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Introduction

A Class II cultural resources inventory of the Department of Energy (DOE) Rocky Flats facility will be undertaken by Burney and Associates, Inc. The COE has determined that an intensive reconnaissance of 25% of the facility's 6,500 acre surface area (1,625 acres) is adequate for the Class II effort. The following text outlines the strategy and rationale for the selection of sample quadrats within the 6,500 acre study area.

It is usually assumed, and generally borne out by investigation, that the distribution of archaeological sites within any universe is nonrandom and that site locations are dependent, to varying degrees, on certain environmental variables. It is further assumed that the independent environmental variables are discrete and quantifiable (cf Binford 1964). The specific environmental variables on which site locations are dependent vary among different cultural and physiographic regions. For example, soil type is considered a significant factor in the distribution of prehistoric horticultural sites in the southwestern United States (Chenhall 1975), but exerts no measurable influence on the location of nonhorticultural hunter-gatherer sites in northwestern Colorado (Grady 1980). Therefore, it is important to clearly define the culturally relevant environmental data within a given universe prior to the formulation of sample selection criteria. Homogeneity or heterogeneity of environmental features within the universe must also be taken into consideration.

Environmental Features Within the Study Area

The number of previously recorded sites within the study area is too small to indicate potential correlations between settlement patterns and environmental factors. However, the number of possible correlations is limited by the number of environmental features present within the study area. Examination of topographic maps and aerial photographs indicates the study area may be divided into 3 major environmental features:

1. East to neartheast-facing ridge tops,
2. Ridge slopes and,
3. Drainage bottoms.

Each of these features may be subdivided into 2 to 3 microenvironmental features based on land mass, directional exposure, and drainage pattern. The subdivisions are as follows:

1. East to northeast-facing ridge tops
 - A. One-quarter mile or greater in breadth.
 - B. Less than one-quarter mile in breadth.
2. Ridge slopes.
 - A. North-facing
 - B. East-facing.
 - C. South-facing.
3. Drainage bottoms.
 - A. Head or place of origin.
 - B. Terraces along main channel.
 - C. Confluence of two or more drainages.

It is assumed that each of these subdivisions represents a differentiated microenvironment. For example, north-facing slopes receive significantly less sunlight and more moisture than south-facing slopes. These factors usually result in significant differences in mean site temperature and in vegetational cover (Cacek 1971). The land mass of a ridge top will have some bearing on both the volume and types of resources immediately available. Finally, the location of archaeological sites in portions of the Colorado Front Range is influenced by proximity to drainage confluences. Site formation processes and the natural preservation of archaeological data also are largely dependent upon this and other hydrologic factors (Grant et al 1988).

Selection of Sample Quadrats

One of the project goals is to determine which environmental features exert the greatest degree of influence on local settlement patterns and how this influence manifests itself in the spatial distribution of archaeological sites. Sites are expected to cluster within certain environmental settings and to avoid others. For example, if a given environmental zone comprises 30 % of the survey area, but 60% of recorded site occur within that zone, a certain degree of correlation is suggested.

Eight environmental features or zones are delineated within the study area, as outlined above. Determining the potential degree of influence each environmental feature exerts on site locations within the study area requires that sample survey coverage reflect the proportional occurrence of each feature or zone within the study area. In other words, if a particular environmental feature or zone comprises 15% of the study area, then 15% of sample survey coverage should occur within that zone.

In this manner sample survey coverage is stratified according to eight environmental or microenvironmental factors with the amount of coverage that occurs within each stratum dependent upon the proportional occurrence of each stratum within the study area (universe). The proportional occurrence of each stratum within the study area is as follows:

Ridge tops one-quarter mile or greater in width:	33%
Ridge tops less than one-quarter mile in width:	22%
North-facing slopes:	10%
East-facing slopes:	8%
South-facing slopes:	10%
Drainage bottom:	13%
Drainage heads:	2%
Confluences:	2%
Total:	100%

Eighty percent of Class II survey coverage (1,300 acres) will be nonrandomly selected from areas representing the above environmental strata and in the proportions listed above. For example, 33% of 1,300 acres, or 429 acres, will be selected on large ridge tops while 10% of 1,300 acres, or 130 acres of survey coverage, will occur on east-facing slopes, and so on. Survey areas will be selected subjectively on the basis of the greatest likelihood of encountering cultural resources. Factors such as ground visibility, prior disturbance, and access will be taken into account. The aim of this sampling strategy is to recover the greatest volume of representative data within the sample constraints outlined above.

The remaining 20% of Class-II survey coverage, or 325 acres, will be comprised of 8 randomly selected 40 acre survey quadrats. These randomly selected survey quadrats will aid in determining the reliability of results from the nonrandom stratified sample.

The results may also indicate whether the use of purely random sampling methods is useful within the study area and similar local environments.

A difference of 5 acres is left after the 40 acre quadrats are surveyed. It is expected that at least this much acreage will be involved in the inspection and re-recording of previously noted cultural resources within the study area.

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