COLORADO STATE UNIVERSITY
FIELD ARCHAEOLOGY
2005

Overview

During May-July, 2005 the Colorado State University (CSU) field archaeology class would like to continue discovery and documentation of archaeological sites on the Shoshone National Forest. Since 2001, this class has recorded nearly 150 previously unknown sites on the forest and is in the process of preparing and submitting documentation (site forms, MA theses, conference papers) to Allen Madril (Shoshone National Forest archaeologist).

In 2005, we would like to undertake four primary research goals. First, to **conduct limited test excavations** (Figure 1) at one archaeological site (48PA2772) on the Shoshone National Forest (not in Washakie Wilderness). These test excavations would seek information on:

- Assessing potential for buried deposits
- Seeking materials for radiometric dating of the occupation
- Collecting obsidian for source analysis
- Evaluate preservation of faunal remains and asses their potential for adding information of subsistence practices and seasonality of site use
- Provide a fine-grained systematic sample to evaluate relationships between surface artifact frequency and nature of subsurface deposits.

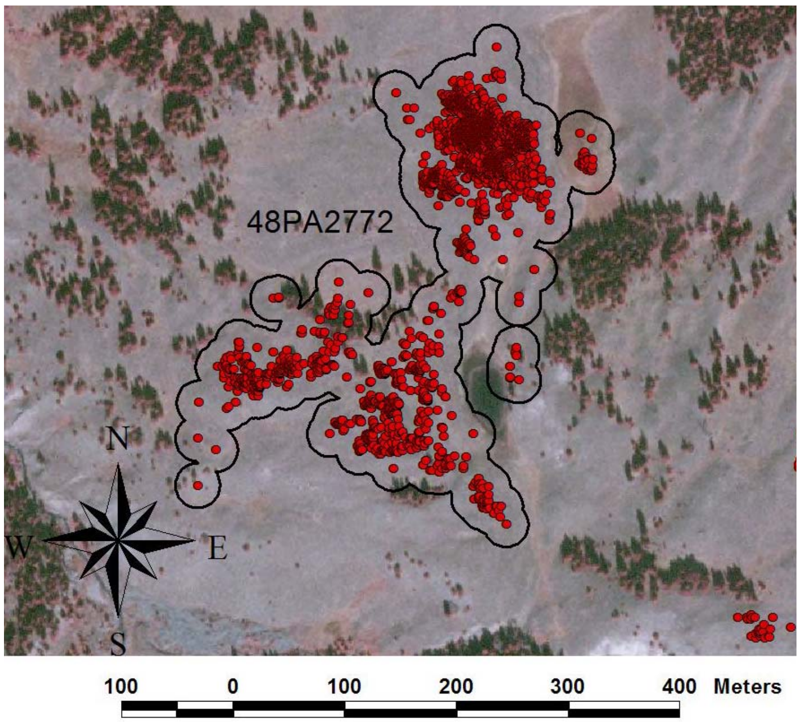

Figure 1. Site 48PA2772 artifact distribution and buffer-defined site boundary.

Second, to **conduct a small block survey** (85 ha) near 48PA2772 (Figure 2). This full coverage survey at 5 m crew spacing will add a good deal to our understanding of artifact density across the local landscape. This setting has proved to be very rich archaeologically and although sites have undergone some incidental artifact collection in the past, the area still had some very significant surface archaeology. Effective management of this resource requires the type of solid, baseline data provided by this survey. The survey will be primarily non-collection (permission to collect, analyze, and return obsidian pieces to determine source locations will be requested), using in-field documentation methods comparable to those used for the last three years.

Third, we would like to be able to **salvage a stone-filled hearth** that is being destroyed by erosion of the creek at site (48PA2811). This site is on the Washakie Wilderness is one of the few sites with deeply stratified deposit identified during our 3-year project. The hearth, which is over 1 m below the present ground surface and adjacent to finely stratified deposits containing charcoal and bison bone to a depth of nearly 2 m, is exposed in the cutbank of the creek and appears to have had approximately 50% removed by erosion and slumping. Indications are that unless action is taken soon, the remainder of the feature will be destroyed. All activities at the site would be restricted to the cutbank face and would entail opening no archaeological test units originating from the contemporary surface. A basic stratigraphic profile of the cutbank would be completed, the hearth mapped, photographed, and its contents removed for flotation analysis. In addition, other samples of charcoal for ^{14}C dating will be collected from the profile. This site may have important information about regional chronology and subsistence, some of which is under immediate threat of destruction.

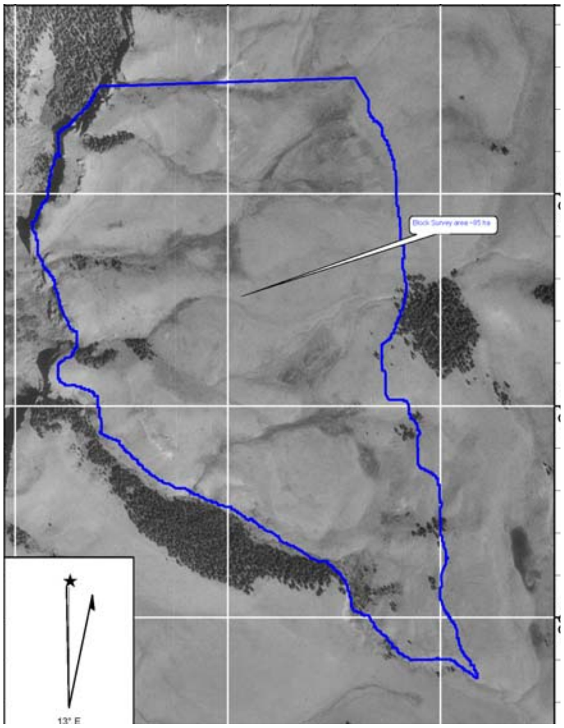

Figure 2. 2005 Block Survey Area.

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Finally, we would like to continue our program **of surveying along pack trail corridors** in the Washakie Wilderness. Specifically, we would like to survey established trails and document archaeological sites potentially impacted by use of these trails.. These surveys will be non-collection and will collect basic information for managing heritage resources in the back county.

Schedule

The field class operates in four 10-day long field sessions. In 2005 the dates of these sessions and proposed locations are:

- ***Session 1*** May 24-June 2 (48PA2811 salvage and trail survey)
- ***Session 2***: June 7-16 (48PA2772 testing and survey)
- ***Session 3***: (testing 48PA2772 and survey)
- ***Session 4*** July 5-14 (Wilderness trail Corridor survey)

Summary reports (area surveyed, number of sites, key diagnostic artifacts located) will be provided at the end of each 10-session and site reports will be completed and submitted during the fall and winter of 2005-2006. Preliminary reports on the summer's work will be presented at the 63rd Plains Anthropological Conference in Edmonton, Alberta, Canada (October 19-23, 2004) and at the 71st Annual meeting of the Society for American Archaeology (April 26-30, 2006 San Juan, Puerto Rico). In addition, information from the 2005 season will provide basic data for at least two additional MA theses for students from the Department of Anthropology, CSU. Copies of all of these materials (conference papers and MA theses) will be provided to the Shoshone National Forest as they become available.

Personnel

All activities of the field class will be under the supervision of Professor Lawrence C. Todd. Dr. Todd will be in the field at all times during the project and will be overseeing the day-to-day operation of the research project. Todd has over 30 years archaeological field experience, much of it on the northwestern Plains and is on the faculty of both the Department of Anthropology and the Graduate Degree Program in Ecology at CSU. In addition, he is a native of Meeteetse, Wyoming and has a long-term familiarly and with and commitment to the Greybull River drainage. Todd will be assisted in the field by a graduate teaching assistant (A. Bohn) was also the projects teaching assistant in 2004 and is familiar with the area and the research protocols. Bohn is working on an MA thesis on obsidian source analysis of materials from the Greybull. CSU summer programs provides funds for a field camp manager who is in charge of the logistics of meals and camp safety/maintenance. The camp manager (L. Melsen) participated in the 2004 field season as a student. Up to five other graduate students will be present for parts of the summer and may begin collection of data for MA theses. The bulk of the crew will be undergraduate anthropology majors from CSU. In addition, we have 2 students joining us from Stony Brook University (New York) and one form Iowa State University. There are eleven undergraduate students and 3 graduate students enrolled in the field class.

48PA2772 Testing

Based on surface documentation in 2003, 48PA2772 is a multi-component site with evidence of use beginning in the Early Archaic and extending through the Late Prehistoric. Chronology of site used is based on projectile point cross dating of the 224 arrow and dart points recorded on the surface (Burnett 2005). Initially, the site was recorded as 5 separate sites, but once the artifact distributions were plotted, it became clear that these were more productively viewed as localities within a single site (Figure 1). For convenience in discussing areas of the site, the original temporary field numbers are retained as Locality names within 48PA2772 (Figure 6).

Based on surface artifact distribution, the site covers nearly 50,000 m^2. There seems to be some horizontal differentiation between temporally distinct uses of the site area (Burnett 2005), but initial documentation did not evaluate the potential for buried deposits. Several apparent features, presumably hearths, were recorded and one cluster of burned

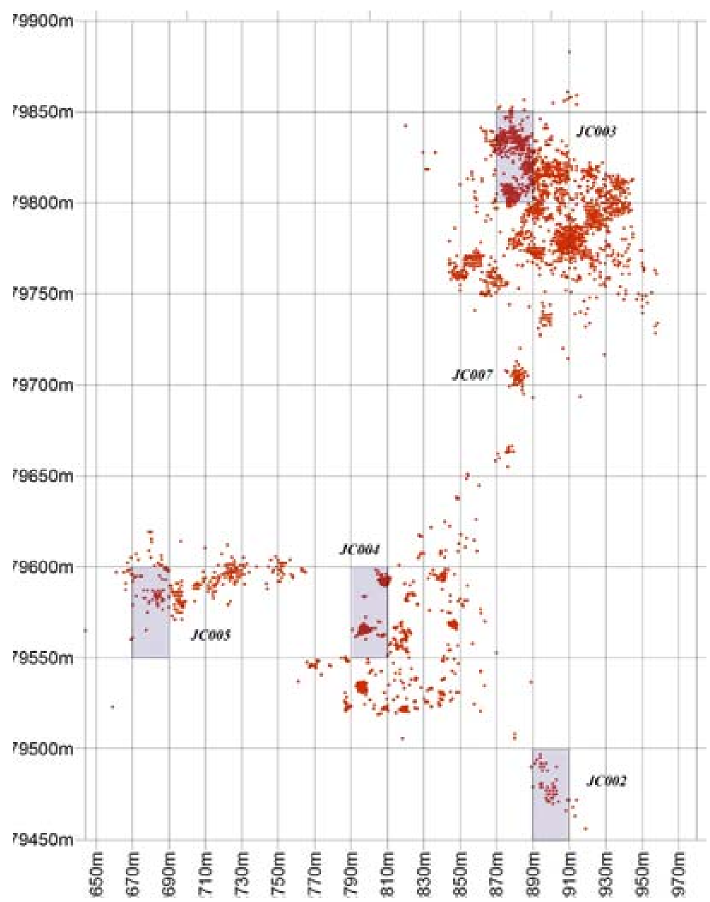


Figure 3. Site 48PA2772 with locations of 20x50 m survey plots for intensive surface documentation, sub-surface testing

bone was documented. Testing of this site would have five goals (noted in Overview section).

Provenience control for mapping all testing units and for recording the location of diagnostic artifacts (only items from excavation areas will be collected – other surface items may be mapped and documented, but will be left in situ) will be based on WGS84 UTM coordinates. A static GPS control network will be established over a minimum of five control points across the site and surrounding area. Ashtech Locus receivers will be mounted on tripods over control points for synchronized recording epochs of at least 5 hours duration. After post-processing these data, control point provenience will have been established at sub-centimeter accuracy. These control points will then be used as base locations for EDM total station mapping (using two Sokkia SET4B total stations with SDR33 data recorders) or for using the Locus GPS units for stop-and-go kinematic mapping. At least two off-site control points will be marked with aluminum survey caps stamped with the control point designation and provenience.

Surface Documentation. Before any excavation is undertaken, all areas proposed for excavation will be surveyed at a transect spacing of about 70 cm. The total area of this survey will be 4000 m2 (8% of the site surface area) and will be restricted to four 20X50 m sample plots (Figure 3). Items found during this survey will be documented and have there locations recorded with EDM. The only items to be collected during this phase will be items on the surface of areas to be included in the 40 m^2 Modified-Whittaker sample units (see below). Next, 130 m2 nested within the sample plots will be re-surveyed by a crawling survey (Burger et al. 2004). All items recorded by this second intensity of survey will again be recorded, and any additional items found in the plots slated for excavation will be mapped and collected.

Any diagnostic artifacts encountered off of the survey plots will also be mapped and documented (many of these may have been previously recorded during the 2003 survey, but re-recording and relocating artifacts is an important component of monitoring the condition of the archaeological site). Large (>10 mm) or diagnostic obsidian items may be temporarily removed from the site for XRF source analysis and then returned to their find spots (depending on amount of time required for analysis, this return may not take place until summer, 2006).

Subsurface Testing. In order to provide information on the nature and extent of subsurface archaeological deposits, we propose testing of less than 1% of the site area. A 1% sample of a 5 ha site would require excavation of 500m^2, which seems excessive in terms of the amount of field time that would be required at the site. A sample of 0.12% (60 m^2) would seem manageable during the 15 days we plan to spend in the site area. This sample will be implemented in two ways. First as a series of 40 50x200 cm test units positioned within four Modified-Whittaker nested sample plots (Burger et al. 2004; see additional description of this approach in the Trail Corridor section, below). Plots

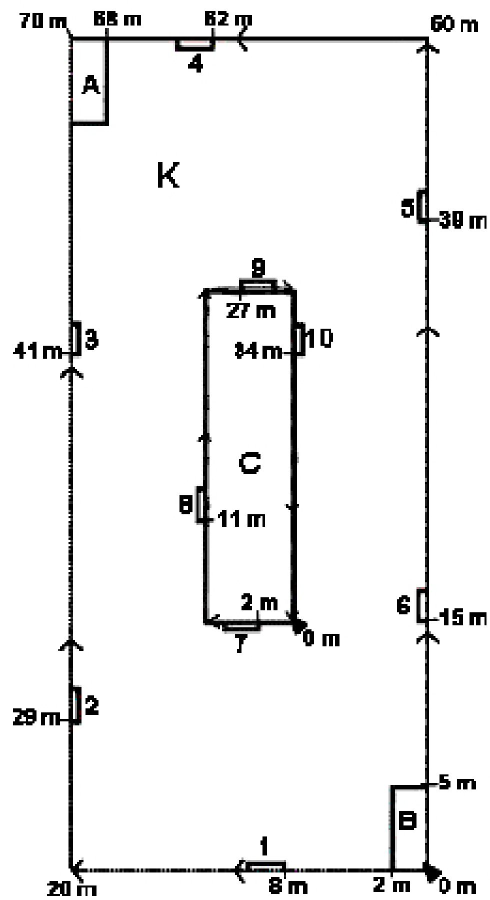


Figure 4. Lay-out of Modified-Whittaker plot (from Burger et al. 2004).

locations (Figure 3) have been selected to include samples of each of the four largest localities. This will result in a 0.08% sample (40m^2) of the documented surface area of the site. Sediments will be removed from these plots (Figure 4, 1-10) using shovels and trowels to a depth of 10 cm in 5 cm levels. In instances when artifact density exceeds 5 items/m^2, half of the excavation plot (50X100 cm) may be taken deeper in order to more fully evaluate subsurface potential. Any items found in situ will have provenience recorded with EDM total station. All materials from these plots will be screened through 1/8” dry screens, which will be picked in the field and all chipped stone, bone, or other artifactual material collected. Should features be encountered within these plots they will be fully excavated by hand with items > 10 mm piece plotted.

The second type of subsurface testing will be two larger contiguous blocks (each 2x5 m). These two block excavations (total 20 m^2 or 0.04% sample) will be positioned either in reference to surface artifact characteristics (e.g., placed in areas of high artifact density and/or concentrations of burned bone) suggestive of buried features, which could yield materials for chronometic dating or produce faunal remains for subsistence/seasonality studies. All excavations in the blocks will be done by hand with and the documentation protocol will seek to record in situ provenience data (using EDM total station) for all items greater than 10 mm in maximum length). Ideally, a system for waterscreening materials can be developed; other wise sediments will be dry-screened through 1/8” screen. All screening will be done onto traps to both limit the impacts of the screened materials on the site surface and to ensure that as much of the fill for excavation areas as possible is available for backfilling.

The combination of 70 cm spacing walking survey, crawling survey, and excavation of sample of these dual-intensity survey areas will allow us to build more reliable models of the relationships between surface artifact visibility and subsurface

In addition to the excavated subsurface testing, which is designed to give data on artifact and feature locations and frequency, we will also be using a soil probe (probe diameter <2.5 cm) to asses sediment depths across the site area.

Block Survey

An area of approximately 85 ha will be surveyed overlooking a major drainage. The northern boundary of this survey block will be the south of a section line, which is the Forest Boundary. The western boundary will be the tops of the cliffs marking the eastern margin of the drainage and the eastern boundary will be approximately at the 2925 m (9600 ft) contour. The southern boundary is marked by an intermittent (Figure 2).

Survey will be conducted by crews walking parallel transects at a spacing of 5 m. A standard speed of coverage will be maintained at about 3 km/hr. Any artifacts (or suspected artifacts; crew will not stop to examine individual pieces) will be marked with red pin flags. Depending on artifact density, in-field documentation may begin before the entire area is surveyed. If artifact density seems to warrant the added documentation, one or more Modified-Whittaker plots (without subsurface testing) may be recorded within the survey area.

Sites will be defined as any occurrence of at least 2 or more prehistoric items within 30 m of each other and temporary site numbers will be assigned, and data collected for completion of Wyoming SHPO site forms. Historic materials (including recent trash) will also be recorded, and if clusters of materials over 50 years of age are found, these will also have data collected for site reports. Other than limited numbers of obsidian for source analysis and recent trash, no items will be collected.

In addition to basic in-field documentation, diagnostic artifacts will be photographed, selected specimens will have latex molds made, and proveniences recorded at sub-meter accuracy using either Locus Kinematic GPS, Sokkia SET 4B total station from GPS established control point, or with Trimble GeoXT GPS.

Hearth Salvage

While conducting surface documentation of site 48PA2811 in 2004, an exposure of fine-grained, laminated Holocene sediments were noted in the near-vertical cutbank exposed by downcutting of the creek (Figure 5). Closer examination of this area was prompted by discovery of several bison bones in the fine-grained sediments approximately 2 m below the modern ground surface (Figure 6). While examining the cut for other materials, a rock-filled charcoal stained hearth feature that had been truncated by the creek (which currently runs about 10 m below the site surface) was noted. Although there are no artifacts observed on the surface above this hearth, it is included as part of site 48PA2811 since it seems likely that the hearth represents buried manifestations of the materials exposed on the surface further to the east (Figure 5).

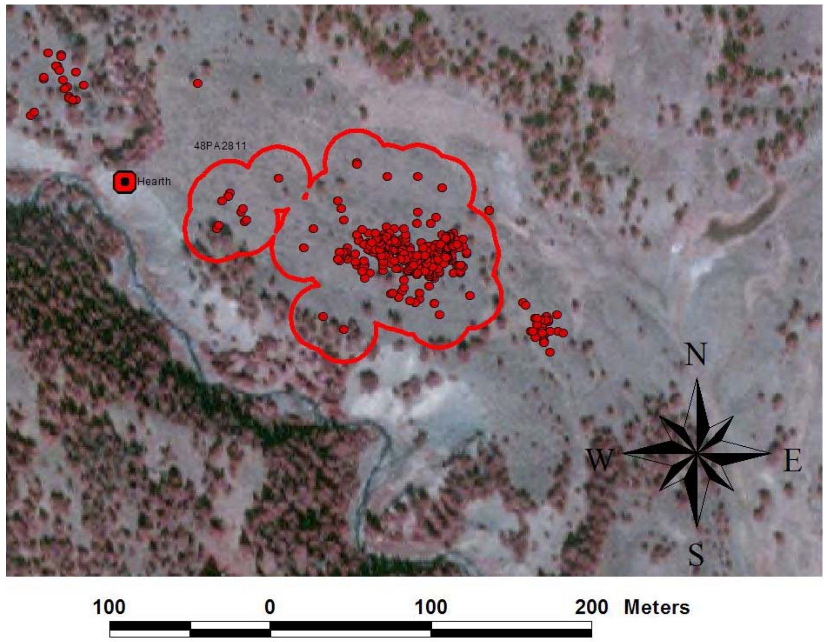


Figure 5. Site (48PA2811 with surface artifact scatter and buffer-defined site boundary).

The hearth is approximately 50 cm wide and about the same depth. It appears that at least half of the feature has already been destroyed by erosion, and the rest is threatened by slumping of the cutbank face in which it is located. This feature has a high potential for providing a solid chronometric date (^{14}C) for at least one occupational episode at 48PA2811, and it's contents may also provide valuable information on prehistoric subsistence at this large, high elevation (2540 m) site. Given the near-vertical, deeply incised nature of this cutbank, there is no feasible way to stabilize this feature, and unless salvage is undertaken soon, significant information will be lost.

Figure 6. Fine-grained, laminated sediments at 48PA2811.

In order to lessen amount of information loss, to place the hearth into a better contextual understanding of the site as a whole, and to lay the groundwork for monitoring the site in the future, we propose several activities during the 2004 field season.   First, a measured profile of the cutbank will be made using a combination of static GSP survey to establish control points and total station EDM mapping (see 48PA2772 testing above).   In addition to gathering provenience data on the hearth, these data can be used to monitor site erosion in the future. In addition to providing a basic stratigraphic section, this profile will also be used to record the locations of any bone or artifacts found during a closer examination of the face.

Once the hearth is documented within it's stratigraphic setting, it will be measured, photographed and the major constituents of its contents (i.e., the hearth stones) mapped with the EDM and removed . Stones from the hearth will be weighted, measured, and discarded. All fine-grained fill will be collected, bagged and removed from the site for flotation processing.   While removing the fill, any artifactual materials found in situ will be point-provenieced (sub-centimeter) using the total station. All work on the feature will be conducted on the face of the cut. No excavations will be originated from the contemporary ground surface.

In order to better understand the general site chronology and depositional history, the profile face will be examined for other charcoal chuck, bone, or artifactual material.   Larger charcoal fragments (> 5 mm) will be mapped and collected. Any bone or cultural material in danger of slumping will be mapped and collected from the face.

Surface documentation of the artifact cluster to the east of the site (Figure 5) provides us with some basic assemblage level information on the site. These data will be supplemented with the documentation of a 20X50 m Modified-Whittaker plot (surface documentation only, no subsurface testing).   Since the site is bisected by a trail, it is in potential danger of a range of anthropogenic stressors (e.g., camping, artifact collection, grazing) and is a good candidate for a periodic, systematic monitoring program. A fully documented Modified-Whittaker plot with artifact locations mapped with EDM total station would seem to be an appropriate unit that could be monitored to assess site condition.   Missing artifacts, or decreases in artifact frequency could serve as triggers for implementation of more protective management policy.   As illustrated in Figure 7, we see monitoring of archaeological materials as being a significant and necessary component of all wilderness monitoring programs.

Wilderness Trail Corridor Surveys

Effective management and protection of resources requires baseline data. Since 2002, our survey program has focused on collecting information on archaeological materials that seem most vulnerable to damage by anthropogenic processes – artifacts and sites along the trail corridors that bring peopling into and through the backcounty.   While impacts will occur exclusively along trail corridors, and extensive off-trail surveys are also required, trail surveys are an effective way to gather a first look at a regions archaeology and to asses where likely impacts might occur.   During the 2005 field season, we'd like to continue our trail corridor survey program, both the add to our basic understanding of the archaeology of the high country, but also to help provide basic baseline data to assist the Forest Service in developing and effective adaptive management program for heritage resources.

Baseline Data Acquisition.

We envision archaeological baseline data being of three varieties. First, there is a need for large-scale general information on coarse-grained regional patterns. In terms of the Upper Greybull, we are presented with a nearly blank slate, with very little understanding of the basic structure to develop a reasonable sampling framework. While we anticipate implementing a more systemic sampling program designed to identify the gaps in our understanding of regional patterns, we first need to an approach that allow us a glimpse of the overall patterns. As discussed below, we argue that an initial examination of regional pattern can most effectively be accumulated by surveying along established (although not necessarily actively maintained) trail systems. We currently have a student working on GIS travel costs models for the area, but until these are available, we will make the assumption that contemporary trail systems which are in part based on game trails, and potential on prehistoric trail systems are a reasonable first approximation of trail and error derived best travel routes though the rugged terrain and may represent a finer-grained solution than a model derived using 10 m DEMs. The implementation of a corridor or transect based survey to provide an archaeological rapid assessment is basic archaeology, and although the specifics will be outlined in Field Methods section, the fundamental concepts require little further discussion here.

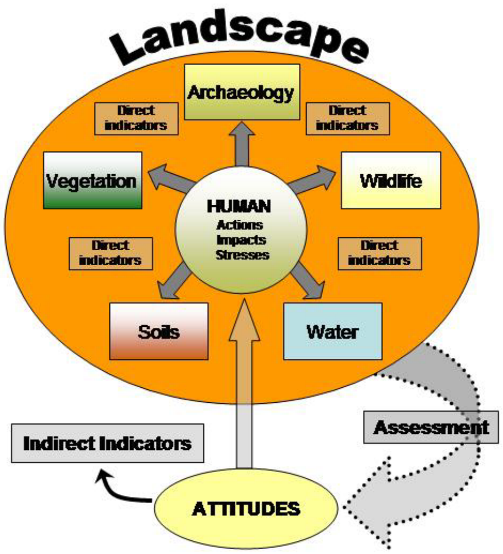


Figure 7. Archaeological monitoring of wilderness resources and stakeholder attitudes.

The second type of baseline information needed for both research and management is to be derived from limited test excavations and/or more detailed surface documentation at six localities. Excavation data add important contextual information for assessing the surface archaeological record and as with basic survey, are the bread-and-butter of archaeology and require little conceptual justification. Specific methods will, however, be described below.

The development of the third variety of baseline data – data to monitor change in archaeological condition – is not as common and thus requires slightly more discussion. At the most simplistic level, it might be suggested that artifact frequencies or key diagnostic artifacts could be recorded as a baseline condition, with subsequent monitoring assessing whether surface artifact frequencies had changed or if ratios of diagnostic to non-diagnostic artifacts had changed (which might be the case of projectile points or other formal tools were being selectively collected). However, without other classes of information on, for example, vegetation cover, recent erosion, evidence of recreational use, or grazing intensity, it would be difficult to evaluate changes in observed surface abundance in terms of probable causes.

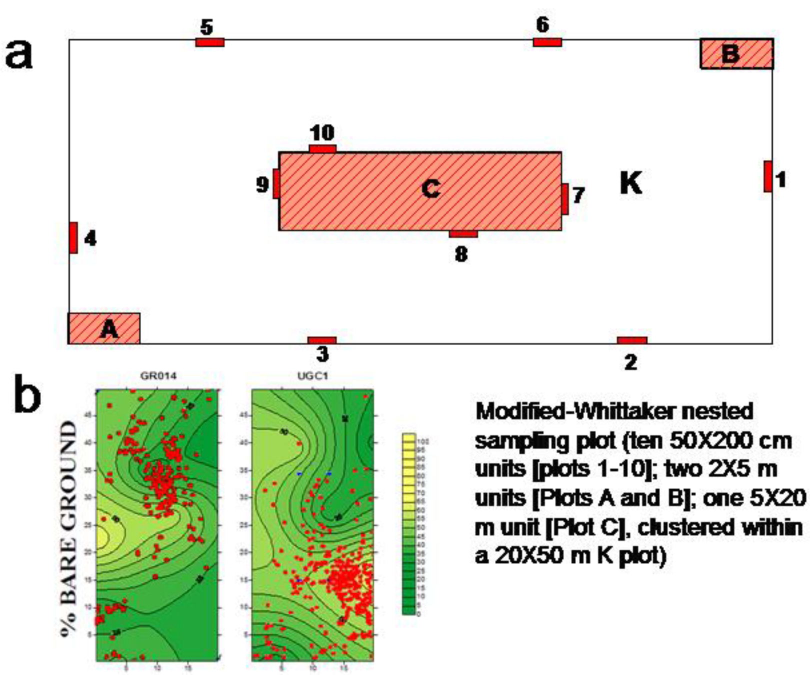
In working to develop appropriate methods for monitoring archaeological sites, we have relied heavily upon better developed approaches of ecological monitoring and assessment protocols (e.g, Noon 2003). Fundamental to such assessment is the need to specify both what processes are likely to influence the system under investigation (stressors) and to specify what attributes of the system can be used to record such influences (indicators). Building on our perspective of landscape ecology, we argue that archaeological monitoring must minimally address three broad categories of stressors: anthropogenic, biotic, and abiotic (Figure 7). Within each of these general categories of stressors, we have identified subsets of processes that seem in most immediate need of monitoring and assessment as well as proposed indicators to be recorded as part of our baseline data collection.

Modified Whittaker sampling plots. Implementing field methods to evaluate indicator condition is a different operation than conducting fieldwork to locate artifacts. In previous studies (Burger 2000; Burger et al. 2004), we've described using nested sampling plots used in ecological studies as an approach to investigating multi-scale spatial properties of archaeological artifact distributions (Figure 8). While still convinced of the utility of these small-scale plots as building blocks for beginning to recognize larger-scale artifact/area relationships, we also see these plots as providing a reliable way to begin a program to monitor archaeological landscape properties. For the 2005 project, we intent to position on such plot on each archaeological site encountered during the trail survey with more than 100 surface artifacts. This will allow not only a refined view of artifact recovery rates and assemblage properties; it will also build a framework within which to capture data relevant for subsequent monitoring.

As illustrated in Figure 8a, these plots consist of 10 1m^2 subplots (1-10), 2 10 m2 plots (A, B), 1 100 m2 plot (C), all nested within a 1000 m2 K-plot. To document artifact recovery at different survey intensity values, we first survey the K plot with crew members spaced at slightly less than one meter apart moving across the plot at a constant rate of about 3 km/hr. Artifacts (both prehistoric and historic/recent items are recorded) located during this survey are mapped, documented, marked with a sharpie dot, and replaced at the spot where they were found. A separate crew then returns to the plot and conducts a higher intensity survey, crawling with shoulders touching, of the smaller 1-10, A,B, and C plots (total of 130 m2) and again documenting and mapping the artifacts, noting which are marked with sharpie dots ('recaptured' artifacts) and which are newly discovered. While the crawl surveys typically find more, and sometimes considerably more, artifacts than closely spaced walking transects, the goal of the sample is not to discover more items per se, but to calibrate the results of surface documentation using coarser-grained sampling. The modified-Whittaker plot allows us to asses "what we may have missed."

As illustrated in Figure 8b, it also allows us to systematically record information of fundamental relevance for documenting other non-archaeological properties of the surveyed landscape. While the ultimate goal of the bundled research perspective outlined above is to dovetail archaeological resource monitoring with collection of data on other landscape attributes such as threatened, endangered, or invasive plant species, plant and soil biogeochemistry, mammal and bird abundances, etc., for the initial

Figure 8. Modified-Whittaker plot with labeled subplots (a) and examples of artifact distribution in relation to percentage bare ground documented in two Modified-Whittaker plots on the Upper Greybull (b).



documentation of each plot, we will record only variables most critical for assessing the nature and condition of the archaeological record. Therefore, once the basic archaeological documentation is completed, the additional attributes recorded within the 1-10 and A, B plots will include: bare ground percentage, vegetation height, %grass, % sage, % trees, #cervid scat, # bovid scat, maximum stone size, average stone size, % rodent mound backdirt cover, and maximum depth of erosional rills. While by no means comprehensive, this group of attributes, in addition to other spatial variable that can be developed from plot GIS data such as distance from plot to trails, streams, and timber, will provide information to assess surface archaeological content and to provide baseline data for indicators of anthropogenic, biotic, and abiotic condition of the site.

Trail Corridor Survey Methodology

The trail corridor surveys will be conducted by 5-person crews within an approximately 20 m wide transect (5 m spacing) centered on existing Forest Service trails. In many areas of rugged topography and steep slopes, transect widths will have to be decreased. Each crew member's location will be recorded using Garmin Rino 110 (WAAS enabled) handheld GSP receivers (track-logs downloaded daily) so that specific transect widths (± 5m) will be recorded. The trail center line will be recorded using Trimble GeoXT handheld GPS units (submeter, real-time accuracy). All artifact locations will be recorded using the Trimble units, which will also be used to record artifact attribute data into GIS tables. At each archaeological site (following Wyoming SHPO definition of 2 artifacts located less than 30 m apart), the trail transect will be abandoned and the immediate vicinity surveyed at ~1 m transect intervals with all artifacts being marked with pin flags until either artifact number proximity exceeds 30 m, or until clear topographic features that would allow clearly defined boundaries to be defined (i.e., cliff, stream channel, gully). Once this finer-grained survey is completed, in-field coding will be completed by two, 2-person teams using the GeoXTs. In addition to UTM provenience data, artifacts will be measured, assigned to lithic raw material class, described in terms of color, opacity, and modification/retouching (see http://www.greybull.org/ArtCodes.pdf). Diagnostic artifacts will be photographed, and silicone rubber molds made of all projectile points (these basic documentation protocols have been developed and refined during three field season's work in the area). In addition to artifact data, information to complete Wyoming SHPO site report forms will be collected using HP iPAQ PDA's. All sites with greater than 100 artifacts will be targeted for a follow-up team to set out and record a Modified-Whittaker sampling plot. In addition to the archaeological documentation, all evidence or historic, recent, or contemporary use of the area (e.g., trash, fire rings, bear poles, cairns, etc.) will also be recorded.