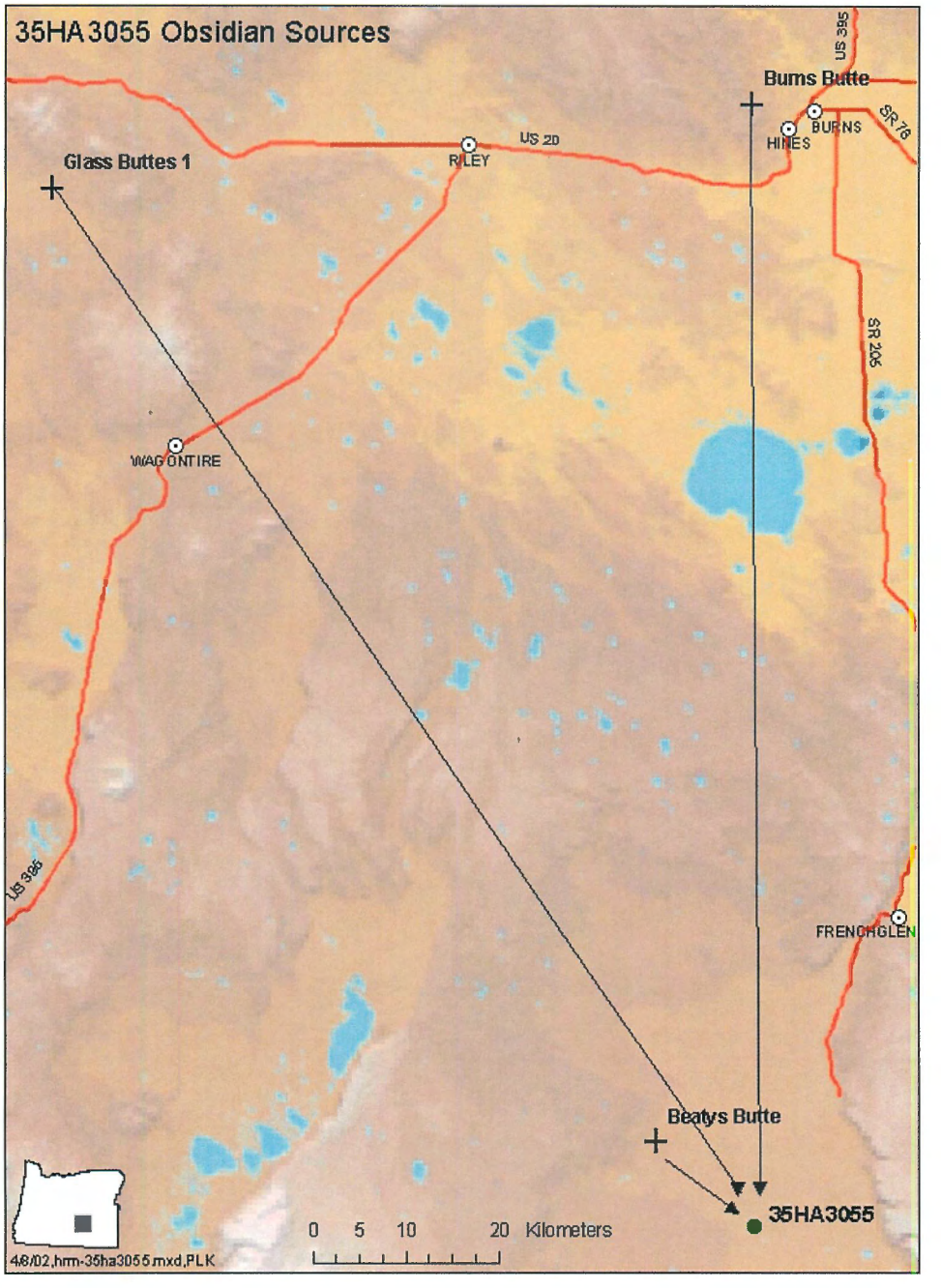
Table 2. Obsidian Flake/Tool Analysis of XRF Specimens

Spec #	Description	Provenience	Source Name	Ventral Hydration Rind	Dorsal Hydration Rind
128	Angular exterior shatter	Unit 3, Level 1	Burns Butte	1.9 microns	NA
129	Anterior flake	Unit 2, Level 1	Burns Butte	1.9 microns	NA
130	Interior flake (multidirectional core)	Unit 2, Level 1	Beatys Butte	4.0 microns	NA
131	Exterior flake (core or cobble thinning)	Unit 8, Level 1	Burns Butte	1.8 microns	9.0 microns
132	Utilized exterior flake (core or cobble)	Unit 7, Level 7	Burns Butte	1.5 microns	NA
133	Exterior flake (core or cobble thinning)	Unit 2, Level 1	Burns Butte	1.6 microns	NA
134	Interior flake (biface reduction)	Unit 9, Level 1	Beatys Butte	4.1 microns	NA
135	Interior flake (multidirectional core)	Unit 9, Level 1	Burns Butte	1.6 microns	4.6 microns
136	Exterior flake frag (core or cobble)	Unit 9, Level 1	Burns Butte	1.8 microns	4.8 microns
137	Interior flake frag (multidirectional core)	Unit 8, Level 1	Burns Butte	1.7 microns	NA
138	Interior flake frag (multidirectional core)	Unit 9, Level 1	Burns Butte	1.6 microns	NA
139	Interior flake frag (corner removal)	Unit 3, Level 1	Burns Butte	1.6 microns	4.6 microns
140	Exterior flake (core decortication)	Unit 3, Level 1	Burns Butte	1.6 microns	5.3 microns
141	Interior flake (biface thinning)	Unit 4, Level 2	Burns Butte	1.6 microns	5.0 microns
142	Interior flake frag (biface thinning)	Unit 5, Level 1	Unknown	3.0 microns	NA
143	Interior flake (corner removal)	Unit 8, Level 1	Burns Butte	1.6 microns	NA
146	Uniface (steep edges and end) scraper	Unit 8, surface	Glass Buttes 1	1.4 microns	NA

Obsidian Sourcing Data

A total of 15 waste flakes and two tools from the site was submitted to Northwest Research Obsidian Studies Laboratory for sourcing analysis. These items constituted 18% of the obsidian assemblage at the site and 4% of the total chipped stone assemblage. Normally, one would expect that most of the waste flakes and expedient tools would originate from the large Beatys Butte source because the site is located on its periphery. However, the Beatys Butte

Figure 5. Site 35HA3055, Obsidian Sources



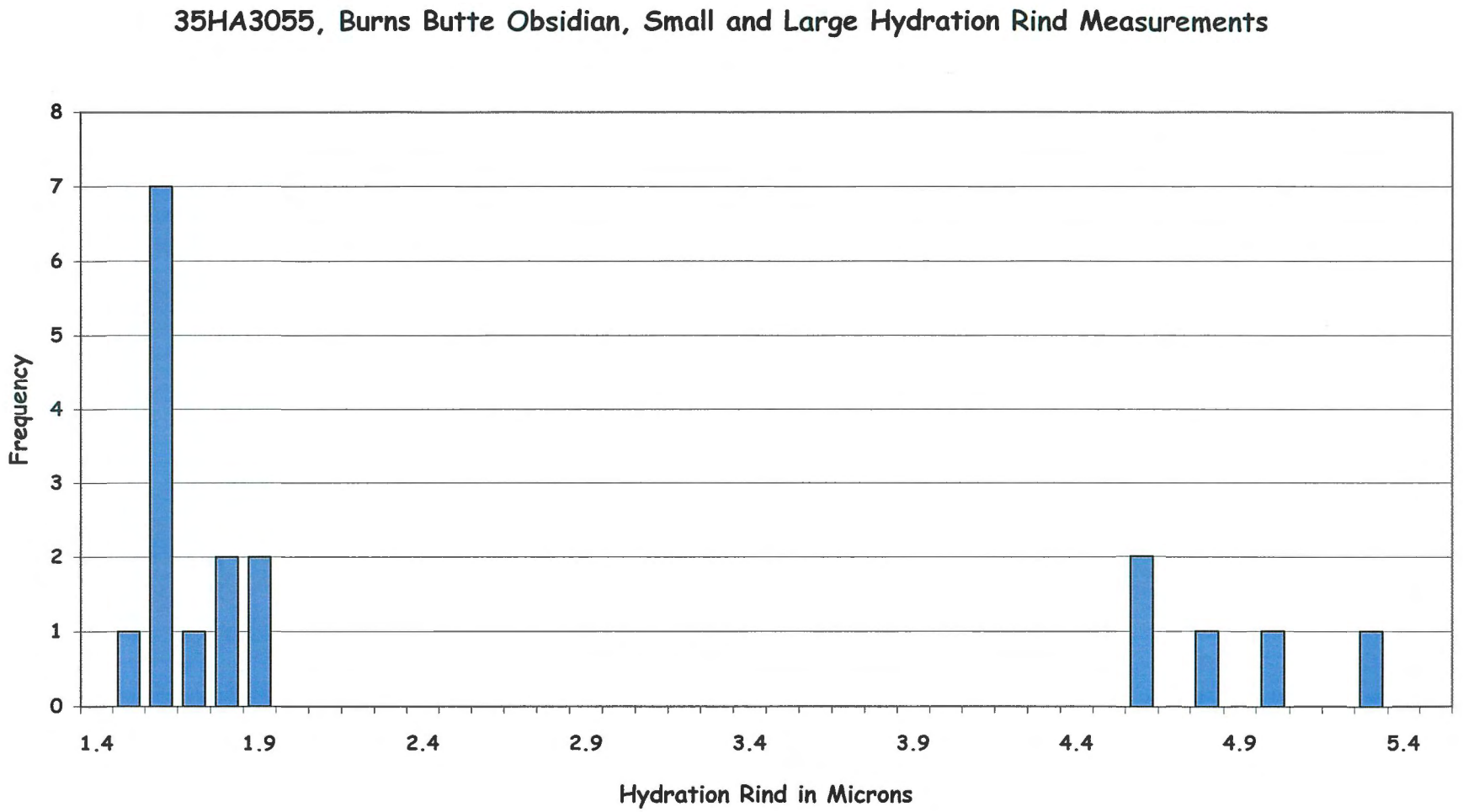
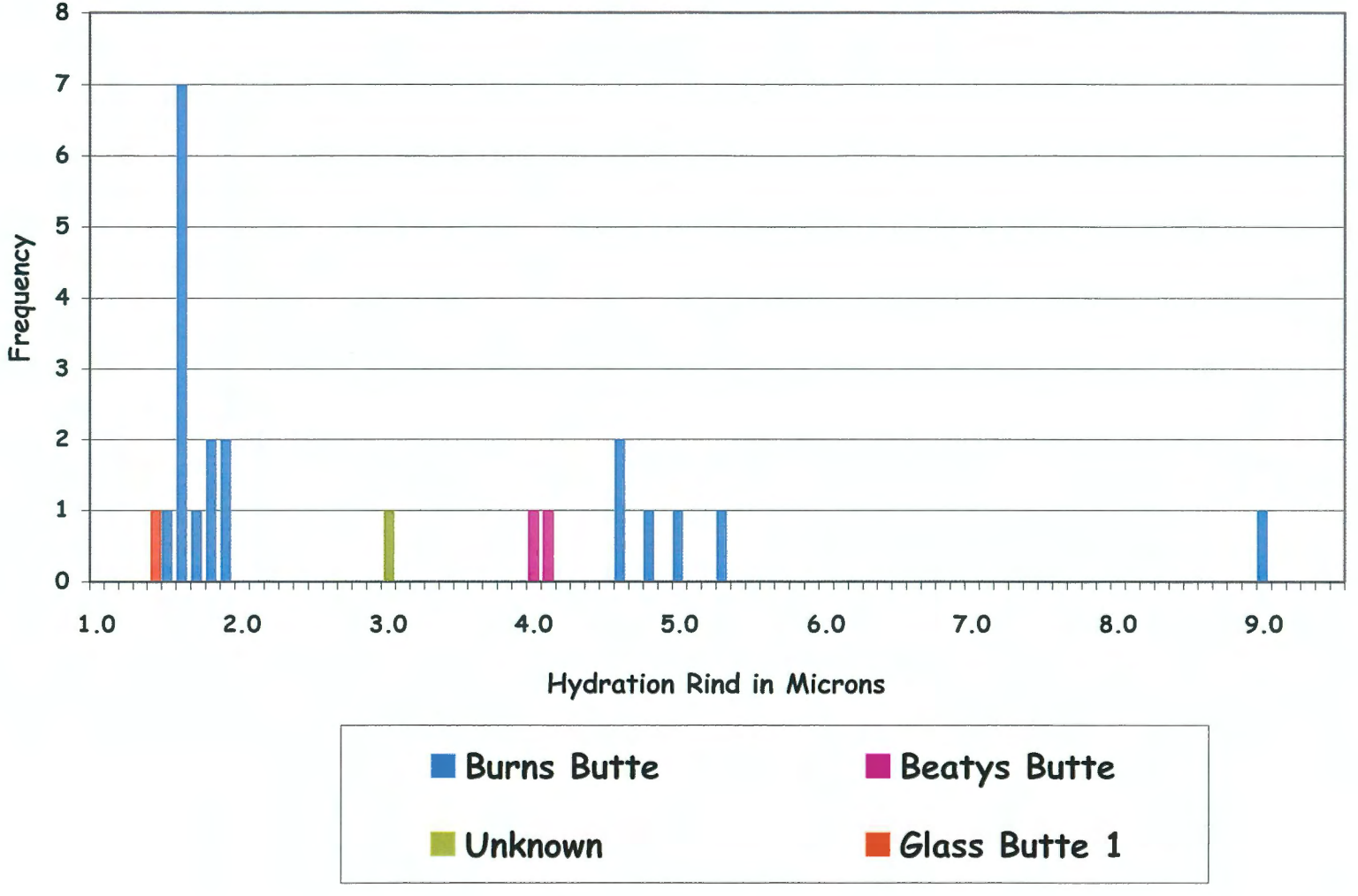


Figure 6. Burns Butte Obsidian, Hydration Rind Measurements

Figure 7. 35HA3055, All Obsidian Sources, Hydration Rind Measurements



source area does not contain cryptocrystalline silicate (CCS) sources and the high proportion CCS in the assemblage (78%) suggests the site's occupants were new arrivals to the area. Along with the CCS, they may also have transported obsidian to the site from elsewhere.

The trace element analysis results reveal this prehistoric group did have exotic obsidian in their possession which included 12 flakes and one tool from the Burns Butte source, one tool from Glass Butte 1 source, two from Beatys Butte and one from an unknown source. Burns Butte is 133 kilometers to the north and Glass Butte 1 is 145 kilometers northwest of the site (Figure 5).

The analysis results may be slightly skewed due to the sample size necessary trace element analysis. Items with a length and width greater than 1 cm were required for analysis. The majority (64%) of the obsidian flakes at the site were smaller than 1 cm. However, flakes or tools were selected from seven of the eight excavation units, assuring a reasonable amount of physical separation within the site and somewhat reducing the possibility of over-representation of any one obsidian source.

A contrast to the obsidian characterization studies at 35HA3055 are the results of recent XRF study of 125 projectile points from other sites in the Beatys Butte source area in Catlow Valley. The projectile point collection contained primarily mid-Holocene points but did include a Clovis specimen, four Great Basin Stemmed and nine late Holocene points. Tools that are often curated, such as projectile points, can have a fairly long use-life. One would expect a collection of projectile points, even one from within or very near a large obsidian source, to contain a moderate number of points from non-local sources. The projectile point characterization data revealed 69% of the projectile points were made of Beatys Butte or Beatys Butte 2 obsidian, while the remainder (31%) were from 22 sources outside the Catlow Valley. These results are within the range of expectations.

Binford (1979) suggests that tool stone procurement is an activity that may be embedded into other resource gathering or travel activities. The people that deposited the tools at site 35HA3055 were most likely recent arrivals to the Catlow Valley (Beatys Butte source) area, and the high proportion of Burns Butte obsidian indicates they may have recently been gathering raw obsidian at the northern end of the neighboring Malheur Lake Basin (Figure 5). Southeastern Oregon is rich in obsidian sources and, in most locations, the collection of raw obsidian could easily be incorporated into other resource procurement strategies. We interpret the deposition of Burns Butte obsidian at 35HA3055 to be the result of subsistence related activities, not a consequence of trade.

The capture and consumption of a number of jackrabbits would seem to fit into Binford's (1979) "situational context" of tool stone use, where one would expect butchering equipment to be expediently manufactured from materials close at hand. However, since most of these tools originated from distant obsidian sources, it seems reasonable to surmise that the new arrivals had not encountered the 110 square mile Beatys Butte obsidian source. In fact, the site lies just east of the main body of the source.

The single tool correlated with Glass Buttes 1 implies the people were in the Glass Buttes area at a previous time. Glass Buttes is about 75 kilometers west of Burns Butte.

Obsidian Hydration Data

Thirteen Burns Butte specimens showed measurable hydration rinds. The rinds ranged in thickness from 1.5 to 9.0 microns. Six of these specimens had two rind measurements, the smaller of the two on the ventral side of the flake and larger on the dorsal. All thirteen specimens had rinds less than 2 microns with a mean of 1.68 microns (Figure 6). The rinds recorded on the dorsal surface of six specimens ranged from 4.6 microns to 9.0 microns. Five out of six of these larger rind measurements clustered around 5.0 microns (Figure 6). This hydration data demonstrates the procurement at Burns Butte of previously culturally modified obsidian. It is possible that five flakes came off one cobble fragment since the group of larger hydration rinds are fairly tightly clustered. The 1.8 and 9.0 micron rinds on one flake show the procurement of at least one other previously flaked core or cobble. The flake morphologies of the Burns Butte specimens show that the most of the obsidian collected at Burns Butte were partially decorticated cobbles or angular sections of the same (Table 2).

Two Beatys Butte flakes showed visible hydration rinds of 4.0 and 4.1 respectively (Figure 7). Although a hydration

rate for Beatys Butte obsidian has not been established, it is clear from previous hydration data from the region that it does not hydrate as fast as Burns Butte obsidian. Both of these flakes are small (< 3cm in length) and may not have been useful for activities associated with butchering and roasting rabbits. However, they may have been collected from nearby to be utilized as small projectile point blanks. It is more probable they were not collected by the most recent inhabitants of the site but are from an earlier occupation not directly encountered in the shallow excavations. One Glass Butte tool showed a visible hydration rind of 1.4 microns, similar but slightly thinner than the Burns Butte specimens (Figure 7). The final specimen from an unknown source, displayed a hydration rind of 3.0 microns (Figure 7).

Obsidian Hydration Chronology

A tentative hydration rate of 10 microns^2 per 1000 years for Burns Butte obsidian has been calculated by Thomas Connolly in O'Grady (et al. 2002). One of the authors of this paper (Skinner, 2002) cautions that this tentative hydration rate is unusually fast for obsidian. Nonetheless, the rate can be cautiously applied when well-date obsidian samples are found in similar contexts. Much of the hydration data collected to calculate this rate came from sites excavated in the northern Malheur Lake Basin near the Burns Butte source at an elevation of approximately 4150 feet. Site 35HA3055 is at approximately 4565 feet. It is considered reasonable to apply the tentative rate to the specimens from this site.

A calendar date of 282 BP can be calculated from the mean rind thickness of 1.68 microns for the 13 Burns Butte measurements. This provisional date is just outside the calibrated radiocarbon date range of 465 to 291 BP (2 sigma) derived from sagebrush charcoal taken from Feature 1 (Figure 8). Nonetheless, it is close enough to be considered a valid date for the site, showing the tentative hydration rate for Burns Butte is accurate in this circumstance.

Five of the six Burns Butte flakes had a mean hydration rind thickness of 4.86 microns on their dorsal surfaces. This mean hydration thickness yields a calendar date of 2361 BP using the tentative rate for Burns Butte. The sixth flake with two hydration rinds had a rind measuring 9.0 microns on the dorsal side. This rind yields a 8100 BP calendar date.

Conclusions

Faunal analysis has shown that at least seven jackrabbits were cooked and consumed near a small hearth at a camp site located mid-slope on a terrace of ancient Lake Catlow. Other likely activities occurring with the rabbit roasting were carcass preparation, tool manufacture and re-sharpening and, possibly, plant food processing and stone boiling. The recovery of 5146 bone fragments, 422 pieces of lithic debitage, sagebrush charcoal recovered from a defined hearth with a date range of 465 to 291 BP (2 sigma) and a stratigraphic understanding of the site formation processes at work resulted from just two days of excavation. Site 35HA3055 provides a perspective on the substance and the quality of information that can be derived from the small, apparently single-incident archaeological sites found in a variety of settings throughout the Northern Great Basin. The limited use of the site and lack of extensive alteration due to erosional processes seemed to allow clear relationships to be discerned between the hearth and the cultural debris surrounding it; suggestive of site use patterns seen elsewhere (Binford 1978; Connolly and Byram 2001)

The presence of a large proportion of CCS and non-local obsidian flakes at the site suggests the occupants were recent arrivals from the Malheur Lake Basin to the north where they had collected Burns Butte obsidian. Some of the Burns Butte obsidian was culturally modified when collected. Obsidian hydration dating of the rinds produced after earlier modifications yielded provisional dates of 2361 and 8100 BP. Obsidian hydration dating of 13 flakes modified at the site is in close agreement with the young end of the calibrated radio carbon date range of 465 to 291 BP.

Several factors fueled the desire to learn more about 35HA3055; the presence of concentrated chert flakes in the confines of a major obsidian source indicated a possible single use of the site which might provide specific information about site activities, the depositional environment suggested by its location on the leeward side of the lake terrace, and the transition of the land parcel from public to private ownership upon completion of recent land exchanges. The latter point was probably instrumental in the decision to return and excavate since the opportunity

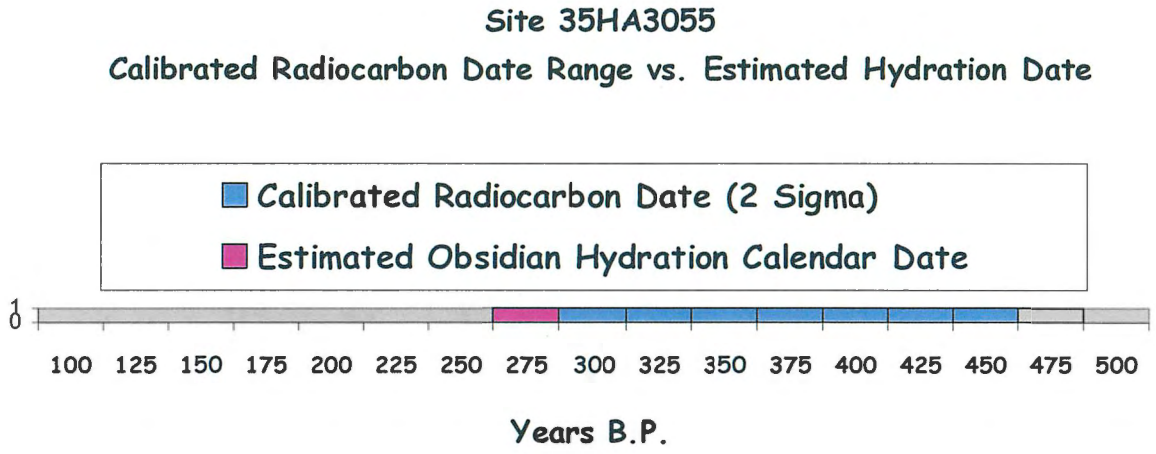


Figure 8. 35HA3055 Calibrated Radiocarbon Date Range Versus Estimated Obsidian Hydration Date

would be lost thereafter, but the results of our analyses have made it apparent that similar sites will receive more attention in the future.

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