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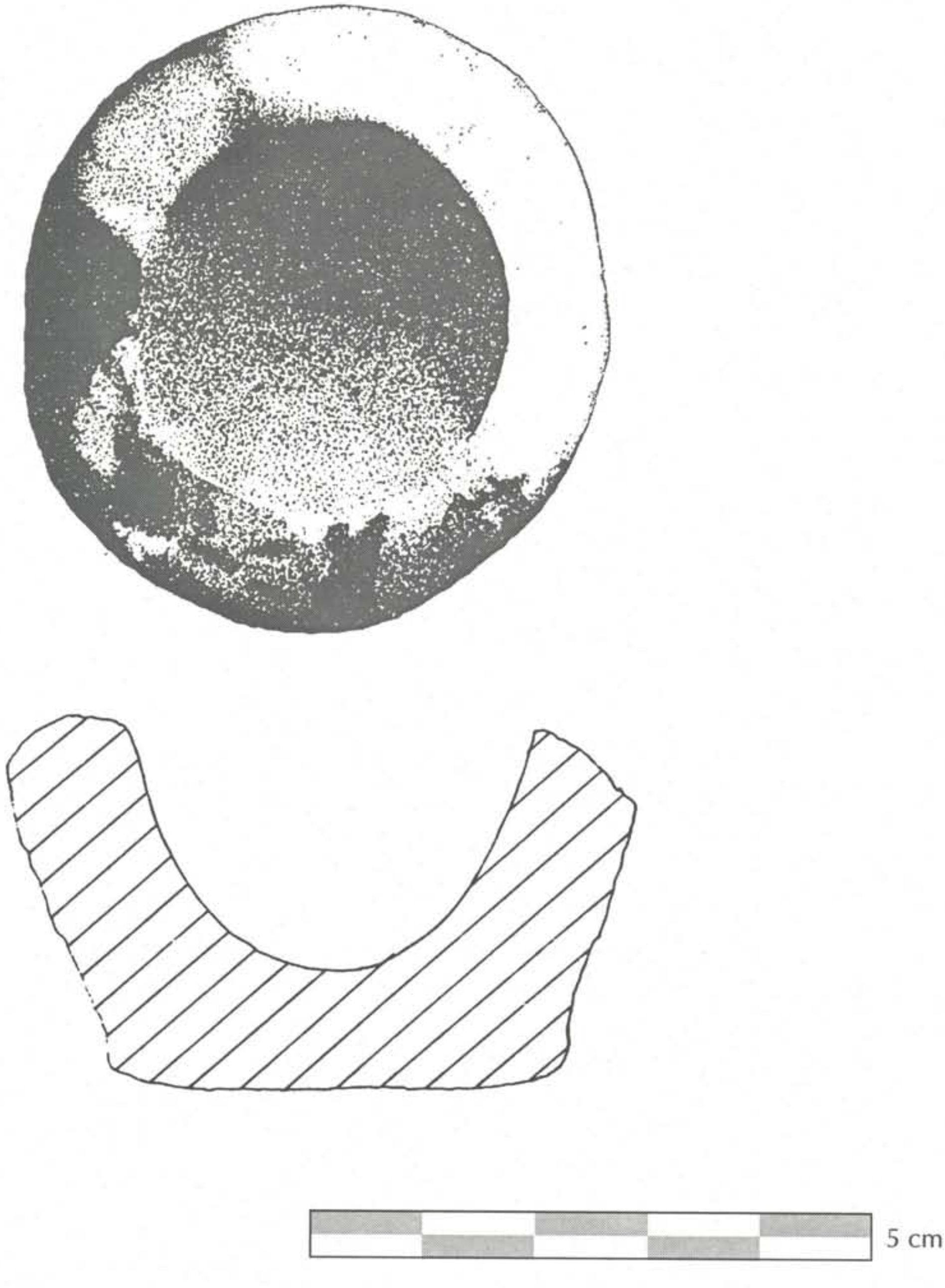

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GEOGRAPHIC DISTRIBUTION OF GROUNDSTONE IN SOUTHWESTERN IDAHO

A. Craig Hauer
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It is clear that there are relationships between material remains and subsistence patterns (Bettinger 1978; Binford 1980), and these vary in environmental context. It has also been shown that subsistence and mobility are interlinked (Andrefsky 1994; Bettinger 1987; Binford 1980), producing regional patterning in which flora and fauna are procured (see Bettinger 1978; Binford 1980, 1981, 1982; Schiffer 1978; Yellen 1977). Given the integrated nature of subsistence, inquiries into artifact distributions should not focus exclusively on implements associated with hunting. Instead it would seem that a more balanced approach is appropriate. This is particularly evident when reviewing the literature for Idaho, in which the ethnographic record suggests a heavy reliance on plants and the use of groundstone (Steward 1938).

Archaeological inquiries concerning plant use, however, have been cursory (Barlow and Metcalfe 1996; Holmer 1989; Jones 1996; Plew 1983; Plew and Gould 1990; Winfery and Newman 1995). These studies, for the most part, assume an observable environmental relationship with the use of groundstone (i. e. Barlow and Metcalfe 1996; Brieur 1976; Jones 1996; Newman and Winfery 1995; Yohe et al. 1991). Given this environmental relationship, it seems beneficial to study the distribution of groundstone in southwestern Idaho, in an attempt to further articulate the forementioned relationship between artifact type and environment.

A geographical distribution of groundstone in southwestern Idaho was compiled to analyze environmental and material relationships that may be correlated to groundstone (Figure 1). Data compiled in this study aims to address the relationship between groundstone and environmental/geographical settings, and the possible relationship between tool types and groundstone (Holmer 1989; Steward 1938:167). The goal of this study, while basic, will help in furthering research interests in Idaho by connecting material culture (groundstone) to the landscape, as well as inquiries into mobility and behavioral models.

Groundstone was used for this study due to its primary association with plant processing (Barlow and Metcalfe 1996; Schneider 1993, 1996; Steward 1938). Within this study groundstone constitutes a class of tools that have 'pecking' as a major component of the manufacturing technique. Some of the more common tools represented in sites used for this study are manos, mortars, pestles, and hand stones. These implements are for the most part believed to be associated with processing of plant food resources.

In the articulation of geographical relationships in regards to groundstone, the use of elevational data is informative. This is derived in part from ethnographic data, which suggests sets of elevational criteria, although in a rather obscure fashion (see Steward 1938:165-167). These accounts infer winter habitation sites associated with the Snake River (an elevationally low area). Summer and spring habitation sites are believed to be associated with the procurement of such items as "camas (*Quamasia quamash*), and yamp (*Perideridia bolanderi*)," in mountainous areas (Steward 1938:167). These elevationally distinct behaviors should be similarly reflected in the archaeological record with concerns towards groundstone. This distribution should also be measurable due to the relatively similar environment since ca. 7,200 B.P. (Bright 1966; Butler 1978; Gruhn 1961).

It would hold that the current elevational and thus environmental niches supporting native plants exploited, through the use of groundstone, by indigenous peoples ethnographically should be the locations of past procurement episodes of similar behavioral patterns. In other words, there should be statistically observable patterns in the archaeological record, which will correspond to the ethnographic data for the area. This type of relation has been implicitly suggested in various studies throughout the Great Basin (Bentley 1982; Barlow and Metcalfe 1996; Couture et al. 1986, Simms 1985).

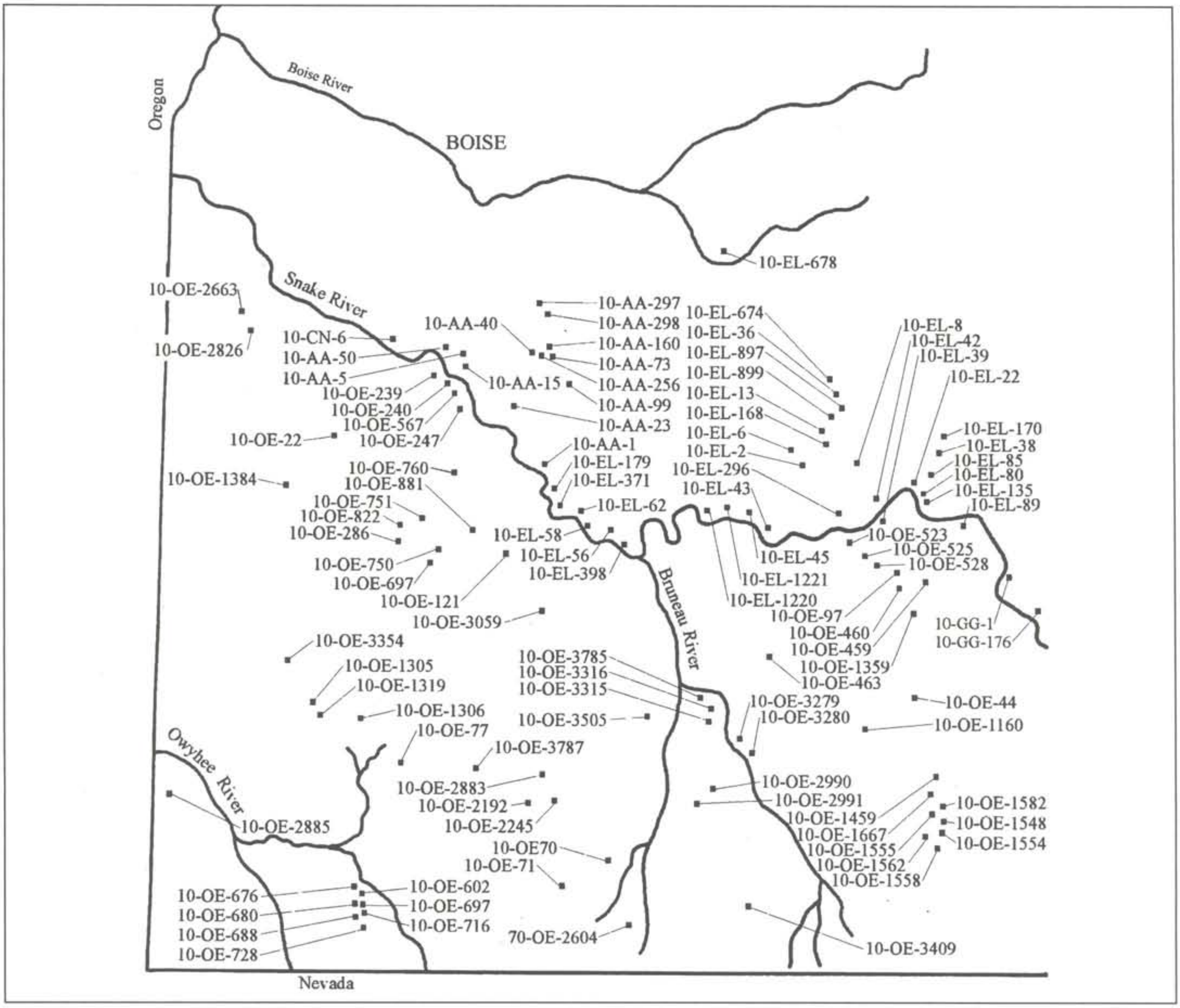

Figure 1. Map Showing Geographic Distribution of Groundstone in Southwestern Idaho.

ETHNOGRAPHIC AND ARCHAEOLOGICAL BACKGROUND

Several researchers have reported ethnographic data relevant to Idaho (Steward 1938; Murphy and Murphy 1960; Liljeblad 1957). For the most part these mirror Steward's (1938) work which is the major source for this discussion. Northwestern Great Basin aboriginal peoples practiced a hunter-gatherer subsistence pattern in which numerous food resources were exploited. Some more common plant resources processed with groundstone were common yamp (*Perideridia bolanderi*), swan-apple (*Coswellia ambigua*), chokeberry (*Prunus virginiana*), camas (*Quamasia quamash*), Bolander's yampah (*Penstemon speciousus*), and cattail (*Typha*) (Steward 1938, 1941, 1943). Within southwestern Idaho, the White Knife Shoshone, who processed the Owyhee region, used groundstone in conjunction with some plant utilization, but these accounts are rather limited (Harris 1940) and are similar to those made by Steward and Wheeler-Voeglin (1974) for the Northern Paiute, who utilized biscuitroot (*Lomatium cous*), bitterroot (*Lewisia rediviva*), with less emphasis on the forementioned common yamp (*Perideridia bolanderi*), and swan-apple (*Coswellia ambigua*) due to environmental niche considerations (Harris 1940; Steward 1938, 1943). The processing of seeds typically involved the collecting of the plant resource, winnowing, and subsequent grinding. In the case of roots or tubers, ethnographic data suggests that processing was similar to the Burns Northern Paiute: "roots are gathered in the morning, peeled at midday, and spread to dry in the wind and the sun . . . Dried roots may be stored whole or ground to a flour using manos and metates or mortars and pestles" (Couture et al. 1986:156-157). Berries, on the other hand, were collected and were occasionally "pounded on a metate to mash the seeds . . . [they then] dried and stored the pulp, including the seeds" (Steward 1938:28).

Archaeological research concerning groundstone, as already mentioned, is at an early stage in Idaho. Most of this work has concerned simple recording of the presence or absences within the sites (Holmer 1989; Keeler and Koko 1971; Murphey 1977; Plew 1983; Plew and Gould 1990; Tuohy and Swanson 1960). In other areas of the Great Basin there has been an increased study of groundstone in conjunction with optimality models (Barlow and Metcalfe 1996; Simms 1985). There has also been, with the refinement of immunological analysis, increased research addressing the specific functional use of groundstone (Winfery and Newman 1995; Yohe et al. 1991). Other research has dealt with the locating of groundstone quarries in an attempt to further articulate behavioral relations (Schneider 1993, 1996; Schneider et al. 1995). Temporally the presence of groundstone was first observed in relation to Plano projectile points at Wilson Butte Cave during the Paleo-Indian period (Butler's 1978 early big game hunting tradition) (Gruhn 1961:118-119). During the Archaic there is an increased reliance on groundstone indicating an increased reliance on plant resources (Gruhn 1961; Metzler 1977; Swanson 1972). Within the Owyhee uplands, Plew (1981) observed groundstone which dated as early as 6,000 years B.P. This culminated in the Protohistoric period in which behavioral patterns were likely similar to those observed by ethnographic accounts, though influenced by white settlers and the establishment of reservations. Over all, the majority of research is limited to the noting of the presence or absence of groundstone in southwestern Idaho (see Butler 1986 for an overview). There have, however, been inconsistencies in the quality of data recovered by the investigators. These sampling techniques have recently, with methodological improvements, been expanded to include the numbers of specimens of groundstone, but little more.

METHODS

The data reported here was collected using the Archaeocompute database, on file at the Idaho State Historical Preservation Office. The database used here consists of a total of 1,293 sites including both historic and prehistoric use. To limit the search a field was set up for the presence of groundstone. This limited the search to 112 sites. The sites used for this study were the result of surveys and limited test excavations. IMAC forms were used to collect data concerning elevation, tool types present, type of water source, and the presence of lithic debitage and thermally altered rock, which were treated as predictor variables. Tool types recorded consisted of ceramics, cores, knives, scrapers, bifaces, preforms, drills, modified flakes, lancelot and projectile points. Projectile points were further broken down by type into Humboldt, Northern Side-Notched, Elko, Desert Side-Notched, Eastgate, Rose Spring, Pinto, and Cottonwood (Aikens 1970; Thomas 1983, 1988).

While there was an initial recording of projectile point types with the expectation of giving a temporal control to the study, the inconsistency of the research material required the abandonment of any temporal specificity. This was necessitated by the fact that projectile points reported in IMAC forms were not specific. Also, in some cases point types that were specified were typed by taxonomic systems that are no longer in use.

All inquiries, excluding groundstone, were limited to the presence or absences of the given archaeological materials in an attempt to compensate for variances in methodological approaches. In the case of groundstone the number of specimens at each site was recorded. This was done to examine relational influences between groundstone and the predictor variables, in which the number of specimens may represent a distribution resulting in a statistically observable pattern.

Elevational data were arbitrarily divided into three groups, in which the Snake River served as a baseline and an elevation of 8,000 feet above sea level represented the ceiling cut off. These units were defined for use in the discussion, and were the quotient of the range of elevational data. This resulted in the following low (2,280-4,186 ft. ASL), medium (4,186-6,093 ft. ASL), and high (6,093-8,000 ft. ASL) elevational units. It should be noted that the medium elevational class overlaps minimally with both upland and lowland environments.

Preliminary relationships of groundstone, elevational data and archaeological remains were correlated. Initially, the relationship between elevation and amount of groundstone were explored (Model 1). This was followed up with testing for relationships based on correla-

Table 1: Correlations of All Categories with Groundstone

Correlations																
		ground stone present	elevation ASL of the site in ft.	presence of bifaces	presence of ceramics	cores present	presence of drills	presence of fcr	presence of hammer stones	presence of knives	presence of lancelot points	presence of lithic debris	presence of modified flakes	presence of projectile points	presence of preforms	presence of lancelot points
Pearson Correlation	ground stone present	1.000	-.122	-.088	.209*	-.100	-.036	-.002	-.025	-.048	-.035	.043	-.046	.088	-.012	-.074
Sig. (2-tailed)	ground stone present		.200	.355	.027	.293	.708	.984	.792	.614	.715	.655	.631	.359	.902	.436
N	ground stone present	112	112	112	112	112	112	112	112	112	112	112	112	112	112	112

*. Correlation is significant at the 0.05 level (2-tailed).

tion output. The following criteria determined these groups: All tool types (ceramics, cores, knifes, scrapers, bifaces, preforms, drills, lithic debris, and projectile points) were examined for elevational relations (Model 2). The four strongest relations between artifacts and groundstone were examined for elevational relations (Model 3), and the grouping of cores, bifaces, lithic debris, and projectile points were examined with concerns towards elevation (Model 4). This last group was examined for the possibility of the use of groundstone in activities associated with animal processing (e.g. Winfery and Newman 1995; Yohe et. al. 1991).

Regression analysis was used in which artifact types, excluding groundstone and elevation, were treated as dummy variables. This was due to the dichotomous nature of data for artifact types. As such, the amount of influence of each artifact class was measured in relationship to groundstone and elevation. In other words, the amount of influence artifact types and elevation have on the ability to predict the presence of groundstone was measured (Hardy 1993). Also, the exploratory nature of the study required the use of a statistical approach that can accomplish this goal with the maximum amount of strength. This is due to the use of groundstone being affected by multiple variables and the statistical method used must have the strength to cope with a number of variables. The results of these inquiries will be discussed below, in which r^2 (strength of the predictor variable), R (strength of the overall relationship), F-value (significance of correlation), b-value (nature of the relationship), t-value (significance of the relationship), and p-value are given.

Table 2: Regression Model 1

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	elevation ASL of the site in ft[a]		Enter

a. All requested variables entered.
b. Dependent Variable groundstone present.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.122[a]	.015	.006	10.31

a. Predictors: (Constant), elevation ASL of the site in ft.
b. Dependent Variable: groundstone present.

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	177.077	1	177.077	1.666	.200[a]
	Residual	11693.49	110	106.304		
	Total	11870.56	111			

a. Predictors: (Constant), elevation ASL of the site in ft.
b. Dependent Variable: groundstone present.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	6.849	3.092		2.215	.029	.723	12.976
	elevation ASL of the site in ft.	-9.4E-04	.001	-.122	-1.291	.200	-.002	.001

a. Dependent Variable: groundstone present.

RESULTS

The initial correlations revealed that the relations between the groundstone and the individual predictor variables were weak (r=-0.122 to 0.209) (Table 1). Highest positive relations were found in the ceramics (r= 0.209) and projectile points (r=0.088). Elevation and cores (r=-.100) had the largest negative relations. There was also a significant relationship between groundstone and ceramics (sig>.027).

Regression analyses were inconclusive. In the first series of tests (see Table 2), in which the relations between ceramics and elevation were examined there was a negative relation between R=0.122, r^2=0.015, b=-9.4 E-04, t=-1.291, sig.<.200. But, the predictor variable has a weak relationship to the amount of groundstone. This weak relationship is also apparent in the low F value (F=1.666, sig.<.200) indicating no linear relationship between the variables. Overall, elevation only reduces the error in predicting the amount of groundstone by 1.5%.

The second level of analysis, concerning the relationship among all tools and elevation (Table 3), was consistent with the initial correlations listed above. In this test there was no significant relationship between the dependent variable and tool types and elevation (R=0.342, r^2=0.117). Although there was no significance the model did reduce the error more than Model 1 (11.7%). But, again there was no linear relationship between the variables (F=1.203, sig.<0.295). Within the independent variables the only significant relationship was between groundstone and ceramics (b=7.392, t=2.690, sig.<0.008). Relations between ceramics and elevation were examined; there was a negative relation between the b=-9.4 E-04, t=-1.291, sig.<.200). Other positive, but not significant, relationships were in projectile points (b=2.973, t=1.262, sig.<0.210) drills (b=8.146E-02, t=0.23, sig.<0.982,), and lithic debris (b=2.523, t=1.175, sig.<0.243). All other relationships were negative (see Table 3).

Table 3: Regression Model 2

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Presence of lancelot points, presence of lithic debris, elevation ASL of the site in ft., presence of preforms, presence of knives, presence of drills, presence of projectile points, presence of modified flakes, cores present, presence of ceramics, presence of bifaces[a]		Enter

a. All requested variables entered.
b. Dependent Variable groundstone present.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.342[a]	.117	.020	10.24

a. Predictors: (Constant), presence of lancelot points, presence of lithic debris, elevation ASL of the site in ft., presence of preforms, presence of knives, presence of drills, presence of projectile points, presence of modified flakes, cores present, presence of ceramics, presence of bifaces.
b. Dependent Variable: groundstone present.

The third model design used the variables of elevation, ceramics, cores, bifaces and projectile points (Table 4). In this test there was no significant relationship between the dependent variable and tool types and elevation (R=0.279, r^2=0.078). Although there was no significance, the model did reduce the error more than Model 1 (7.8%), not as much as Model 2. Again there was no linear relationship between the variables (F=1.789, sig.<0.121). Ceramics was significant (b=4.731, t=1.961, sig.<0.052). Other positive, but not significant, relationships were in projectile points (b=2.527, t=1.096, sig.<0.275). All other relationships were negative (see Table 4).

The final model design of elevational factors, cores, bifaces, lithic debris, and projectile points showed no significance (Table 5).

DISCUSSION

While there is a significant relation between ceramics and groundstone, the primary indicator of elevation

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1387.203	11	126.109	1.203	.295[a]
	Residual	10483.36	100	104.834		
	Total	11870.56	111			

a. Predictors: (Constant), presence of lancelot points, presence of lithic debris, elevation ASL of the site in ft., presence of preforms, presence of knives, presence of drills, presence of projectile points, presence of modified flakes, cores present, presence of ceramics, presence of bifaces.
b. Dependent Variable: groundstone present.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	3.004	3.592		.836	.405	-4.123	10.131
	elevation ASL of the site in ft.	-5.0E-04	.001	-.065	-.631	.529	-.002	.001
	presence of ceramics	7.392	2.748	.299	2.690	.008	1.939	12.844
	cores present	-.248	2.301	-.012	-.108	.915	-4.813	4.318
	presence of bifaces	-2.016	2.651	-.093	-.761	.449	-7.275	3.243
	presence of projectile points	2.973	2.355	.144	1.262	.210	-1.700	7.646
	presence of drills	8.146E-02	3.585	.002	.023	.982	-7.031	7.194
	presence of knives	-2.380	2.798	-.089	-.851	.397	-7.931	3.171
	presence of lithic debris	2.523	2.146	.117	1.175	.243	-1.736	6.781
	presence of modified flakes	-.582	2.814	-.022	-.207	.837	-6.165	5.001
	presence of preforms	-2.594	6.298	-.041	-.412	.681	-15.089	9.901
	presence of lancelot points	-4.024	2.479	-.184	-1.623	.108	-8.942	.894

a. Dependent Variable: groundstone present.

showed no or an extremely weak relationship. Given this we cannot conclude that there are relationships between the amount of groundstone and elevation, or between the artifact types examined in Models 2 through 4. A lack of correlation between the elevational factors and groundstone is interesting in that previous research would imply that there should be an uneven distribution. This is due to the groundstone being associated with habitation areas, which have been described as being either along the Snake River (low category), or at the base of the mountains (medium category) (Steward 1938). This pattern of use should hypothetically be represented in the material record as exhibiting larger densities of groundstone in the low and middle elevational categories. This type of patterning is not statistically represented by the data. Despite this lack of statistical significance the slope of Model 1 (b=-9.4E-04) might suggest that there could be a distribution mimicking the ethnographic record. Given this lack of statistical relationship it seems more plausible that the use of groundstone for processing which would be affected by both climatic and population pressures on procurement, resulting in a more diffuse distribution (Steward 1938). By this it is meant that variability, as addressed by diet breadth models, will be based on resource availability, which affects the return and use of the same resource or habitation area consistently. This could then result in areas that have different concentrations of groundstone, which shift geographically and elevationally due to environmental and behavioral factors.

As mentioned, the use of groundstone for processing would account for the lack of relationships between elevational provenance. This is due to the exploitation of plant habitats in a number of different niches, as discussed above. The ethnographic literature would support this as in cases such as pickle weed (*Allenrolfea occidentalis*) which is established within the lower classification and some of the middle elevational zone (Barlow and Metcalfe 1996; Steward 1938), and other plants including pine nuts (*Pinus monophylla*), yamp (*Penstemon Speciousus*), and camas (*Quamasia quamash*). There is also some evidence to support the use of groundstone in processing small mammals, which would also affect the distribution of groundstone (Newman 1995; Yohe et al. 1991). If this behavior were ubiquitous, it seems likely that the distribution of groundstone would not be bounded by elevational criteria.

Other factors, which could result in a lack of elevational significance, is the possible inconsistency in the use of groundstone for processing. This would be the re-

Table 4: Regression Model 3

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	Presence of projectile points, cores present, presence of ceramics, elevation ASL of the site in ft., presence of bifaces[a]		Enter

a. All requested variables entered.
b. Dependent Variable groundstone present.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.279[a]	.078	.034	10.16

a. Predictors: (Constant), presence of projectile points, cores present, presence of ceramics, elevation ASL of the site in ft., presence of bifaces.
b. Dependent Variable: groundstone present.

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	923.940	5	184.788	1.789	.121[a]
	Residual	10946.62	106	103.270		
	Total	11870.56	111			

a. Predictors: (Constant), presence of projectile points, cores present, presence of ceramics, elevation ASL of the site in ft., presence of bifaces.
b. Dependent Variable: groundstone present.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	4.739	3.156		1.502	.136	-1.518	10.997
	elevation ASL of the site in ft.	-6.4E-04	.001	-.083	-.821	.414	-.002	.001
	presence of ceramics	4.731	2.413	.191	1.961	.052	-.052	9.515
	cores present	-.778	2.072	-.037	-.375	.708	-4.886	3.330
	presence of bifaces	-3.235	2.397	-.150	-1.350	.180	-7.987	1.516
	presence of projectile points	2.527	2.305	.123	1.096	.275	-2.043	7.097

a. Dependent Variable: groundstone present.

sult of the implements not being integral to processing and consumption as suggested by Couture et al. (1986) and Steward (1938).

The relation between the ceramics and groundstone, while significant, is weakened, when studies of ceramic elevational distributions are considered, in which Plew and Bennick (1990:120) observed that 59% of the pottery-producing sites are located within riverine environments between 2,500 and 3,400 feet. This type of relationship was only partially represented in the study conducted here. While the relationship with ceramics was significant it was only slightly weighted towards the lower and middle elevations. This would seem to be slightly contradicted by studies that show that ceramics are found in the second greatest abundance in areas above 5,000 feet (Plew and Bennick 1990). It should be cautioned that the relationship was weak given the lack of relationship in Model 3 R=.279, r^2=0.078. This is further broken into a negative relationship for all tools except ceramics, lithic debris, and projectile points. In other words, if ceramics, lithic debris, and projectile points are found at a site, the greater the likelihood of finding groundstone. Furthermore, the negative relationship between the amount of groundstone and elevational provenance suggests that lower elevational sites would have more groundstone in them. Groundstone might co-occur with hunting or related activities due to the relatively greater strength of prediction in models with projectile point and lithic debris in the independent variables. Another more likely interpretation of these indicators could be that groundstone is likely to be associated with either multiple use or multiple component sites, in which hunting activities take place. The former can be supported by the ethnographic evidence in which, "the winter camps [were sites] of many activities, including hunting," (Couture et al. 1986:154) or "the food plants are found in communities that reflect soil composition . . . less than half the area supports the plant communities . . . the remainder of the area is utilized for other activities, including campsites and hunting" (Couture et al. 1986:155). Steward (1938) refers to similar multiple uses of an area. This, along with the relation between ceramics might indicate an association with habitation sites, but this is a very weak relation given that the correlation strength for thermally altered rock (another indication of habitation areas) and groundstone is -0.002.

Also affecting this study is the likelihood of sampling bias. The sporadic nature of the surveys from which the database was constructed excluded any type of random sampling technique. These surveys, mainly the product of cultural resource management requirements, resulted in an uneven coverage of the area. Other factors biasing the distribution and artifactual associations could be the result of removal of groundstone by amateurs through collecting, and reuse by aboriginal peoples. The latter is suggested by Couture et al. in which, "several of the Burns Paiute women used manos and metates reclaimed from the root camp and carried to their home on the reservation" (1986:157). Sampling of artifacts could have also been biased by natural factors during surveys such as surface visibility, lighting, raw material reflectivity, or artifact shape. These factors, along with taphonomic processes could result in a skewed sample.

CONCLUSION

This paper has examined relationships between elevational provenience and the distribution of groundstone. Secondary to this study was to examine any relationships with other artifacts. No significance was established in the relationship between groundstone and elevational factors, or with artifact types, other than ceramics. However, the relationship between ceramics and groundstone is statistically weak, and is possibly the result of sampling bias.

Despite the lack of significance in the relationships, it can be suggested that, based on the slope of the first model (b=-9.4E-04) and correlation (r=-.122), there is a decrease in the amount of groundstone in archaeological sites as elevation increases. This may suggest that the lower elevational class saw a heavier use for activities associated with groundstone, but it should be reiterated that no significance was found. This implies that there is not a simple summer/winter habitational association, but possibly one involving processing. The inclusion of the tool variables of ceramics, cores, knifes, scrapers, bifaces, preforms, drills, modified flakes, lithic debris, and projectile points increased the strength of the relationships with groundstone from R=0.122, for elevation, to R=0.342 for all the tools. Further, the relation was negative for all tool types except ceramics, lithic debris, and projectile points. This would suggest that the probability of finding groundstone at a site will increase if ceramics, lithic debris, and projectile points are encountered. The positive relationship with ceramics, lithic debris, and projectile points further suggests that groundstone is associated with processing. Furthermore, this relation seems independent of elevation. Another complementary explanation for the lack of relations is the possibility of locations of groundstone being associated with multicomponent sites. The increase in strength of the relationship would seem to tentatively substantiate traditional views concerning groundstone. This relationship might also suggest that the peoples who utilized these sites may have been mobile foragers, where the structure of the site would reflect one of general use.

Table 5: Regression Model 4

Variables Entered/Removed[b]

Model	Variables Entered	Variables Removed	Method
1	presence of preforms, presence of lithic debris, elevation ASL of the site in ft., presence of projectile points, cores present, presence of bifaces[a]		Enter

a. All requested variables entered.
b. Dependent Variable groundstone present.

Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.217[a]	.047	-.007	10.38

a. Predictors: (Constant), presence of preforms, presence of lithic debris, elevation ASL of the site in ft., presence of projectile points, cores present, presence of bifaces.
b. Dependent Variable: groundstone present.

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	559.546	6	93.258	.866	.523[a]
	Residual	11311.02	105	107.724		
	Total	11870.56	111			

a. Predictors: (Constant), presence of preforms, presence of lithic debris, elevation ASL of the site in ft., presence of projectile points, cores present, presence of bifaces.
b. Dependent Variable: groundstone present.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients			95% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	5.084	3.512		1.448	.151	-1.879	12.047
	elevation ASL of the site in ft.	-7.6E-04	.001	-.099	-.956	.341	-.002	.001
	cores present	-1.062	2.173	-.051	-.489	.626	-5.372	3.247
	presence of bifaces	-3.029	2.446	-.140	-1.238	.218	-7.878	1.820
	presence of projectile points	3.588	2.313	.174	1.551	.124	-.998	8.175
	presence of lithic debris	1.120	2.111	.052	.531	.597	-3.065	5.305
	presence of preforms	-.902	6.186	-.014	-.146	.884	-13.169	11.364

a. Dependent Variable: groundstone present.

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